Conventions

December 17, 2020

Contents

1 Standard Machine Names

The following machine names are suggested:

- aug
- ftu
- iter
- jet
- mast
- tcv
- tore_supra
- west

2 Physics Conventions

The ITM-TF has agreed on a variety of conventions to facilitate the integration of the code modules across EFDA.
In the following the most important conventions are explained in detail to remove confusion and avoid ambiguity. For more physical detail than that represented here see F Hinton and R Hazeltine, *Rev Mod Phys* **48** (1976) 239-308, or R Hazeltine and J Meiss, *Plasma Confinement* (Addison-Wesley, 1992).

2.1 Coordinate System

There are generally two choices for defining a right-handed coordinate system in a toroidal geometry with the following coordinates:

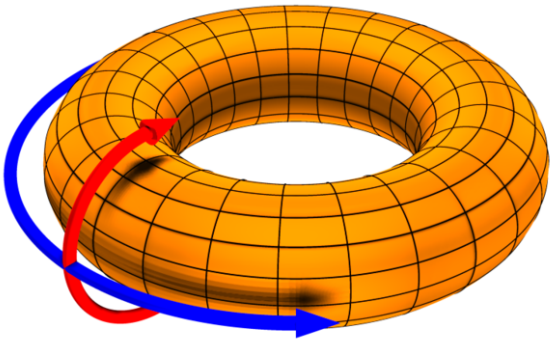
- major radius R
- vertical heights Z
- toroidal angle ϕ

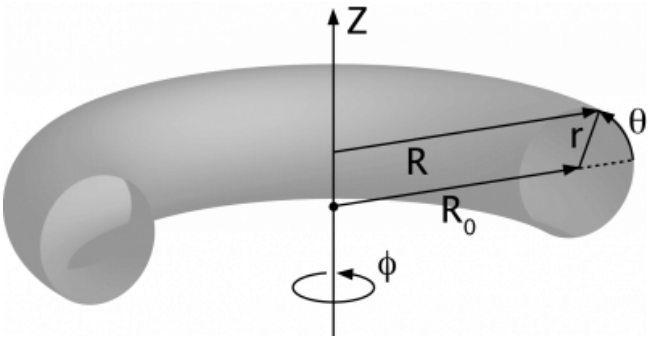
Remaining consistent with ITER, the ITM-TF has chosen to adopt the right-handed system

$$(R, \phi, Z)$$

i.e. R is to the right, Z is upwards, and ϕ points into the plane on the right-hand side of the torus (i.e. mathematically positive). Looking from above, the toroidal angle is counter-clockwise, i.e. mathematically positive.

The following figures demonstrate the orientation of the toroidal angle ϕ and the poloidal angle θ :





source:
http://www-fusion.ciemat.es/fusionwiki/index.php/Toroidal_coordinates [1]
http://en.wikipedia.org/wiki/Toroidal_and_poloidal [2]

2.2 Representation of the Magnetic Field and Current

Generally, the magnetic field is described in terms of two scalar fields as it is divergence free. If the field is also axisymmetric then MHD equilibrium demands these are functions of each other. In the ITM-TF the relevant quantities are $F_{\rm dia}$ and Ψ and the representation is

$$\mathbf{B} = F_{\rm dia}\nabla\phi + (2\pi)^{-1}\nabla\Psi \times \nabla\phi$$

where the factor of 2π is to have Ψ

one and the same with the poloidal flux in Webers (see below).

The current given by Ampere's law is

$$\mu_0\mathbf{J} = \nabla F_{\rm dia} \times \nabla\phi - (2\pi)^{-1}(R^2\nabla \cdot R^{-2}\nabla\Psi)\nabla\phi$$

The respective covariant toroidal components are useful forms:

$$B_\phi = F_{\rm dia} \qquad \mu_0 J_\phi = -(2\pi)^{-1}(R^2\nabla \cdot R^{-2}\nabla\Psi)$$

where the latter is often expressed in terms of the "delta-star" operator, $\Delta^* = R^2\nabla \cdot R^{-2}\nabla$.
These are not the toroidal field and current but the toroidal field and current multiplied by R respectively. The total plasma current I_p is the integral of J_ϕ/R

over the poloidal cross section (usually, but not always, over the closed flux surface region only).

2.3 Poloidal and Toroidal Fluxes

The toroidal flux Φ is the integral of B_ϕ/R over the region enclosed by the flux surface. Due to axisymmetry it is also a volume integral

$$\Phi = \oint d^3V \, (2\pi R^2)^{-1} \, F_{\text{dia}}$$

All volume integrals are understood as integration over the region enclosed by the flux surface. They are therefore flux quantities (pure functions of Ψ). The units of Φ are volt-seconds, or Webers (Wb).

The poloidal flux is Ψ due to the construction of $\mathbf{B}$. The factor of 2π

ensures this is not Wb per radian (the more usual quantity ψ used as a covariant toroidal component of the magnetic potential is in Wb/radian; the factor of 2π results from integration over one angular circuit). Note that the poloidal flux Ψ and its equivalent per radian ψ are often used equivalently in the literature.

2.4 Safety Factor

The magnetic pitch parameter is defined in terms of the flux components:

$$q \equiv d\Phi/d\Psi$$

which is a flux quantity. This definition is the same as saying the magnetic pitch is given as the number of toroidal cycle a magnetic field line traverses per unit poloidal cycle. It is also called the local safety factor for MHD stability reasons (here, "local" means local to a given flux surface). Equivalent relations often seen depend on the definition of coordinates. These are given for straight field line coordinates, below.

2.5 Signs

With the above definition of the toroidal coordinate system and the magnetic field, the following sign relationships ensue (where increasing and decreasing refer to going from the magnetic axis to the separatrix on the outboard midplane):

Table 1: Sign Relations

B_{tor}	I_p	Ψ	Φ	**safety factor** q
positive	positive	decreasing	increasing	negative
positive	negative	increasing	increasing	positive
negative	positive	decreasing	decreasing	positive
negative	negative	increasing	decreasing	negative

2.6 COCOS - toroidal coordinate conventions

16 different fundamental coordinate conventions (COCOS) has been identified for toroidal systems. These are described by O. Sauter and S. Yu. Medvedev, Computer Phys. Commun. 184 (2013) 293 [3], and summarized in the figure below.

[3] http://www.sciencedirect.com/science/article/pii/S0010465512002962

Table 1
(a) Coordinate conventions for each *COCOS* index. $COCOS \leq 8$ refers to ψ divided by (2π) and thus with $e_{Bp} = 0$ while $COCOS \geq 11$ refers to full poloidal flux with $e_{Bp} = 1$. Otherwise $COCOS = i$ and $COCOS = 10 + i$ have the same coordinate conventions. The cylindrical (with the related $\sigma_{R\varphi Z}$ value) and poloidal (with $\sigma_{\rho\theta\varphi}$) right-handed coordinate systems are given as well. (b) The indications in this subtable (last three columns) are assuming I_p and B_0 positive in the related coordinate system, that is in the direction of the related φ.

COCOS	e_{Bp}	σ_{Bp}	Cylind, $\sigma_{R\varphi Z}$	Poloid, $\sigma_{\rho\theta\varphi}$	φ from top	θ from front
1/11	0/1	$+1$	$(R, \varphi, Z), +1$	$(\rho, \theta, \varphi), +1$	Cnt-clockwise	Clockwise
2/12	0/1	$+1$	$(R, Z, \varphi), -1$	$(\rho, \theta, \varphi), +1$	Clockwise	Cnt-clockwise
3/13	0/1	-1	$(R, \varphi, Z), +1$	$(\rho, \varphi, \theta), -1$	Cnt-clockwise	Cnt-clockwise
4/14	0/1	-1	$(R, Z, \varphi), -1$	$(\rho, \varphi, \theta), -1$	Clockwise	Clockwise
5/15	0/1	$+1$	$(R, \varphi, Z), +1$	$(\rho, \varphi, \theta), -1$	Cnt-clockwise	Cnt-clockwise
6/16	0/1	$+1$	$(R, Z, \varphi), -1$	$(\rho, \varphi, \theta), -1$	Clockwise	Clockwise
7/17	0/1	-1	$(R, \varphi, Z), +1$	$(\rho, \theta, \varphi), +1$	Cnt-clockwise	Clockwise
8/18	0/1	-1	$(R, Z, \varphi), -1$	$(\rho, \theta, \varphi), +1$	Clockwise	Cnt-clockwise
			(a)			

ψ_{ref}	sign(q)	sign $\left(\frac{dp}{d\psi}\right)$
Increasing	$+1$	-1
Increasing	$+1$	-1
Decreasing	-1	$+1$
Decreasing	-1	$+1$
Increasing	-1	-1
Increasing	-1	-1
Decreasing	$+1$	$+1$
Decreasing	$+1$	$+1$
	(b)	

The current ITM convention (described above) is number 13, while the ITER convention is 11.

2.6.1 Determining the COCOS number

V. CHECKING THE CONSISTENCY OF EQUILIBRIUM QUANTITIES/ASSUMPTION WITH A *COCOS* INDEX

Let us obtain conditions of consistency of an input equilibrium with a specific *COCOS* index, generalizing Eq. (22). For this, it is easier to use Eq. (21) and to note that since with the CHEASE normalization we have I_p and B_0 positive, we should have I_p and F positive, ψ_{chease} increasing, $dp/d\psi_{chease}$ negative and q positive (from Table I, $COCOS = 2$ line). Thus, using Eq. (21) we should have for any *cocos* equilibrium:

$$\begin{aligned}
\sigma_{Ip} &= sign(I_p), \\
\sigma_{B_0} &= sign(B_0), \\
sign(F_{cocos}) &= \sigma_{B_0}, \\
sign(\Phi_{cocos}) &= \sigma_{B_0}, \\
sign\big[\psi_{cocos}(\text{edge}) - \psi_{\text{cocos}}(\text{axis})\big] &= \sigma_{Ip}\, \sigma_{Bp,cocos}, \\
sign(\frac{dp}{d\psi}\Big|_{cocos}) &= -\sigma_{Ip}\, \sigma_{Bp,cocos}, \\
sign(j_{cocos}) &= \sigma_{Ip}, \\
sign(q_{cocos}) &= \sigma_{Ip}\, \sigma_{B_0}\, \sigma_{\rho\theta\varphi},
\end{aligned} \tag{23}$$

with $\sigma_{Bp,cocos}, \sigma_{\rho\theta\varphi}$ given in Table I for the related *cocos* value. Note that the sign of $dp/d\psi$ being $-\sigma_{Ip}\sigma_{Bp,cocos}$ should be understood as the "main" $sign(dp/d\psi)$ following the fact that pressure is usually much larger on axis than at the edge. To be more precise one could replace this relation by $sign\big(\sum_0^{\text{edge}} \frac{dp}{d\psi}\, \Delta\psi\big) = -1$.

It should be noted that Eq. (23) can also be used to determine the *COCOS* used in a code or set of equations. Usually, one starts by checking if ψ is increasing or decreasing from magnetic axis to the edge. Then, depending on $sign(I_P)$, one can obtain the value of $\sigma_{Bp,cocos}$. Another way is if $\mathbf{B}_p \sim \nabla\varphi \times \nabla\psi$, thus $\sigma_{Bp,cocos} = +1$ or $\mathbf{B}_p \sim \nabla\psi \times \nabla\varphi$, yielding $\sigma_{Bp,cocos} = -1$. Then one can check with the sign of $dp/d\psi$. The next step is to determine $\sigma_{R\varphi Z}$, either from the comparison of the sign of I_p and B_0 with the effective direction of I_p and B_0 if it is known, or by comparing the definition of B_R, for example, with Eqs. (12) and (13) and taking into account the value of σ_{Bp}. Then, the effective sign of q gives the value of $\sigma_{\rho\theta\varphi}$. Finally, e_{Bp} is obtained from the factor 2π appearing either in the definition of $\mathbf{B}_p$, Eq. (1), giving $e_{Bp} = 1$ or in the definition of q, Eq. (9), yielding $e_{Bp} = 0$. Note that if a specific sign of I_p or B_0 is used, it should be used in Eq. (23) to infer the *COCOS* value. In particular, some codes (Table IV) use a different sign for I_p and B_0, yielding a different effective sign of q.

2.6.2 Equilibrium COCOS transformation library and actor

A Fortran library has been developed for transforming the equilibrium cpo between different COCOS. The source is found in

```
https://gforge6.eufus.eu/svn/numerical_tools/tags/COCOStransform_v1_1
```

and the actor is

```
https://gforge6.eufus.eu/svn/kepleractors/tags/4.09a/imp12/COCOStransformequil.tar
```

(also available from: ~sauter/public/ACTORS/4.09a)

Inputs:

- `Equilibrium_in` : input cpo
- `COCOS_in` : COCOS of the input equilibrium (if the COCOS is not stored in Equilibrium_in)
- `COCOS_out` : Requested COCOS for the Equilibrium_out
- `Ipsign_out` : Requested sign for output Ip; -9 if just wants IP_in transformed to new equilibrium, +1 or -1 if a specific sign in output is desired
- `B0sign_out` : Requested sign for output B0

Output:

- `Equilibrium_out` : Output cpo

2.7 The Flux Surface Average

In general, the flux surface average is the operation which annihilates the magnetic derivative $\mathbf{B} \cdot \nabla$ and acts as an identity operator on any flux quantity. It can be proved that this results in a volume derivative of a volume integral (alternatively one starts with the latter property and then proves the former, as the above Ciemat reference does).
The flux surface average of a scalar and divergence of a vector are given by

$$\langle G \rangle = \frac{\partial}{\partial V} \oint d^3V \, G \qquad \langle \nabla \cdot \mathbf{G} \rangle = \frac{\partial}{\partial V} \langle \mathbf{G} \cdot \nabla V \rangle$$

where $\mathbf{G} \cdot \nabla V$ is the contravariant volume component of the vector $\mathbf{G}$.
It follows that the flux surface average is an angle average weighted by the volume element $\sqrt{g}$

$$\langle G \rangle = \oint d\phi \oint d\theta \, \sqrt{g} \, G \Big/ \oint d\phi \oint d\theta \, \sqrt{g}$$

for any choice of toroidal and poloidal angle as well as radial coordinates, where g is the determinant of the covariant metric tensor components in those coordinates.
Note in general G is not an axisymmetric quantity so the integration is actually over both angles.

For more detail see the above references.

2.8 The Toroidal Flux Radius as the Radial Coordinate

The ITM-TF has decided to use the toroidal flux radius ρ_{tor} defined by

$$\Phi = \pi B_0 \rho_{\mathrm{tor}}^2$$

where B_0 is the reference (vacuum) magnetic field value. Note that $\rho_{\rm tor}$

is a positive quantity which has units of meters.
For several applications the volume radius $\rho_{\rm vol}$ is also used. It is a normalised radius going from 0 to 1 and is defined as

$$V = V_{\rm LCFS}\rho_{\rm vol}^2$$

where LCFS refers to the last closed flux surface.
Both should be defined in the equilibrium CPO (as well as `volume` $\equiv V$ itself).

2.9 Toroidal and Parallel Current

These are not equivalent, despite the often-seen experimental practice of considering them so. The toroidal current given in Amperes depends on some convention applied to J_ϕ given above, which is *not* a flux quantity. The ITM-TF has decided on this definition of the toroidal current as a flux quantity:

$$\texttt{jphi} \equiv \langle J^\phi \rangle / \langle 1/R \rangle$$

This uses the contravariant toroidal component of **J** which is a pure divergence

$$J^\phi = \mathbf{J}\cdot\nabla\phi = J_\phi/R^2 = -\nabla\cdot(2\pi\mu_0 R^2)^{-1}\nabla\Psi$$

Hence the flux surface average invokes the often-used quantity $\langle g^{\rho\rho}/R^2\rangle$ in the form

$$\langle J^\phi\rangle = -(2\pi\mu_0)^{-1}\frac{1}{V'_\rho}\frac{\partial}{\partial\rho}V'_\rho\langle g^{\rho\rho}/R^2\rangle\frac{\partial\Psi}{\partial\rho}$$

Here, $V'_\rho \equiv \partial V/\partial\rho_{\rm tor}$ explicitly using the toroidal flux radius as the radial coordinate.

The parallel current is different from this due to the finiteness of the poloidal current and magnetic field. Generally the correction is $O(\epsilon^2/q^2)$ which is usually a few percent (but *not* in a spherical tokamak). Using the representations for **B** and **J** given above we find

$$\mathbf{J}\cdot\mathbf{B} = -(2\pi\mu_0)^{-1}F_{\rm dia}^2\nabla\cdot\frac{1}{F_{\rm dia}R^2}\nabla\Psi$$

Since $F_{\rm dia}$ is a flux quantity the flux surface average behaves as for `jphi` and we use a factor of B_0 to provide the correct units, yielding

$$\texttt{jparallel} \equiv -(2\pi\mu_0 B_0)^{-1}\frac{F_{\rm dia}^2}{V'_\rho}\frac{\partial}{\partial\rho}\frac{V'_\rho}{F_{\rm dia}}\langle g^{\rho\rho}/R^2\rangle\frac{\partial\Psi}{\partial\rho}$$

This form has been chosen due to the natural use of the flux surface average $\langle\mathbf{J}\cdot\mathbf{B}\rangle$ in neoclassical theory and the magnetic flux diffusion equation (see the Hinton and Hazeltine reference above).

2.10 Straight Field Line Coordinates

A variety of modules in the ITM-TF use straight field line coordinate systems to represent the closed flux surface region.
To guarantee consistency with the definition of the poloidal flux and the magnetic field representation given above, a standard definition of the coordinate volume element follows. This is the same sense as the usage of the term "Jacobian" in the CPOs (note many papers use the inverse volume element as the "Jacobian" by contrast).
Here, "straight field line coordinates" refers to the use of the right-handed coordinate system (Ψ,θ,ζ) with the poloidal flux Ψ , the straight field line angle θ , and the toroidal angle $\zeta = -\phi$. Therefore, θ has the same

orientation as the poloidal angle θ in toroidal coordinates, while the toroidal angle ζ is in the opposite direction of ϕ . This is standard usage generally in terms of "flux coordinates" (see Hazeltine and Meiss, above).

Note here that while the toroidal angle is the geometric one in the orientation sense of flux coordinates, the poloidal angle is not geometric. This results from the demand that the field lines be straight in the coordinate plane (θ, ζ) . The definition of this property is given by the specification of the ratio of contravariant components of the magnetic field as a flux quantity, which is one and the same with the pitch parameter ("local safety factor"):

$$q = q(\Psi) = -B^{\zeta}/B^{\theta} = B^{\phi}/B^{\theta}$$

where the minus sign appears by consistency with the primary definition in terms of the flux components as given above. This represents a magnetic differential equation for the poloidal angle:

$$B^{\theta} = B^{\phi}/q = F_{\mathrm{dia}}/qR^2$$

Due to the choice of "natural" coordinates (with Ψ , not ρ_{tor}) this relation is close to the definition of the volume element $\sqrt{g}$ and, equivalently, the Jacobian J

$$J \equiv \sqrt{g} \qquad J^{-1} = \nabla\Psi \cdot \nabla\theta \times \nabla\zeta = \nabla\Psi \times \nabla\phi \cdot \nabla\theta$$

Note the ordering of $\nabla\Psi$ and $\nabla\phi$.
The components of the magnetic field are then

$$\begin{aligned} B^{\theta} &= \mathbf{B} \cdot \nabla\theta = (2\pi)^{-1} \nabla\Psi \times \nabla\phi \cdot \nabla\theta = (2\pi J)^{-1} \\ B^{\zeta} &= \mathbf{B} \cdot \nabla\zeta = -B_{\phi}/R^2 = -F_{\mathrm{dia}}/R^2 \\ B^{\Psi} &= \mathbf{B} \cdot \nabla\Psi = 0 \end{aligned}$$

With these relations the following relationship between the Jacobian and pitch parameter ("local safety factor") holds

$$J = (2\pi)^{-1} qR^2/F_{\mathrm{dia}}$$

This is the quantity labelled `jacobian` in the equilibrium CPO.

2.11 Plasma Betas

Out of the many definitions of plasma betas, the ITM has agreed to adhere to the following definitions:

Following Wesson (p. 116), the **poloidal beta** is defined as an integral over the poloidal cross section

$$\beta_{\mathrm{p}} = \frac{2\mu_0}{B_{\mathrm{a}}^2} \frac{\int_A p \mathrm{dS}}{\int_A \mathrm{dS}}$$

where $A = A(\Psi)$ is the poloidal cross section enclosed by the flux surface Ψ , $B_{\mathrm{a}} = \frac{\mu_0 I}{l}$ is the flux surface averaged poloidal magnetic field, $I = I(\Psi)$ the toroidal plasma current inside the flux surface Ψ and $l = \oint \mathrm{dl}$ the length of the poloidal perimeter of flux surface Ψ .
This definition yields a one-dimensional profile $\beta_{\mathrm{p}} = \beta_{\mathrm{p}}(\Psi)$ stored in `profiles_1d%beta_pol` in the equilibrium CPO [4] . The overall poloidal beta $\beta_{\mathrm{p}}(\Psi = \Psi_{\mathrm{bd}})$ is stored in `global_param%beta_pol` .

The **toroidal beta** is defined as

[4] https://www.efda-itm.eu/ITM/html/itm_glossary.html#g_cpo

$$\beta_{\mathrm{tor}} = \frac{2\mu_0}{B_0^2}\frac{\int_\Omega p\mathrm{dV}}{\int_\Omega \mathrm{dV}}$$

with B_0 the vacuum magnetic field as stored in `global_param%toroid_field%b0` . The integral is carried out over the entire plasma volume and the result stored in `global_param%beta_tor` .

The **normalized plasma beta** is defined as

$$\beta_{\mathrm{N}} = 100\frac{aB_0}{10^{-6}I_{\mathrm{p}}}\beta_{\mathrm{tor}}$$

with I_{p} the total plasma current (following Y.-S. Na et al., *PPCF* **44** (2002), 1285) and **a** is the minor radius. It is stored in `global_param%beta_normal` .

2.12 Internal Inductance

The definition of the **internal inductance** follows J.A. Romero et al., *NF* **50** (2010), 115002. The magnetic energy contained inside the flux surface Ψ is
$W_{\mathrm{mag}} = \frac{1}{2\mu_0}\int_\Omega B_{\mathrm{p}}^2\mathrm{dV}$
where B_{p} is the poloidal component of the magnetic field.
The (unnormalized) internal inductance is then defined as
$L_{\mathrm{i}} = \frac{2W_{\mathrm{mag}}}{I^2}$
where $I = I(\Psi)$ is the toroidal plasma current enclosed by the flux surface Ψ .
The normalized internal inductance, as stored in `profiles_1d%li` is defined as

$$l_{\mathrm{i}} = \frac{2L_{\mathrm{i}}}{\mu_0\bar{R}}$$

with the surface averaged major radius
$\bar{R} = \frac{\int_A R\mathrm{dS}}{\int_A \mathrm{dS}} = \frac{V(\Psi)}{2\pi A(\Psi)}$.
The overall internal inductance $l_{\mathrm{i}}(\Psi = \Psi_{\mathrm{bd}})$ is stored in `global_param%li` .

2.13 Poloidal Angle Dimension in Equilibrium CPO

The following entries in the equilibrium CPO [5] are defined along the poloidal dimension (as dim2 in the case of a flux surface equilibrium, i.e. radial coordinate psi in dim1 and poloidal angle in dim2):

```
coord_sys%jacobian(:,:)
coord_sys%g_11(:,:)
coord_sys%g_12(:,:)
coord_sys%g_13(:,:)
coord_sys%g_22(:,:)
coord_sys%g_23(:,:)
coord_sys%g_33(:,:)
profiles_2d%position
profiles_2d%grid
profiles_2d%psi_grid(:,:)
profiles_2d%jphi_grid(:,:)
profiles_2d%jpar_grid(:,:)
profiles_2d%br(:,:)
profiles_2d%bz(:,:)
profiles_2d%bphi(:,:)
```

The ITM-TF has decided not to repeat the first poloidal point (with poloidal angle $\theta = 0$), which is identical to $\theta = 2\pi$. This option was chosen to facilitate Fourier transforms along the poloidal direction. To that purpose it is required that the dimension dim2 be equidistant in the poloidal angle θ

[5] https://www.efda-itm.eu/ITM/html/itm_glossary.html#g_cpo

(going from $\theta = 0$ to $\theta = (ndim2 - 1)/ndim2 * 2\pi$ where ndim2 is the number of poloidal grid points), whatever the choice of this angle is.

3 Numerical and computational conventions

3.1 Standardized Variable Types

To ensure that physics modules produce identical results on various computer architectures and to avoid issues with double precision versus single precision interfaces, the ITM-TF has agreed on a set of standardized variable types.
It is recommended that these types be used throughout all ITM modules, but at least for the interface definitions.
The Fortran90 module defining the type standards `itm_types.f90` is hosted by the project **itmshared** .
To check out the relevant files please do

```
svn checkout https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_types target_dir
```

For Fortran90, the following standard types have been defined

```
INTEGER,  PARAMETER :: ITM_I1 = SELECTED_INT_KIND (2)        ! Integer*1
INTEGER,  PARAMETER :: ITM_I2 = SELECTED_INT_KIND (4)        ! Integer*2
INTEGER,  PARAMETER :: ITM_I4 = SELECTED_INT_KIND (9)        ! Integer*4
INTEGER,  PARAMETER :: ITM_I8 = SELECTED_INT_KIND (18)       ! Integer*8
INTEGER,  PARAMETER :: R4 = SELECTED_REAL_KIND (6, 37)   ! Real*4
INTEGER,  PARAMETER :: R8 = SELECTED_REAL_KIND (15, 300) ! Real*8
```

To implement these types in your code, please add the following line to your modules

```
  use itm_types
```

Compiled versions of the module can be found in

```
  $ITMLIBDIR/itmtypes/lib/$OBJECTCODE
```

where the following values of OBJECTCODE are supported

```
amd64_g95_0.92
amd64_gfortran_4.7
amd64_intel_12
amd64_pgi_10
```

(More information about the ITM libraries [6].)

3.2 Standardized Physical Constants

To avoid discrepancies in simulations from using different definitions of the physical constants, the ITM-TF has agreed upon a set of standardized physical constants (all in SI units except for temperatures) based on the NIST recommendations [7].
It is recommended that these constant be used throughout all ITM modules.
The Fortran90 module defining the standardized physical constants `itm_constants.f90` is hosted by the project **itmshared** .
To check out the relevant files please do

[6] https://www.efda-itm.eu/ITM/html/itm_libraries.html#itm_libraries
[7] http://physics.nist.gov/cuu/Constants/index.html

```
svn checkout https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants target_dir
```

Compiled versions of the module can be found in

```
  $ITMLIBDIR/itmconstants/lib/$OBJECTCODE
```

where the following values of OBJECTCODE are supported

```
amd64_g95_0.92
amd64_gfortran_4.7
amd64_intel_12
amd64_pgi_10
```

The C equivalent (”itm_constants.h”) can be found in

```
  $ITMLIBDIR/itmconstants/include/
```

and the Python in

```
  $ITMLIBDIR/itmconstants/lib/python2.6/
```

A Java version is available but has not yet been released — contact ISIP if you are interested.
(More information about the ITM libraries [8].)
The following constants are available:

3.2.1 itm_constants

```
Module implementing the ITM physics constants

Source:
 based on SOLPS b2mod_constants.F
   09/12/2007 xpb : source CODATA 2006 (http://www.nist.gov/)
   08/19/2011 xpb : source CODATA 2010 (http://www.nist.gov/)
 pulled from ets r100

\author David Coster

\version "$Id: itm_constants.xml 2024 2015-03-24 15:22:07Z tjohnson $"
```

Fortran interface example:

```
use itm_constants, only: get_type_value, get_type_name, get_type_description
```

Name	Value	Description
ITM_PI	3.14159265358979323846264338328O	
ITM_C	2.99792458e8	speed of light
ITM_ME	9.10938291e-31	electron mass
ITM_MP	1.672621777e-27	proton mass
ITM_MN	1.674927351e-27	neutron mass
ITM_MD	3.34358348e-27	deuteron mass

[8] https://www.efda-itm.eu/ITM/html/itm_libraries.html#itm_libraries

Name	Value	Description
ITM_MT	5.00735630e-27	triton mass
ITM_MA	6.64465675e-27	alpha mass
ITM_AMU	1.660538921e-27	atomic mass unit
ITM_EV	1.602176565e-19	electron volt (eV)
ITM_QE	ITM_EV	elementary charge
ITM_MU0	4.0e-7 * ITM_PI	vacuum permeability
ITM_EPS0	1.0 / (ITM_MU0 * ITM_C * ITM_C)	
ITM_AVOGR	6.02214129e23	
ITM_KBOLT	1.3806488e-23	
ITM_MASS_H_1	1.00782503207 * ITM_AMU	isotope mass
ITM_MASS_H_2	2.0141017778 * ITM_AMU	isotope mass
ITM_MASS_H_3	3.0160492777 * ITM_AMU	isotope mass
ITM_MASS_H_4	4.02781 * ITM_AMU	isotope mass
ITM_MASS_H_5	5.03531 * ITM_AMU	isotope mass
ITM_MASS_H_6	6.04494 * ITM_AMU	isotope mass
ITM_MASS_H_7	7.05275 * ITM_AMU	isotope mass
ITM_MASS_He_3	3.0160293191 * ITM_AMU	isotope mass
ITM_MASS_He_4	4.00260325415 * ITM_AMU	isotope mass
ITM_MASS_He_5	5.012220 * ITM_AMU	isotope mass
ITM_MASS_He_6	6.0188891 * ITM_AMU	isotope mass
ITM_MASS_He_7	7.028021 * ITM_AMU	isotope mass
ITM_MASS_He_8	8.033922 * ITM_AMU	isotope mass
ITM_MASS_He_9	9.043950 * ITM_AMU	isotope mass
ITM_MASS_He_10	10.052400 * ITM_AMU	isotope mass
ITM_MASS_Li_3	3.03078 * ITM_AMU	isotope mass
ITM_MASS_Li_4	4.02719 * ITM_AMU	isotope mass
ITM_MASS_Li_5	5.012540 * ITM_AMU	isotope mass
ITM_MASS_Li_6	6.015122795 * ITM_AMU	isotope mass
ITM_MASS_Li_7	7.01600455 * ITM_AMU	isotope mass
ITM_MASS_Li_8	8.02248736 * ITM_AMU	isotope mass
ITM_MASS_Li_9	9.0267895 * ITM_AMU	isotope mass
ITM_MASS_Li_10	10.035481 * ITM_AMU	isotope mass
ITM_MASS_Li_11	11.043798 * ITM_AMU	isotope mass
ITM_MASS_Li_12	12.05378 * ITM_AMU	isotope mass
ITM_MASS_Be_5	5.04079 * ITM_AMU	isotope mass
ITM_MASS_Be_6	6.019726 * ITM_AMU	isotope mass
ITM_MASS_Be_7	7.01692983 * ITM_AMU	isotope mass
ITM_MASS_Be_8	8.00530510 * ITM_AMU	isotope mass
ITM_MASS_Be_9	9.0121822 * ITM_AMU	isotope mass
ITM_MASS_Be_10	10.0135338 * ITM_AMU	isotope mass
ITM_MASS_Be_11	11.021658 * ITM_AMU	isotope mass
ITM_MASS_Be_12	12.026921 * ITM_AMU	isotope mass
ITM_MASS_Be_13	13.035690 * ITM_AMU	isotope mass
ITM_MASS_Be_14	14.04289 * ITM_AMU	isotope mass
ITM_MASS_Be_15	15.05346 * ITM_AMU	isotope mass
ITM_MASS_Be_16	16.06192 * ITM_AMU	isotope mass
ITM_MASS_B_6	6.04681 * ITM_AMU	isotope mass
ITM_MASS_B_7	7.029920 * ITM_AMU	isotope mass
ITM_MASS_B_8	8.0246072 * ITM_AMU	isotope mass
ITM_MASS_B_9	9.0133288 * ITM_AMU	isotope mass
ITM_MASS_B_10	10.0129370 * ITM_AMU	isotope mass
ITM_MASS_B_11	11.0093054 * ITM_AMU	isotope mass
ITM_MASS_B_12	12.0143521 * ITM_AMU	isotope mass
ITM_MASS_B_13	13.0177802 * ITM_AMU	isotope mass
ITM_MASS_B_14	14.025404 * ITM_AMU	isotope mass
ITM_MASS_B_15	15.031103 * ITM_AMU	isotope mass
ITM_MASS_B_16	16.039810 * ITM_AMU	isotope mass
ITM_MASS_B_17	17.04699 * ITM_AMU	isotope mass
ITM_MASS_B_18	18.05617 * ITM_AMU	isotope mass
ITM_MASS_B_19	19.06373 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_C_8	8.037675 * ITM_AMU	isotope mass
ITM_MASS_C_9	9.0310367 * ITM_AMU	isotope mass
ITM_MASS_C_10	10.0168532 * ITM_AMU	isotope mass
ITM_MASS_C_11	11.0114336 * ITM_AMU	isotope mass
ITM_MASS_C_12	12.0000000 * ITM_AMU	isotope mass
ITM_MASS_C_13	13.0033548378 * ITM_AMU	isotope mass
ITM_MASS_C_14	14.003241989 * ITM_AMU	isotope mass
ITM_MASS_C_15	15.0105993 * ITM_AMU	isotope mass
ITM_MASS_C_16	16.014701 * ITM_AMU	isotope mass
ITM_MASS_C_17	17.022586 * ITM_AMU	isotope mass
ITM_MASS_C_18	18.026760 * ITM_AMU	isotope mass
ITM_MASS_C_19	19.03481 * ITM_AMU	isotope mass
ITM_MASS_C_20	20.04032 * ITM_AMU	isotope mass
ITM_MASS_C_21	21.04934 * ITM_AMU	isotope mass
ITM_MASS_C_22	22.05720 * ITM_AMU	isotope mass
ITM_MASS_N_10	10.04165 * ITM_AMU	isotope mass
ITM_MASS_N_11	11.026090 * ITM_AMU	isotope mass
ITM_MASS_N_12	12.0186132 * ITM_AMU	isotope mass
ITM_MASS_N_13	13.00573861 * ITM_AMU	isotope mass
ITM_MASS_N_14	14.0030740048 * ITM_AMU	isotope mass
ITM_MASS_N_15	15.0001088982 * ITM_AMU	isotope mass
ITM_MASS_N_16	16.0061017 * ITM_AMU	isotope mass
ITM_MASS_N_17	17.008450 * ITM_AMU	isotope mass
ITM_MASS_N_18	18.014079 * ITM_AMU	isotope mass
ITM_MASS_N_19	19.017029 * ITM_AMU	isotope mass
ITM_MASS_N_20	20.023370 * ITM_AMU	isotope mass
ITM_MASS_N_21	21.02711 * ITM_AMU	isotope mass
ITM_MASS_N_22	22.03439 * ITM_AMU	isotope mass
ITM_MASS_N_23	23.04122 * ITM_AMU	isotope mass
ITM_MASS_N_24	24.05104 * ITM_AMU	isotope mass
ITM_MASS_N_25	25.06066 * ITM_AMU	isotope mass
ITM_MASS_O_12	12.034405 * ITM_AMU	isotope mass
ITM_MASS_O_13	13.024812 * ITM_AMU	isotope mass
ITM_MASS_O_14	14.00859625 * ITM_AMU	isotope mass
ITM_MASS_O_15	15.0030656 * ITM_AMU	isotope mass
ITM_MASS_O_16	15.99491461956 * ITM_AMU	isotope mass
ITM_MASS_O_17	16.99913170 * ITM_AMU	isotope mass
ITM_MASS_O_18	17.9991610 * ITM_AMU	isotope mass
ITM_MASS_O_19	19.003580 * ITM_AMU	isotope mass
ITM_MASS_O_20	20.0040767 * ITM_AMU	isotope mass
ITM_MASS_O_21	21.008656 * ITM_AMU	isotope mass
ITM_MASS_O_22	22.009970 * ITM_AMU	isotope mass
ITM_MASS_O_23	23.01569 * ITM_AMU	isotope mass
ITM_MASS_O_24	24.02047 * ITM_AMU	isotope mass
ITM_MASS_O_25	25.02946 * ITM_AMU	isotope mass
ITM_MASS_O_26	26.03834 * ITM_AMU	isotope mass
ITM_MASS_O_27	27.04826 * ITM_AMU	isotope mass
ITM_MASS_O_28	28.05781 * ITM_AMU	isotope mass
ITM_MASS_F_14	14.03506 * ITM_AMU	isotope mass
ITM_MASS_F_15	15.01801 * ITM_AMU	isotope mass
ITM_MASS_F_16	16.011466 * ITM_AMU	isotope mass
ITM_MASS_F_17	17.00209524 * ITM_AMU	isotope mass
ITM_MASS_F_18	18.0009380 * ITM_AMU	isotope mass
ITM_MASS_F_19	18.99840322 * ITM_AMU	isotope mass
ITM_MASS_F_20	19.99998132 * ITM_AMU	isotope mass
ITM_MASS_F_21	20.9999490 * ITM_AMU	isotope mass
ITM_MASS_F_22	22.002999 * ITM_AMU	isotope mass
ITM_MASS_F_23	23.003570 * ITM_AMU	isotope mass
ITM_MASS_F_24	24.008120 * ITM_AMU	isotope mass
ITM_MASS_F_25	25.01210 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_F_26	26.01962 * ITM_AMU	isotope mass
ITM_MASS_F_27	27.02676 * ITM_AMU	isotope mass
ITM_MASS_F_28	28.03567 * ITM_AMU	isotope mass
ITM_MASS_F_29	29.04326 * ITM_AMU	isotope mass
ITM_MASS_F_30	30.05250 * ITM_AMU	isotope mass
ITM_MASS_F_31	31.06043 * ITM_AMU	isotope mass
ITM_MASS_Ne_16	16.025761 * ITM_AMU	isotope mass
ITM_MASS_Ne_17	17.017672 * ITM_AMU	isotope mass
ITM_MASS_Ne_18	18.0057082 * ITM_AMU	isotope mass
ITM_MASS_Ne_19	19.0018802 * ITM_AMU	isotope mass
ITM_MASS_Ne_20	19.9924401754 * ITM_AMU	isotope mass
ITM_MASS_Ne_21	20.99384668 * ITM_AMU	isotope mass
ITM_MASS_Ne_22	21.991385114 * ITM_AMU	isotope mass
ITM_MASS_Ne_23	22.99446690 * ITM_AMU	isotope mass
ITM_MASS_Ne_24	23.9936108 * ITM_AMU	isotope mass
ITM_MASS_Ne_25	24.997737 * ITM_AMU	isotope mass
ITM_MASS_Ne_26	26.000461 * ITM_AMU	isotope mass
ITM_MASS_Ne_27	27.00759 * ITM_AMU	isotope mass
ITM_MASS_Ne_28	28.01207 * ITM_AMU	isotope mass
ITM_MASS_Ne_29	29.01939 * ITM_AMU	isotope mass
ITM_MASS_Ne_30	30.02480 * ITM_AMU	isotope mass
ITM_MASS_Ne_31	31.03311 * ITM_AMU	isotope mass
ITM_MASS_Ne_32	32.04002 * ITM_AMU	isotope mass
ITM_MASS_Ne_33	33.04938 * ITM_AMU	isotope mass
ITM_MASS_Ne_34	34.05703 * ITM_AMU	isotope mass
ITM_MASS_Na_18	18.025970 * ITM_AMU	isotope mass
ITM_MASS_Na_19	19.013877 * ITM_AMU	isotope mass
ITM_MASS_Na_20	20.007351 * ITM_AMU	isotope mass
ITM_MASS_Na_21	20.9976552 * ITM_AMU	isotope mass
ITM_MASS_Na_22	21.9944364 * ITM_AMU	isotope mass
ITM_MASS_Na_23	22.9897692809 * ITM_AMU	isotope mass
ITM_MASS_Na_24	23.99096278 * ITM_AMU	isotope mass
ITM_MASS_Na_25	24.9899540 * ITM_AMU	isotope mass
ITM_MASS_Na_26	25.992633 * ITM_AMU	isotope mass
ITM_MASS_Na_27	26.994077 * ITM_AMU	isotope mass
ITM_MASS_Na_28	27.998938 * ITM_AMU	isotope mass
ITM_MASS_Na_29	29.002861 * ITM_AMU	isotope mass
ITM_MASS_Na_30	30.008976 * ITM_AMU	isotope mass
ITM_MASS_Na_31	31.01359 * ITM_AMU	isotope mass
ITM_MASS_Na_32	32.02047 * ITM_AMU	isotope mass
ITM_MASS_Na_33	33.02672 * ITM_AMU	isotope mass
ITM_MASS_Na_34	34.03517 * ITM_AMU	isotope mass
ITM_MASS_Na_35	35.04249 * ITM_AMU	isotope mass
ITM_MASS_Na_36	36.05148 * ITM_AMU	isotope mass
ITM_MASS_Na_37	37.05934 * ITM_AMU	isotope mass
ITM_MASS_Mg_19	19.03547 * ITM_AMU	isotope mass
ITM_MASS_Mg_20	20.018863 * ITM_AMU	isotope mass
ITM_MASS_Mg_21	21.011713 * ITM_AMU	isotope mass
ITM_MASS_Mg_22	21.9995738 * ITM_AMU	isotope mass
ITM_MASS_Mg_23	22.9941237 * ITM_AMU	isotope mass
ITM_MASS_Mg_24	23.985041700 * ITM_AMU	isotope mass
ITM_MASS_Mg_25	24.98583692 * ITM_AMU	isotope mass
ITM_MASS_Mg_26	25.982592929 * ITM_AMU	isotope mass
ITM_MASS_Mg_27	26.98434059 * ITM_AMU	isotope mass
ITM_MASS_Mg_28	27.9838768 * ITM_AMU	isotope mass
ITM_MASS_Mg_29	28.988600 * ITM_AMU	isotope mass
ITM_MASS_Mg_30	29.990434 * ITM_AMU	isotope mass
ITM_MASS_Mg_31	30.996546 * ITM_AMU	isotope mass
ITM_MASS_Mg_32	31.998975 * ITM_AMU	isotope mass
ITM_MASS_Mg_33	33.005254 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Mg_34	34.00946 * ITM_AMU	isotope mass
ITM_MASS_Mg_35	35.01734 * ITM_AMU	isotope mass
ITM_MASS_Mg_36	36.02300 * ITM_AMU	isotope mass
ITM_MASS_Mg_37	37.03140 * ITM_AMU	isotope mass
ITM_MASS_Mg_38	38.03757 * ITM_AMU	isotope mass
ITM_MASS_Mg_39	39.04677 * ITM_AMU	isotope mass
ITM_MASS_Mg_40	40.05393 * ITM_AMU	isotope mass
ITM_MASS_Al_21	21.02804 * ITM_AMU	isotope mass
ITM_MASS_Al_22	22.01952 * ITM_AMU	isotope mass
ITM_MASS_Al_23	23.007267 * ITM_AMU	isotope mass
ITM_MASS_Al_24	23.9999389 * ITM_AMU	isotope mass
ITM_MASS_Al_25	24.9904281 * ITM_AMU	isotope mass
ITM_MASS_Al_26	25.98689169 * ITM_AMU	isotope mass
ITM_MASS_Al_27	26.98153863 * ITM_AMU	isotope mass
ITM_MASS_Al_28	27.98191031 * ITM_AMU	isotope mass
ITM_MASS_Al_29	28.9804450 * ITM_AMU	isotope mass
ITM_MASS_Al_30	29.982960 * ITM_AMU	isotope mass
ITM_MASS_Al_31	30.983947 * ITM_AMU	isotope mass
ITM_MASS_Al_32	31.988120 * ITM_AMU	isotope mass
ITM_MASS_Al_33	32.990840 * ITM_AMU	isotope mass
ITM_MASS_Al_34	33.99685 * ITM_AMU	isotope mass
ITM_MASS_Al_35	34.99986 * ITM_AMU	isotope mass
ITM_MASS_Al_36	36.00621 * ITM_AMU	isotope mass
ITM_MASS_Al_37	37.01068 * ITM_AMU	isotope mass
ITM_MASS_Al_38	38.01723 * ITM_AMU	isotope mass
ITM_MASS_Al_39	39.02297 * ITM_AMU	isotope mass
ITM_MASS_Al_40	40.03145 * ITM_AMU	isotope mass
ITM_MASS_Al_41	41.03833 * ITM_AMU	isotope mass
ITM_MASS_Al_42	42.04689 * ITM_AMU	isotope mass
ITM_MASS_Si_22	22.03453 * ITM_AMU	isotope mass
ITM_MASS_Si_23	23.02552 * ITM_AMU	isotope mass
ITM_MASS_Si_24	24.011546 * ITM_AMU	isotope mass
ITM_MASS_Si_25	25.004106 * ITM_AMU	isotope mass
ITM_MASS_Si_26	25.992330 * ITM_AMU	isotope mass
ITM_MASS_Si_27	26.98670491 * ITM_AMU	isotope mass
ITM_MASS_Si_28	27.9769265325 * ITM_AMU	isotope mass
ITM_MASS_Si_29	28.976494700 * ITM_AMU	isotope mass
ITM_MASS_Si_30	29.97377017 * ITM_AMU	isotope mass
ITM_MASS_Si_31	30.97536323 * ITM_AMU	isotope mass
ITM_MASS_Si_32	31.97414808 * ITM_AMU	isotope mass
ITM_MASS_Si_33	32.978000 * ITM_AMU	isotope mass
ITM_MASS_Si_34	33.978576 * ITM_AMU	isotope mass
ITM_MASS_Si_35	34.984580 * ITM_AMU	isotope mass
ITM_MASS_Si_36	35.98660 * ITM_AMU	isotope mass
ITM_MASS_Si_37	36.99294 * ITM_AMU	isotope mass
ITM_MASS_Si_38	37.99563 * ITM_AMU	isotope mass
ITM_MASS_Si_39	39.00207 * ITM_AMU	isotope mass
ITM_MASS_Si_40	40.00587 * ITM_AMU	isotope mass
ITM_MASS_Si_41	41.01456 * ITM_AMU	isotope mass
ITM_MASS_Si_42	42.01979 * ITM_AMU	isotope mass
ITM_MASS_Si_43	43.02866 * ITM_AMU	isotope mass
ITM_MASS_Si_44	44.03526 * ITM_AMU	isotope mass
ITM_MASS_P_24	24.03435 * ITM_AMU	isotope mass
ITM_MASS_P_25	25.02026 * ITM_AMU	isotope mass
ITM_MASS_P_26	26.01178 * ITM_AMU	isotope mass
ITM_MASS_P_27	26.999230 * ITM_AMU	isotope mass
ITM_MASS_P_28	27.992315 * ITM_AMU	isotope mass
ITM_MASS_P_29	28.9818006 * ITM_AMU	isotope mass
ITM_MASS_P_30	29.9783138 * ITM_AMU	isotope mass
ITM_MASS_P_31	30.97376163 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_P_32	31.97390727 * ITM_AMU	isotope mass
ITM_MASS_P_33	32.9717255 * ITM_AMU	isotope mass
ITM_MASS_P_34	33.973636 * ITM_AMU	isotope mass
ITM_MASS_P_35	34.9733141 * ITM_AMU	isotope mass
ITM_MASS_P_36	35.978260 * ITM_AMU	isotope mass
ITM_MASS_P_37	36.979610 * ITM_AMU	isotope mass
ITM_MASS_P_38	37.98416 * ITM_AMU	isotope mass
ITM_MASS_P_39	38.98618 * ITM_AMU	isotope mass
ITM_MASS_P_40	39.99130 * ITM_AMU	isotope mass
ITM_MASS_P_41	40.99434 * ITM_AMU	isotope mass
ITM_MASS_P_42	42.00101 * ITM_AMU	isotope mass
ITM_MASS_P_43	43.00619 * ITM_AMU	isotope mass
ITM_MASS_P_44	44.01299 * ITM_AMU	isotope mass
ITM_MASS_P_45	45.01922 * ITM_AMU	isotope mass
ITM_MASS_P_46	46.02738 * ITM_AMU	isotope mass
ITM_MASS_S_26	26.02788 * ITM_AMU	isotope mass
ITM_MASS_S_27	27.01883 * ITM_AMU	isotope mass
ITM_MASS_S_28	28.00437 * ITM_AMU	isotope mass
ITM_MASS_S_29	28.996610 * ITM_AMU	isotope mass
ITM_MASS_S_30	29.984903 * ITM_AMU	isotope mass
ITM_MASS_S_31	30.9795547 * ITM_AMU	isotope mass
ITM_MASS_S_32	31.97207100 * ITM_AMU	isotope mass
ITM_MASS_S_33	32.97145876 * ITM_AMU	isotope mass
ITM_MASS_S_34	33.96786690 * ITM_AMU	isotope mass
ITM_MASS_S_35	34.96903216 * ITM_AMU	isotope mass
ITM_MASS_S_36	35.96708076 * ITM_AMU	isotope mass
ITM_MASS_S_37	36.97112557 * ITM_AMU	isotope mass
ITM_MASS_S_38	37.971163 * ITM_AMU	isotope mass
ITM_MASS_S_39	38.975130 * ITM_AMU	isotope mass
ITM_MASS_S_40	39.97545 * ITM_AMU	isotope mass
ITM_MASS_S_41	40.97958 * ITM_AMU	isotope mass
ITM_MASS_S_42	41.98102 * ITM_AMU	isotope mass
ITM_MASS_S_43	42.98715 * ITM_AMU	isotope mass
ITM_MASS_S_44	43.99021 * ITM_AMU	isotope mass
ITM_MASS_S_45	44.99651 * ITM_AMU	isotope mass
ITM_MASS_S_46	46.00075 * ITM_AMU	isotope mass
ITM_MASS_S_47	47.00859 * ITM_AMU	isotope mass
ITM_MASS_S_48	48.01417 * ITM_AMU	isotope mass
ITM_MASS_S_49	49.02362 * ITM_AMU	isotope mass
ITM_MASS_Cl_28	28.02851 * ITM_AMU	isotope mass
ITM_MASS_Cl_29	29.01411 * ITM_AMU	isotope mass
ITM_MASS_Cl_30	30.00477 * ITM_AMU	isotope mass
ITM_MASS_Cl_31	30.992410 * ITM_AMU	isotope mass
ITM_MASS_Cl_32	31.985690 * ITM_AMU	isotope mass
ITM_MASS_Cl_33	32.9774519 * ITM_AMU	isotope mass
ITM_MASS_Cl_34	33.97376282 * ITM_AMU	isotope mass
ITM_MASS_Cl_35	34.96885268 * ITM_AMU	isotope mass
ITM_MASS_Cl_36	35.96830698 * ITM_AMU	isotope mass
ITM_MASS_Cl_37	36.96590259 * ITM_AMU	isotope mass
ITM_MASS_Cl_38	37.96801043 * ITM_AMU	isotope mass
ITM_MASS_Cl_39	38.9680082 * ITM_AMU	isotope mass
ITM_MASS_Cl_40	39.970420 * ITM_AMU	isotope mass
ITM_MASS_Cl_41	40.970680 * ITM_AMU	isotope mass
ITM_MASS_Cl_42	41.97325 * ITM_AMU	isotope mass
ITM_MASS_Cl_43	42.97405 * ITM_AMU	isotope mass
ITM_MASS_Cl_44	43.97828 * ITM_AMU	isotope mass
ITM_MASS_Cl_45	44.98029 * ITM_AMU	isotope mass
ITM_MASS_Cl_46	45.98421 * ITM_AMU	isotope mass
ITM_MASS_Cl_47	46.98871 * ITM_AMU	isotope mass
ITM_MASS_Cl_48	47.99495 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Cl_49	49.00032 * ITM_AMU	isotope mass
ITM_MASS_Cl_50	50.00784 * ITM_AMU	isotope mass
ITM_MASS_Cl_51	51.01449 * ITM_AMU	isotope mass
ITM_MASS_Ar_30	30.02156 * ITM_AMU	isotope mass
ITM_MASS_Ar_31	31.01212 * ITM_AMU	isotope mass
ITM_MASS_Ar_32	31.9976380 * ITM_AMU	isotope mass
ITM_MASS_Ar_33	32.9899257 * ITM_AMU	isotope mass
ITM_MASS_Ar_34	33.9802712 * ITM_AMU	isotope mass
ITM_MASS_Ar_35	34.9752576 * ITM_AMU	isotope mass
ITM_MASS_Ar_36	35.967545106 * ITM_AMU	isotope mass
ITM_MASS_Ar_37	36.96677632 * ITM_AMU	isotope mass
ITM_MASS_Ar_38	37.9627324 * ITM_AMU	isotope mass
ITM_MASS_Ar_39	38.964313 * ITM_AMU	isotope mass
ITM_MASS_Ar_40	39.9623831225 * ITM_AMU	isotope mass
ITM_MASS_Ar_41	40.9645006 * ITM_AMU	isotope mass
ITM_MASS_Ar_42	41.963046 * ITM_AMU	isotope mass
ITM_MASS_Ar_43	42.965636 * ITM_AMU	isotope mass
ITM_MASS_Ar_44	43.9649240 * ITM_AMU	isotope mass
ITM_MASS_Ar_45	44.9680400 * ITM_AMU	isotope mass
ITM_MASS_Ar_46	45.968090 * ITM_AMU	isotope mass
ITM_MASS_Ar_47	46.97219 * ITM_AMU	isotope mass
ITM_MASS_Ar_48	47.97454 * ITM_AMU	isotope mass
ITM_MASS_Ar_49	48.98052 * ITM_AMU	isotope mass
ITM_MASS_Ar_50	49.98443 * ITM_AMU	isotope mass
ITM_MASS_Ar_51	50.99163 * ITM_AMU	isotope mass
ITM_MASS_Ar_52	51.99678 * ITM_AMU	isotope mass
ITM_MASS_Ar_53	53.00494 * ITM_AMU	isotope mass
ITM_MASS_K_32	32.02192 * ITM_AMU	isotope mass
ITM_MASS_K_33	33.00726 * ITM_AMU	isotope mass
ITM_MASS_K_34	33.99841 * ITM_AMU	isotope mass
ITM_MASS_K_35	34.988010 * ITM_AMU	isotope mass
ITM_MASS_K_36	35.981292 * ITM_AMU	isotope mass
ITM_MASS_K_37	36.97337589 * ITM_AMU	isotope mass
ITM_MASS_K_38	37.9690812 * ITM_AMU	isotope mass
ITM_MASS_K_39	38.96370668 * ITM_AMU	isotope mass
ITM_MASS_K_40	39.96399848 * ITM_AMU	isotope mass
ITM_MASS_K_41	40.96182576 * ITM_AMU	isotope mass
ITM_MASS_K_42	41.96240281 * ITM_AMU	isotope mass
ITM_MASS_K_43	42.960716 * ITM_AMU	isotope mass
ITM_MASS_K_44	43.961560 * ITM_AMU	isotope mass
ITM_MASS_K_45	44.960699 * ITM_AMU	isotope mass
ITM_MASS_K_46	45.961977 * ITM_AMU	isotope mass
ITM_MASS_K_47	46.961678 * ITM_AMU	isotope mass
ITM_MASS_K_48	47.965514 * ITM_AMU	isotope mass
ITM_MASS_K_49	48.967450 * ITM_AMU	isotope mass
ITM_MASS_K_50	49.97278 * ITM_AMU	isotope mass
ITM_MASS_K_51	50.97638 * ITM_AMU	isotope mass
ITM_MASS_K_52	51.98261 * ITM_AMU	isotope mass
ITM_MASS_K_53	52.98712 * ITM_AMU	isotope mass
ITM_MASS_K_54	53.99420 * ITM_AMU	isotope mass
ITM_MASS_K_55	54.99971 * ITM_AMU	isotope mass
ITM_MASS_Ca_34	34.01412 * ITM_AMU	isotope mass
ITM_MASS_Ca_35	35.00494 * ITM_AMU	isotope mass
ITM_MASS_Ca_36	35.993090 * ITM_AMU	isotope mass
ITM_MASS_Ca_37	36.985870 * ITM_AMU	isotope mass
ITM_MASS_Ca_38	37.976318 * ITM_AMU	isotope mass
ITM_MASS_Ca_39	38.9707197 * ITM_AMU	isotope mass
ITM_MASS_Ca_40	39.96259098 * ITM_AMU	isotope mass
ITM_MASS_Ca_41	40.96227806 * ITM_AMU	isotope mass
ITM_MASS_Ca_42	41.95861801 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ca_43	42.9587666 * ITM_AMU	isotope mass
ITM_MASS_Ca_44	43.9554818 * ITM_AMU	isotope mass
ITM_MASS_Ca_45	44.9561866 * ITM_AMU	isotope mass
ITM_MASS_Ca_46	45.9536926 * ITM_AMU	isotope mass
ITM_MASS_Ca_47	46.9545460 * ITM_AMU	isotope mass
ITM_MASS_Ca_48	47.952534 * ITM_AMU	isotope mass
ITM_MASS_Ca_49	48.955674 * ITM_AMU	isotope mass
ITM_MASS_Ca_50	49.957519 * ITM_AMU	isotope mass
ITM_MASS_Ca_51	50.96150 * ITM_AMU	isotope mass
ITM_MASS_Ca_52	51.96510 * ITM_AMU	isotope mass
ITM_MASS_Ca_53	52.97005 * ITM_AMU	isotope mass
ITM_MASS_Ca_54	53.97435 * ITM_AMU	isotope mass
ITM_MASS_Ca_55	54.98055 * ITM_AMU	isotope mass
ITM_MASS_Ca_56	55.98557 * ITM_AMU	isotope mass
ITM_MASS_Ca_57	56.99236 * ITM_AMU	isotope mass
ITM_MASS_Sc_36	36.01492 * ITM_AMU	isotope mass
ITM_MASS_Sc_37	37.00305 * ITM_AMU	isotope mass
ITM_MASS_Sc_38	37.99470 * ITM_AMU	isotope mass
ITM_MASS_Sc_39	38.984790 * ITM_AMU	isotope mass
ITM_MASS_Sc_40	39.977967 * ITM_AMU	isotope mass
ITM_MASS_Sc_41	40.96925113 * ITM_AMU	isotope mass
ITM_MASS_Sc_42	41.96551643 * ITM_AMU	isotope mass
ITM_MASS_Sc_43	42.9611507 * ITM_AMU	isotope mass
ITM_MASS_Sc_44	43.9594028 * ITM_AMU	isotope mass
ITM_MASS_Sc_45	44.9559119 * ITM_AMU	isotope mass
ITM_MASS_Sc_46	45.9551719 * ITM_AMU	isotope mass
ITM_MASS_Sc_47	46.9524075 * ITM_AMU	isotope mass
ITM_MASS_Sc_48	47.952231 * ITM_AMU	isotope mass
ITM_MASS_Sc_49	48.950024 * ITM_AMU	isotope mass
ITM_MASS_Sc_50	49.952188 * ITM_AMU	isotope mass
ITM_MASS_Sc_51	50.953603 * ITM_AMU	isotope mass
ITM_MASS_Sc_52	51.95668 * ITM_AMU	isotope mass
ITM_MASS_Sc_53	52.95961 * ITM_AMU	isotope mass
ITM_MASS_Sc_54	53.96326 * ITM_AMU	isotope mass
ITM_MASS_Sc_55	54.96824 * ITM_AMU	isotope mass
ITM_MASS_Sc_56	55.97287 * ITM_AMU	isotope mass
ITM_MASS_Sc_57	56.97779 * ITM_AMU	isotope mass
ITM_MASS_Sc_58	57.98371 * ITM_AMU	isotope mass
ITM_MASS_Sc_59	58.98922 * ITM_AMU	isotope mass
ITM_MASS_Sc_60	59.99571 * ITM_AMU	isotope mass
ITM_MASS_Ti_38	38.00977 * ITM_AMU	isotope mass
ITM_MASS_Ti_39	39.00161 * ITM_AMU	isotope mass
ITM_MASS_Ti_40	39.99050 * ITM_AMU	isotope mass
ITM_MASS_Ti_41	40.98315 * ITM_AMU	isotope mass
ITM_MASS_Ti_42	41.973031 * ITM_AMU	isotope mass
ITM_MASS_Ti_43	42.968522 * ITM_AMU	isotope mass
ITM_MASS_Ti_44	43.9596901 * ITM_AMU	isotope mass
ITM_MASS_Ti_45	44.9581256 * ITM_AMU	isotope mass
ITM_MASS_Ti_46	45.9526316 * ITM_AMU	isotope mass
ITM_MASS_Ti_47	46.9517631 * ITM_AMU	isotope mass
ITM_MASS_Ti_48	47.9479463 * ITM_AMU	isotope mass
ITM_MASS_Ti_49	48.9478700 * ITM_AMU	isotope mass
ITM_MASS_Ti_50	49.9447912 * ITM_AMU	isotope mass
ITM_MASS_Ti_51	50.9466150 * ITM_AMU	isotope mass
ITM_MASS_Ti_52	51.946897 * ITM_AMU	isotope mass
ITM_MASS_Ti_53	52.94973 * ITM_AMU	isotope mass
ITM_MASS_Ti_54	53.95105 * ITM_AMU	isotope mass
ITM_MASS_Ti_55	54.95527 * ITM_AMU	isotope mass
ITM_MASS_Ti_56	55.95820 * ITM_AMU	isotope mass
ITM_MASS_Ti_57	56.96399 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ti_58	`57.96697 * ITM_AMU`	isotope mass
ITM_MASS_Ti_59	`58.97293 * ITM_AMU`	isotope mass
ITM_MASS_Ti_60	`59.97676 * ITM_AMU`	isotope mass
ITM_MASS_Ti_61	`60.98320 * ITM_AMU`	isotope mass
ITM_MASS_Ti_62	`61.98749 * ITM_AMU`	isotope mass
ITM_MASS_Ti_63	`62.99442 * ITM_AMU`	isotope mass
ITM_MASS_V_40	`40.01109 * ITM_AMU`	isotope mass
ITM_MASS_V_41	`40.99978 * ITM_AMU`	isotope mass
ITM_MASS_V_42	`41.99123 * ITM_AMU`	isotope mass
ITM_MASS_V_43	`42.98065 * ITM_AMU`	isotope mass
ITM_MASS_V_44	`43.97411 * ITM_AMU`	isotope mass
ITM_MASS_V_45	`44.965776 * ITM_AMU`	isotope mass
ITM_MASS_V_46	`45.9602005 * ITM_AMU`	isotope mass
ITM_MASS_V_47	`46.9549089 * ITM_AMU`	isotope mass
ITM_MASS_V_48	`47.9522537 * ITM_AMU`	isotope mass
ITM_MASS_V_49	`48.9485161 * ITM_AMU`	isotope mass
ITM_MASS_V_50	`49.9471585 * ITM_AMU`	isotope mass
ITM_MASS_V_51	`50.9439595 * ITM_AMU`	isotope mass
ITM_MASS_V_52	`51.9447755 * ITM_AMU`	isotope mass
ITM_MASS_V_53	`52.944338 * ITM_AMU`	isotope mass
ITM_MASS_V_54	`53.946440 * ITM_AMU`	isotope mass
ITM_MASS_V_55	`54.94723 * ITM_AMU`	isotope mass
ITM_MASS_V_56	`55.95053 * ITM_AMU`	isotope mass
ITM_MASS_V_57	`56.95256 * ITM_AMU`	isotope mass
ITM_MASS_V_58	`57.95683 * ITM_AMU`	isotope mass
ITM_MASS_V_59	`58.96021 * ITM_AMU`	isotope mass
ITM_MASS_V_60	`59.96503 * ITM_AMU`	isotope mass
ITM_MASS_V_61	`60.96848 * ITM_AMU`	isotope mass
ITM_MASS_V_62	`61.97378 * ITM_AMU`	isotope mass
ITM_MASS_V_63	`62.97755 * ITM_AMU`	isotope mass
ITM_MASS_V_64	`63.98347 * ITM_AMU`	isotope mass
ITM_MASS_V_65	`64.98792 * ITM_AMU`	isotope mass
ITM_MASS_Cr_42	`42.00643 * ITM_AMU`	isotope mass
ITM_MASS_Cr_43	`42.99771 * ITM_AMU`	isotope mass
ITM_MASS_Cr_44	`43.985550 * ITM_AMU`	isotope mass
ITM_MASS_Cr_45	`44.97964 * ITM_AMU`	isotope mass
ITM_MASS_Cr_46	`45.968359 * ITM_AMU`	isotope mass
ITM_MASS_Cr_47	`46.962900 * ITM_AMU`	isotope mass
ITM_MASS_Cr_48	`47.954032 * ITM_AMU`	isotope mass
ITM_MASS_Cr_49	`48.9513357 * ITM_AMU`	isotope mass
ITM_MASS_Cr_50	`49.9460442 * ITM_AMU`	isotope mass
ITM_MASS_Cr_51	`50.9447674 * ITM_AMU`	isotope mass
ITM_MASS_Cr_52	`51.9405075 * ITM_AMU`	isotope mass
ITM_MASS_Cr_53	`52.9406494 * ITM_AMU`	isotope mass
ITM_MASS_Cr_54	`53.9388804 * ITM_AMU`	isotope mass
ITM_MASS_Cr_55	`54.9408397 * ITM_AMU`	isotope mass
ITM_MASS_Cr_56	`55.9406531 * ITM_AMU`	isotope mass
ITM_MASS_Cr_57	`56.9436130 * ITM_AMU`	isotope mass
ITM_MASS_Cr_58	`57.94435 * ITM_AMU`	isotope mass
ITM_MASS_Cr_59	`58.94859 * ITM_AMU`	isotope mass
ITM_MASS_Cr_60	`59.95008 * ITM_AMU`	isotope mass
ITM_MASS_Cr_61	`60.95472 * ITM_AMU`	isotope mass
ITM_MASS_Cr_62	`61.95661 * ITM_AMU`	isotope mass
ITM_MASS_Cr_63	`62.96186 * ITM_AMU`	isotope mass
ITM_MASS_Cr_64	`63.96441 * ITM_AMU`	isotope mass
ITM_MASS_Cr_65	`64.97016 * ITM_AMU`	isotope mass
ITM_MASS_Cr_66	`65.97338 * ITM_AMU`	isotope mass
ITM_MASS_Cr_67	`66.97955 * ITM_AMU`	isotope mass
ITM_MASS_Mn_44	`44.00687 * ITM_AMU`	isotope mass
ITM_MASS_Mn_45	`44.99451 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Mn_46	`45.98672 * ITM_AMU`	isotope mass
ITM_MASS_Mn_47	`46.97610 * ITM_AMU`	isotope mass
ITM_MASS_Mn_48	`47.96852 * ITM_AMU`	isotope mass
ITM_MASS_Mn_49	`48.959618 * ITM_AMU`	isotope mass
ITM_MASS_Mn_50	`49.9542382 * ITM_AMU`	isotope mass
ITM_MASS_Mn_51	`50.9482108 * ITM_AMU`	isotope mass
ITM_MASS_Mn_52	`51.9455655 * ITM_AMU`	isotope mass
ITM_MASS_Mn_53	`52.9412901 * ITM_AMU`	isotope mass
ITM_MASS_Mn_54	`53.9403589 * ITM_AMU`	isotope mass
ITM_MASS_Mn_55	`54.9380451 * ITM_AMU`	isotope mass
ITM_MASS_Mn_56	`55.9389049 * ITM_AMU`	isotope mass
ITM_MASS_Mn_57	`56.9382854 * ITM_AMU`	isotope mass
ITM_MASS_Mn_58	`57.939980 * ITM_AMU`	isotope mass
ITM_MASS_Mn_59	`58.940440 * ITM_AMU`	isotope mass
ITM_MASS_Mn_60	`59.942910 * ITM_AMU`	isotope mass
ITM_MASS_Mn_61	`60.94465 * ITM_AMU`	isotope mass
ITM_MASS_Mn_62	`61.94843 * ITM_AMU`	isotope mass
ITM_MASS_Mn_63	`62.95024 * ITM_AMU`	isotope mass
ITM_MASS_Mn_64	`63.95425 * ITM_AMU`	isotope mass
ITM_MASS_Mn_65	`64.95634 * ITM_AMU`	isotope mass
ITM_MASS_Mn_66	`65.96108 * ITM_AMU`	isotope mass
ITM_MASS_Mn_67	`66.96414 * ITM_AMU`	isotope mass
ITM_MASS_Mn_68	`67.96930 * ITM_AMU`	isotope mass
ITM_MASS_Mn_69	`68.97284 * ITM_AMU`	isotope mass
ITM_MASS_Fe_45	`45.01458 * ITM_AMU`	isotope mass
ITM_MASS_Fe_46	`46.00081 * ITM_AMU`	isotope mass
ITM_MASS_Fe_47	`46.99289 * ITM_AMU`	isotope mass
ITM_MASS_Fe_48	`47.980500 * ITM_AMU`	isotope mass
ITM_MASS_Fe_49	`48.97361 * ITM_AMU`	isotope mass
ITM_MASS_Fe_50	`49.962990 * ITM_AMU`	isotope mass
ITM_MASS_Fe_51	`50.956820 * ITM_AMU`	isotope mass
ITM_MASS_Fe_52	`51.948114 * ITM_AMU`	isotope mass
ITM_MASS_Fe_53	`52.9453079 * ITM_AMU`	isotope mass
ITM_MASS_Fe_54	`53.9396105 * ITM_AMU`	isotope mass
ITM_MASS_Fe_55	`54.9382934 * ITM_AMU`	isotope mass
ITM_MASS_Fe_56	`55.9349375 * ITM_AMU`	isotope mass
ITM_MASS_Fe_57	`56.9353940 * ITM_AMU`	isotope mass
ITM_MASS_Fe_58	`57.9332756 * ITM_AMU`	isotope mass
ITM_MASS_Fe_59	`58.9348755 * ITM_AMU`	isotope mass
ITM_MASS_Fe_60	`59.934072 * ITM_AMU`	isotope mass
ITM_MASS_Fe_61	`60.936745 * ITM_AMU`	isotope mass
ITM_MASS_Fe_62	`61.936767 * ITM_AMU`	isotope mass
ITM_MASS_Fe_63	`62.94037 * ITM_AMU`	isotope mass
ITM_MASS_Fe_64	`63.94120 * ITM_AMU`	isotope mass
ITM_MASS_Fe_65	`64.94538 * ITM_AMU`	isotope mass
ITM_MASS_Fe_66	`65.94678 * ITM_AMU`	isotope mass
ITM_MASS_Fe_67	`66.95095 * ITM_AMU`	isotope mass
ITM_MASS_Fe_68	`67.95370 * ITM_AMU`	isotope mass
ITM_MASS_Fe_69	`68.95878 * ITM_AMU`	isotope mass
ITM_MASS_Fe_70	`69.96146 * ITM_AMU`	isotope mass
ITM_MASS_Fe_71	`70.96672 * ITM_AMU`	isotope mass
ITM_MASS_Fe_72	`71.96962 * ITM_AMU`	isotope mass
ITM_MASS_Co_47	`47.01149 * ITM_AMU`	isotope mass
ITM_MASS_Co_48	`48.00176 * ITM_AMU`	isotope mass
ITM_MASS_Co_49	`48.98972 * ITM_AMU`	isotope mass
ITM_MASS_Co_50	`49.98154 * ITM_AMU`	isotope mass
ITM_MASS_Co_51	`50.97072 * ITM_AMU`	isotope mass
ITM_MASS_Co_52	`51.963590 * ITM_AMU`	isotope mass
ITM_MASS_Co_53	`52.954219 * ITM_AMU`	isotope mass
ITM_MASS_Co_54	`53.9484596 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Co_55	54.9419990 * ITM_AMU	isotope mass
ITM_MASS_Co_56	55.9398393 * ITM_AMU	isotope mass
ITM_MASS_Co_57	56.9362914 * ITM_AMU	isotope mass
ITM_MASS_Co_58	57.9357528 * ITM_AMU	isotope mass
ITM_MASS_Co_59	58.9331950 * ITM_AMU	isotope mass
ITM_MASS_Co_60	59.9338171 * ITM_AMU	isotope mass
ITM_MASS_Co_61	60.9324758 * ITM_AMU	isotope mass
ITM_MASS_Co_62	61.934051 * ITM_AMU	isotope mass
ITM_MASS_Co_63	62.933612 * ITM_AMU	isotope mass
ITM_MASS_Co_64	63.935810 * ITM_AMU	isotope mass
ITM_MASS_Co_65	64.936478 * ITM_AMU	isotope mass
ITM_MASS_Co_66	65.93976 * ITM_AMU	isotope mass
ITM_MASS_Co_67	66.94089 * ITM_AMU	isotope mass
ITM_MASS_Co_68	67.94487 * ITM_AMU	isotope mass
ITM_MASS_Co_69	68.94632 * ITM_AMU	isotope mass
ITM_MASS_Co_70	69.95100 * ITM_AMU	isotope mass
ITM_MASS_Co_71	70.95290 * ITM_AMU	isotope mass
ITM_MASS_Co_72	71.95781 * ITM_AMU	isotope mass
ITM_MASS_Co_73	72.96024 * ITM_AMU	isotope mass
ITM_MASS_Co_74	73.96538 * ITM_AMU	isotope mass
ITM_MASS_Co_75	74.96833 * ITM_AMU	isotope mass
ITM_MASS_Ni_48	48.01975 * ITM_AMU	isotope mass
ITM_MASS_Ni_49	49.00966 * ITM_AMU	isotope mass
ITM_MASS_Ni_50	49.99593 * ITM_AMU	isotope mass
ITM_MASS_Ni_51	50.98772 * ITM_AMU	isotope mass
ITM_MASS_Ni_52	51.975680 * ITM_AMU	isotope mass
ITM_MASS_Ni_53	52.96847 * ITM_AMU	isotope mass
ITM_MASS_Ni_54	53.957910 * ITM_AMU	isotope mass
ITM_MASS_Ni_55	54.951330 * ITM_AMU	isotope mass
ITM_MASS_Ni_56	55.942132 * ITM_AMU	isotope mass
ITM_MASS_Ni_57	56.9397935 * ITM_AMU	isotope mass
ITM_MASS_Ni_58	57.9353429 * ITM_AMU	isotope mass
ITM_MASS_Ni_59	58.9343467 * ITM_AMU	isotope mass
ITM_MASS_Ni_60	59.9307864 * ITM_AMU	isotope mass
ITM_MASS_Ni_61	60.9310560 * ITM_AMU	isotope mass
ITM_MASS_Ni_62	61.9283451 * ITM_AMU	isotope mass
ITM_MASS_Ni_63	62.9296694 * ITM_AMU	isotope mass
ITM_MASS_Ni_64	63.9279660 * ITM_AMU	isotope mass
ITM_MASS_Ni_65	64.9300843 * ITM_AMU	isotope mass
ITM_MASS_Ni_66	65.9291393 * ITM_AMU	isotope mass
ITM_MASS_Ni_67	66.931569 * ITM_AMU	isotope mass
ITM_MASS_Ni_68	67.931869 * ITM_AMU	isotope mass
ITM_MASS_Ni_69	68.935610 * ITM_AMU	isotope mass
ITM_MASS_Ni_70	69.93650 * ITM_AMU	isotope mass
ITM_MASS_Ni_71	70.94074 * ITM_AMU	isotope mass
ITM_MASS_Ni_72	71.94209 * ITM_AMU	isotope mass
ITM_MASS_Ni_73	72.94647 * ITM_AMU	isotope mass
ITM_MASS_Ni_74	73.94807 * ITM_AMU	isotope mass
ITM_MASS_Ni_75	74.95287 * ITM_AMU	isotope mass
ITM_MASS_Ni_76	75.95533 * ITM_AMU	isotope mass
ITM_MASS_Ni_77	76.96055 * ITM_AMU	isotope mass
ITM_MASS_Ni_78	77.96318 * ITM_AMU	isotope mass
ITM_MASS_Cu_52	51.99718 * ITM_AMU	isotope mass
ITM_MASS_Cu_53	52.98555 * ITM_AMU	isotope mass
ITM_MASS_Cu_54	53.97671 * ITM_AMU	isotope mass
ITM_MASS_Cu_55	54.96605 * ITM_AMU	isotope mass
ITM_MASS_Cu_56	55.95856 * ITM_AMU	isotope mass
ITM_MASS_Cu_57	56.949211 * ITM_AMU	isotope mass
ITM_MASS_Cu_58	57.9445385 * ITM_AMU	isotope mass
ITM_MASS_Cu_59	58.9394980 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Cu_60	59.9373650 * ITM_AMU	isotope mass
ITM_MASS_Cu_61	60.9334578 * ITM_AMU	isotope mass
ITM_MASS_Cu_62	61.932584 * ITM_AMU	isotope mass
ITM_MASS_Cu_63	62.9295975 * ITM_AMU	isotope mass
ITM_MASS_Cu_64	63.9297642 * ITM_AMU	isotope mass
ITM_MASS_Cu_65	64.9277895 * ITM_AMU	isotope mass
ITM_MASS_Cu_66	65.9288688 * ITM_AMU	isotope mass
ITM_MASS_Cu_67	66.9277303 * ITM_AMU	isotope mass
ITM_MASS_Cu_68	67.9296109 * ITM_AMU	isotope mass
ITM_MASS_Cu_69	68.9294293 * ITM_AMU	isotope mass
ITM_MASS_Cu_70	69.9323923 * ITM_AMU	isotope mass
ITM_MASS_Cu_71	70.9326768 * ITM_AMU	isotope mass
ITM_MASS_Cu_72	71.9358203 * ITM_AMU	isotope mass
ITM_MASS_Cu_73	72.936675 * ITM_AMU	isotope mass
ITM_MASS_Cu_74	73.939875 * ITM_AMU	isotope mass
ITM_MASS_Cu_75	74.94190 * ITM_AMU	isotope mass
ITM_MASS_Cu_76	75.945275 * ITM_AMU	isotope mass
ITM_MASS_Cu_77	76.94785 * ITM_AMU	isotope mass
ITM_MASS_Cu_78	77.95196 * ITM_AMU	isotope mass
ITM_MASS_Cu_79	78.95456 * ITM_AMU	isotope mass
ITM_MASS_Cu_80	79.96087 * ITM_AMU	isotope mass
ITM_MASS_Zn_54	53.99295 * ITM_AMU	isotope mass
ITM_MASS_Zn_55	54.98398 * ITM_AMU	isotope mass
ITM_MASS_Zn_56	55.97238 * ITM_AMU	isotope mass
ITM_MASS_Zn_57	56.96479 * ITM_AMU	isotope mass
ITM_MASS_Zn_58	57.954590 * ITM_AMU	isotope mass
ITM_MASS_Zn_59	58.949260 * ITM_AMU	isotope mass
ITM_MASS_Zn_60	59.941827 * ITM_AMU	isotope mass
ITM_MASS_Zn_61	60.939511 * ITM_AMU	isotope mass
ITM_MASS_Zn_62	61.934330 * ITM_AMU	isotope mass
ITM_MASS_Zn_63	62.9332116 * ITM_AMU	isotope mass
ITM_MASS_Zn_64	63.9291422 * ITM_AMU	isotope mass
ITM_MASS_Zn_65	64.9292410 * ITM_AMU	isotope mass
ITM_MASS_Zn_66	65.9260334 * ITM_AMU	isotope mass
ITM_MASS_Zn_67	66.9271273 * ITM_AMU	isotope mass
ITM_MASS_Zn_68	67.9248442 * ITM_AMU	isotope mass
ITM_MASS_Zn_69	68.9265503 * ITM_AMU	isotope mass
ITM_MASS_Zn_70	69.9253193 * ITM_AMU	isotope mass
ITM_MASS_Zn_71	70.927722 * ITM_AMU	isotope mass
ITM_MASS_Zn_72	71.926858 * ITM_AMU	isotope mass
ITM_MASS_Zn_73	72.929780 * ITM_AMU	isotope mass
ITM_MASS_Zn_74	73.929460 * ITM_AMU	isotope mass
ITM_MASS_Zn_75	74.932940 * ITM_AMU	isotope mass
ITM_MASS_Zn_76	75.933290 * ITM_AMU	isotope mass
ITM_MASS_Zn_77	76.93696 * ITM_AMU	isotope mass
ITM_MASS_Zn_78	77.93844 * ITM_AMU	isotope mass
ITM_MASS_Zn_79	78.94265 * ITM_AMU	isotope mass
ITM_MASS_Zn_80	79.94434 * ITM_AMU	isotope mass
ITM_MASS_Zn_81	80.95048 * ITM_AMU	isotope mass
ITM_MASS_Zn_82	81.95442 * ITM_AMU	isotope mass
ITM_MASS_Zn_83	82.96103 * ITM_AMU	isotope mass
ITM_MASS_Ga_56	55.99491 * ITM_AMU	isotope mass
ITM_MASS_Ga_57	56.98293 * ITM_AMU	isotope mass
ITM_MASS_Ga_58	57.97425 * ITM_AMU	isotope mass
ITM_MASS_Ga_59	58.96337 * ITM_AMU	isotope mass
ITM_MASS_Ga_60	59.95706 * ITM_AMU	isotope mass
ITM_MASS_Ga_61	60.949450 * ITM_AMU	isotope mass
ITM_MASS_Ga_62	61.944175 * ITM_AMU	isotope mass
ITM_MASS_Ga_63	62.9392942 * ITM_AMU	isotope mass
ITM_MASS_Ga_64	63.9368387 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ga_65	64.9327348 * ITM_AMU	isotope mass
ITM_MASS_Ga_66	65.931589 * ITM_AMU	isotope mass
ITM_MASS_Ga_67	66.9282017 * ITM_AMU	isotope mass
ITM_MASS_Ga_68	67.9279801 * ITM_AMU	isotope mass
ITM_MASS_Ga_69	68.9255736 * ITM_AMU	isotope mass
ITM_MASS_Ga_70	69.9260220 * ITM_AMU	isotope mass
ITM_MASS_Ga_71	70.9247013 * ITM_AMU	isotope mass
ITM_MASS_Ga_72	71.9263663 * ITM_AMU	isotope mass
ITM_MASS_Ga_73	72.9251747 * ITM_AMU	isotope mass
ITM_MASS_Ga_74	73.926946 * ITM_AMU	isotope mass
ITM_MASS_Ga_75	74.9265002 * ITM_AMU	isotope mass
ITM_MASS_Ga_76	75.9288276 * ITM_AMU	isotope mass
ITM_MASS_Ga_77	76.9291543 * ITM_AMU	isotope mass
ITM_MASS_Ga_78	77.9316082 * ITM_AMU	isotope mass
ITM_MASS_Ga_79	78.93289 * ITM_AMU	isotope mass
ITM_MASS_Ga_80	79.93652 * ITM_AMU	isotope mass
ITM_MASS_Ga_81	80.93775 * ITM_AMU	isotope mass
ITM_MASS_Ga_82	81.94299 * ITM_AMU	isotope mass
ITM_MASS_Ga_83	82.94698 * ITM_AMU	isotope mass
ITM_MASS_Ga_84	83.95265 * ITM_AMU	isotope mass
ITM_MASS_Ga_85	84.95700 * ITM_AMU	isotope mass
ITM_MASS_Ga_86	85.96312 * ITM_AMU	isotope mass
ITM_MASS_Ge_58	57.99101 * ITM_AMU	isotope mass
ITM_MASS_Ge_59	58.98175 * ITM_AMU	isotope mass
ITM_MASS_Ge_60	59.97019 * ITM_AMU	isotope mass
ITM_MASS_Ge_61	60.96379 * ITM_AMU	isotope mass
ITM_MASS_Ge_62	61.95465 * ITM_AMU	isotope mass
ITM_MASS_Ge_63	62.94964 * ITM_AMU	isotope mass
ITM_MASS_Ge_64	63.941650 * ITM_AMU	isotope mass
ITM_MASS_Ge_65	64.93944 * ITM_AMU	isotope mass
ITM_MASS_Ge_66	65.933840 * ITM_AMU	isotope mass
ITM_MASS_Ge_67	66.932734 * ITM_AMU	isotope mass
ITM_MASS_Ge_68	67.928094 * ITM_AMU	isotope mass
ITM_MASS_Ge_69	68.9279645 * ITM_AMU	isotope mass
ITM_MASS_Ge_70	69.9242474 * ITM_AMU	isotope mass
ITM_MASS_Ge_71	70.9249510 * ITM_AMU	isotope mass
ITM_MASS_Ge_72	71.9220758 * ITM_AMU	isotope mass
ITM_MASS_Ge_73	72.9234589 * ITM_AMU	isotope mass
ITM_MASS_Ge_74	73.9211778 * ITM_AMU	isotope mass
ITM_MASS_Ge_75	74.9228589 * ITM_AMU	isotope mass
ITM_MASS_Ge_76	75.9214026 * ITM_AMU	isotope mass
ITM_MASS_Ge_77	76.9235486 * ITM_AMU	isotope mass
ITM_MASS_Ge_78	77.922853 * ITM_AMU	isotope mass
ITM_MASS_Ge_79	78.92540 * ITM_AMU	isotope mass
ITM_MASS_Ge_80	79.925370 * ITM_AMU	isotope mass
ITM_MASS_Ge_81	80.92882 * ITM_AMU	isotope mass
ITM_MASS_Ge_82	81.92955 * ITM_AMU	isotope mass
ITM_MASS_Ge_83	82.93462 * ITM_AMU	isotope mass
ITM_MASS_Ge_84	83.93747 * ITM_AMU	isotope mass
ITM_MASS_Ge_85	84.94303 * ITM_AMU	isotope mass
ITM_MASS_Ge_86	85.94649 * ITM_AMU	isotope mass
ITM_MASS_Ge_87	86.95251 * ITM_AMU	isotope mass
ITM_MASS_Ge_88	87.95691 * ITM_AMU	isotope mass
ITM_MASS_Ge_89	88.96383 * ITM_AMU	isotope mass
ITM_MASS_As_60	59.99313 * ITM_AMU	isotope mass
ITM_MASS_As_61	60.98062 * ITM_AMU	isotope mass
ITM_MASS_As_62	61.97320 * ITM_AMU	isotope mass
ITM_MASS_As_63	62.96369 * ITM_AMU	isotope mass
ITM_MASS_As_64	63.95757 * ITM_AMU	isotope mass
ITM_MASS_As_65	64.94956 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_As_66	65.94471 * ITM_AMU	isotope mass
ITM_MASS_As_67	66.93919 * ITM_AMU	isotope mass
ITM_MASS_As_68	67.936770 * ITM_AMU	isotope mass
ITM_MASS_As_69	68.932270 * ITM_AMU	isotope mass
ITM_MASS_As_70	69.930920 * ITM_AMU	isotope mass
ITM_MASS_As_71	70.927112 * ITM_AMU	isotope mass
ITM_MASS_As_72	71.926752 * ITM_AMU	isotope mass
ITM_MASS_As_73	72.923825 * ITM_AMU	isotope mass
ITM_MASS_As_74	73.9239287 * ITM_AMU	isotope mass
ITM_MASS_As_75	74.9215965 * ITM_AMU	isotope mass
ITM_MASS_As_76	75.9223940 * ITM_AMU	isotope mass
ITM_MASS_As_77	76.9206473 * ITM_AMU	isotope mass
ITM_MASS_As_78	77.921827 * ITM_AMU	isotope mass
ITM_MASS_As_79	78.920948 * ITM_AMU	isotope mass
ITM_MASS_As_80	79.922534 * ITM_AMU	isotope mass
ITM_MASS_As_81	80.922132 * ITM_AMU	isotope mass
ITM_MASS_As_82	81.92450 * ITM_AMU	isotope mass
ITM_MASS_As_83	82.92498 * ITM_AMU	isotope mass
ITM_MASS_As_84	83.92906 * ITM_AMU	isotope mass
ITM_MASS_As_85	84.93202 * ITM_AMU	isotope mass
ITM_MASS_As_86	85.93650 * ITM_AMU	isotope mass
ITM_MASS_As_87	86.93990 * ITM_AMU	isotope mass
ITM_MASS_As_88	87.94494 * ITM_AMU	isotope mass
ITM_MASS_As_89	88.94939 * ITM_AMU	isotope mass
ITM_MASS_As_90	89.95550 * ITM_AMU	isotope mass
ITM_MASS_As_91	90.96043 * ITM_AMU	isotope mass
ITM_MASS_As_92	91.96680 * ITM_AMU	isotope mass
ITM_MASS_Se_65	64.96466 * ITM_AMU	isotope mass
ITM_MASS_Se_66	65.95521 * ITM_AMU	isotope mass
ITM_MASS_Se_67	66.95009 * ITM_AMU	isotope mass
ITM_MASS_Se_68	67.941800 * ITM_AMU	isotope mass
ITM_MASS_Se_69	68.939560 * ITM_AMU	isotope mass
ITM_MASS_Se_70	69.933390 * ITM_AMU	isotope mass
ITM_MASS_Se_71	70.932240 * ITM_AMU	isotope mass
ITM_MASS_Se_72	71.927112 * ITM_AMU	isotope mass
ITM_MASS_Se_73	72.926765 * ITM_AMU	isotope mass
ITM_MASS_Se_74	73.9224764 * ITM_AMU	isotope mass
ITM_MASS_Se_75	74.9225234 * ITM_AMU	isotope mass
ITM_MASS_Se_76	75.9192136 * ITM_AMU	isotope mass
ITM_MASS_Se_77	76.9199140 * ITM_AMU	isotope mass
ITM_MASS_Se_78	77.9173091 * ITM_AMU	isotope mass
ITM_MASS_Se_79	78.9184991 * ITM_AMU	isotope mass
ITM_MASS_Se_80	79.9165213 * ITM_AMU	isotope mass
ITM_MASS_Se_81	80.9179925 * ITM_AMU	isotope mass
ITM_MASS_Se_82	81.9166994 * ITM_AMU	isotope mass
ITM_MASS_Se_83	82.919118 * ITM_AMU	isotope mass
ITM_MASS_Se_84	83.918462 * ITM_AMU	isotope mass
ITM_MASS_Se_85	84.922250 * ITM_AMU	isotope mass
ITM_MASS_Se_86	85.924272 * ITM_AMU	isotope mass
ITM_MASS_Se_87	86.928520 * ITM_AMU	isotope mass
ITM_MASS_Se_88	87.931420 * ITM_AMU	isotope mass
ITM_MASS_Se_89	88.93645 * ITM_AMU	isotope mass
ITM_MASS_Se_90	89.93996 * ITM_AMU	isotope mass
ITM_MASS_Se_91	90.94596 * ITM_AMU	isotope mass
ITM_MASS_Se_92	91.94992 * ITM_AMU	isotope mass
ITM_MASS_Se_93	92.95629 * ITM_AMU	isotope mass
ITM_MASS_Se_94	93.96049 * ITM_AMU	isotope mass
ITM_MASS_Br_67	66.96479 * ITM_AMU	isotope mass
ITM_MASS_Br_68	67.95852 * ITM_AMU	isotope mass
ITM_MASS_Br_69	68.95011 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Br_70	69.94479 * ITM_AMU	isotope mass
ITM_MASS_Br_71	70.93874 * ITM_AMU	isotope mass
ITM_MASS_Br_72	71.936640 * ITM_AMU	isotope mass
ITM_MASS_Br_73	72.931690 * ITM_AMU	isotope mass
ITM_MASS_Br_74	73.929891 * ITM_AMU	isotope mass
ITM_MASS_Br_75	74.925776 * ITM_AMU	isotope mass
ITM_MASS_Br_76	75.924541 * ITM_AMU	isotope mass
ITM_MASS_Br_77	76.921379 * ITM_AMU	isotope mass
ITM_MASS_Br_78	77.921146 * ITM_AMU	isotope mass
ITM_MASS_Br_79	78.9183371 * ITM_AMU	isotope mass
ITM_MASS_Br_80	79.9185293 * ITM_AMU	isotope mass
ITM_MASS_Br_81	80.9162906 * ITM_AMU	isotope mass
ITM_MASS_Br_82	81.9168041 * ITM_AMU	isotope mass
ITM_MASS_Br_83	82.915180 * ITM_AMU	isotope mass
ITM_MASS_Br_84	83.916479 * ITM_AMU	isotope mass
ITM_MASS_Br_85	84.915608 * ITM_AMU	isotope mass
ITM_MASS_Br_86	85.918798 * ITM_AMU	isotope mass
ITM_MASS_Br_87	86.920711 * ITM_AMU	isotope mass
ITM_MASS_Br_88	87.924070 * ITM_AMU	isotope mass
ITM_MASS_Br_89	88.926390 * ITM_AMU	isotope mass
ITM_MASS_Br_90	89.930630 * ITM_AMU	isotope mass
ITM_MASS_Br_91	90.933970 * ITM_AMU	isotope mass
ITM_MASS_Br_92	91.939260 * ITM_AMU	isotope mass
ITM_MASS_Br_93	92.94305 * ITM_AMU	isotope mass
ITM_MASS_Br_94	93.94868 * ITM_AMU	isotope mass
ITM_MASS_Br_95	94.95287 * ITM_AMU	isotope mass
ITM_MASS_Br_96	95.95853 * ITM_AMU	isotope mass
ITM_MASS_Br_97	96.96280 * ITM_AMU	isotope mass
ITM_MASS_Kr_69	68.96518 * ITM_AMU	isotope mass
ITM_MASS_Kr_70	69.95526 * ITM_AMU	isotope mass
ITM_MASS_Kr_71	70.94963 * ITM_AMU	isotope mass
ITM_MASS_Kr_72	71.942092 * ITM_AMU	isotope mass
ITM_MASS_Kr_73	72.939289 * ITM_AMU	isotope mass
ITM_MASS_Kr_74	73.9330844 * ITM_AMU	isotope mass
ITM_MASS_Kr_75	74.930946 * ITM_AMU	isotope mass
ITM_MASS_Kr_76	75.925910 * ITM_AMU	isotope mass
ITM_MASS_Kr_77	76.9246700 * ITM_AMU	isotope mass
ITM_MASS_Kr_78	77.9203648 * ITM_AMU	isotope mass
ITM_MASS_Kr_79	78.920082 * ITM_AMU	isotope mass
ITM_MASS_Kr_80	79.9163790 * ITM_AMU	isotope mass
ITM_MASS_Kr_81	80.9165920 * ITM_AMU	isotope mass
ITM_MASS_Kr_82	81.9134836 * ITM_AMU	isotope mass
ITM_MASS_Kr_83	82.914136 * ITM_AMU	isotope mass
ITM_MASS_Kr_84	83.911507 * ITM_AMU	isotope mass
ITM_MASS_Kr_85	84.9125273 * ITM_AMU	isotope mass
ITM_MASS_Kr_86	85.91061073 * ITM_AMU	isotope mass
ITM_MASS_Kr_87	86.91335486 * ITM_AMU	isotope mass
ITM_MASS_Kr_88	87.914447 * ITM_AMU	isotope mass
ITM_MASS_Kr_89	88.917630 * ITM_AMU	isotope mass
ITM_MASS_Kr_90	89.919517 * ITM_AMU	isotope mass
ITM_MASS_Kr_91	90.923450 * ITM_AMU	isotope mass
ITM_MASS_Kr_92	91.926156 * ITM_AMU	isotope mass
ITM_MASS_Kr_93	92.93127 * ITM_AMU	isotope mass
ITM_MASS_Kr_94	93.93436 * ITM_AMU	isotope mass
ITM_MASS_Kr_95	94.93984 * ITM_AMU	isotope mass
ITM_MASS_Kr_96	95.94307 * ITM_AMU	isotope mass
ITM_MASS_Kr_97	96.94856 * ITM_AMU	isotope mass
ITM_MASS_Kr_98	97.95191 * ITM_AMU	isotope mass
ITM_MASS_Kr_99	98.95760 * ITM_AMU	isotope mass
ITM_MASS_Kr_100	99.96114 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Rb_71	`70.96532 * ITM_AMU`	isotope mass
ITM_MASS_Rb_72	`71.95908 * ITM_AMU`	isotope mass
ITM_MASS_Rb_73	`72.95056 * ITM_AMU`	isotope mass
ITM_MASS_Rb_74	`73.944265 * ITM_AMU`	isotope mass
ITM_MASS_Rb_75	`74.938570 * ITM_AMU`	isotope mass
ITM_MASS_Rb_76	`75.9350722 * ITM_AMU`	isotope mass
ITM_MASS_Rb_77	`76.930408 * ITM_AMU`	isotope mass
ITM_MASS_Rb_78	`77.928141 * ITM_AMU`	isotope mass
ITM_MASS_Rb_79	`78.923989 * ITM_AMU`	isotope mass
ITM_MASS_Rb_80	`79.922519 * ITM_AMU`	isotope mass
ITM_MASS_Rb_81	`80.918996 * ITM_AMU`	isotope mass
ITM_MASS_Rb_82	`81.9182086 * ITM_AMU`	isotope mass
ITM_MASS_Rb_83	`82.915110 * ITM_AMU`	isotope mass
ITM_MASS_Rb_84	`83.914385 * ITM_AMU`	isotope mass
ITM_MASS_Rb_85	`84.911789738 * ITM_AMU`	isotope mass
ITM_MASS_Rb_86	`85.91116742 * ITM_AMU`	isotope mass
ITM_MASS_Rb_87	`86.909180527 * ITM_AMU`	isotope mass
ITM_MASS_Rb_88	`87.91131559 * ITM_AMU`	isotope mass
ITM_MASS_Rb_89	`88.912278 * ITM_AMU`	isotope mass
ITM_MASS_Rb_90	`89.914802 * ITM_AMU`	isotope mass
ITM_MASS_Rb_91	`90.916537 * ITM_AMU`	isotope mass
ITM_MASS_Rb_92	`91.919729 * ITM_AMU`	isotope mass
ITM_MASS_Rb_93	`92.922042 * ITM_AMU`	isotope mass
ITM_MASS_Rb_94	`93.926405 * ITM_AMU`	isotope mass
ITM_MASS_Rb_95	`94.929303 * ITM_AMU`	isotope mass
ITM_MASS_Rb_96	`95.934270 * ITM_AMU`	isotope mass
ITM_MASS_Rb_97	`96.937350 * ITM_AMU`	isotope mass
ITM_MASS_Rb_98	`97.941790 * ITM_AMU`	isotope mass
ITM_MASS_Rb_99	`98.94538 * ITM_AMU`	isotope mass
ITM_MASS_Rb_100	`99.94987 * ITM_AMU`	isotope mass
ITM_MASS_Rb_101	`100.95320 * ITM_AMU`	isotope mass
ITM_MASS_Rb_102	`101.95887 * ITM_AMU`	isotope mass
ITM_MASS_Sr_73	`72.96597 * ITM_AMU`	isotope mass
ITM_MASS_Sr_74	`73.95631 * ITM_AMU`	isotope mass
ITM_MASS_Sr_75	`74.94995 * ITM_AMU`	isotope mass
ITM_MASS_Sr_76	`75.941770 * ITM_AMU`	isotope mass
ITM_MASS_Sr_77	`76.937945 * ITM_AMU`	isotope mass
ITM_MASS_Sr_78	`77.932180 * ITM_AMU`	isotope mass
ITM_MASS_Sr_79	`78.929708 * ITM_AMU`	isotope mass
ITM_MASS_Sr_80	`79.924521 * ITM_AMU`	isotope mass
ITM_MASS_Sr_81	`80.923212 * ITM_AMU`	isotope mass
ITM_MASS_Sr_82	`81.918402 * ITM_AMU`	isotope mass
ITM_MASS_Sr_83	`82.917557 * ITM_AMU`	isotope mass
ITM_MASS_Sr_84	`83.913425 * ITM_AMU`	isotope mass
ITM_MASS_Sr_85	`84.912933 * ITM_AMU`	isotope mass
ITM_MASS_Sr_86	`85.9092602 * ITM_AMU`	isotope mass
ITM_MASS_Sr_87	`86.9088771 * ITM_AMU`	isotope mass
ITM_MASS_Sr_88	`87.9056121 * ITM_AMU`	isotope mass
ITM_MASS_Sr_89	`88.9074507 * ITM_AMU`	isotope mass
ITM_MASS_Sr_90	`89.907738 * ITM_AMU`	isotope mass
ITM_MASS_Sr_91	`90.910203 * ITM_AMU`	isotope mass
ITM_MASS_Sr_92	`91.911038 * ITM_AMU`	isotope mass
ITM_MASS_Sr_93	`92.914026 * ITM_AMU`	isotope mass
ITM_MASS_Sr_94	`93.915361 * ITM_AMU`	isotope mass
ITM_MASS_Sr_95	`94.919359 * ITM_AMU`	isotope mass
ITM_MASS_Sr_96	`95.921697 * ITM_AMU`	isotope mass
ITM_MASS_Sr_97	`96.926153 * ITM_AMU`	isotope mass
ITM_MASS_Sr_98	`97.928453 * ITM_AMU`	isotope mass
ITM_MASS_Sr_99	`98.933240 * ITM_AMU`	isotope mass
ITM_MASS_Sr_100	`99.93535 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Sr_101	100.94052 * ITM_AMU	isotope mass
ITM_MASS_Sr_102	101.94302 * ITM_AMU	isotope mass
ITM_MASS_Sr_103	102.94895 * ITM_AMU	isotope mass
ITM_MASS_Sr_104	103.95233 * ITM_AMU	isotope mass
ITM_MASS_Sr_105	104.95858 * ITM_AMU	isotope mass
ITM_MASS_Y_76	75.95845 * ITM_AMU	isotope mass
ITM_MASS_Y_77	76.949650 * ITM_AMU	isotope mass
ITM_MASS_Y_78	77.94361 * ITM_AMU	isotope mass
ITM_MASS_Y_79	78.93735 * ITM_AMU	isotope mass
ITM_MASS_Y_80	79.93428 * ITM_AMU	isotope mass
ITM_MASS_Y_81	80.929130 * ITM_AMU	isotope mass
ITM_MASS_Y_82	81.92679 * ITM_AMU	isotope mass
ITM_MASS_Y_83	82.922350 * ITM_AMU	isotope mass
ITM_MASS_Y_84	83.92039 * ITM_AMU	isotope mass
ITM_MASS_Y_85	84.916433 * ITM_AMU	isotope mass
ITM_MASS_Y_86	85.914886 * ITM_AMU	isotope mass
ITM_MASS_Y_87	86.9108757 * ITM_AMU	isotope mass
ITM_MASS_Y_88	87.9095011 * ITM_AMU	isotope mass
ITM_MASS_Y_89	88.9058483 * ITM_AMU	isotope mass
ITM_MASS_Y_90	89.9071519 * ITM_AMU	isotope mass
ITM_MASS_Y_91	90.907305 * ITM_AMU	isotope mass
ITM_MASS_Y_92	91.908949 * ITM_AMU	isotope mass
ITM_MASS_Y_93	92.909583 * ITM_AMU	isotope mass
ITM_MASS_Y_94	93.911595 * ITM_AMU	isotope mass
ITM_MASS_Y_95	94.912821 * ITM_AMU	isotope mass
ITM_MASS_Y_96	95.915891 * ITM_AMU	isotope mass
ITM_MASS_Y_97	96.918134 * ITM_AMU	isotope mass
ITM_MASS_Y_98	97.922203 * ITM_AMU	isotope mass
ITM_MASS_Y_99	98.924636 * ITM_AMU	isotope mass
ITM_MASS_Y_100	99.927760 * ITM_AMU	isotope mass
ITM_MASS_Y_101	100.93031 * ITM_AMU	isotope mass
ITM_MASS_Y_102	101.933560 * ITM_AMU	isotope mass
ITM_MASS_Y_103	102.93673 * ITM_AMU	isotope mass
ITM_MASS_Y_104	103.94105 * ITM_AMU	isotope mass
ITM_MASS_Y_105	104.94487 * ITM_AMU	isotope mass
ITM_MASS_Y_106	105.94979 * ITM_AMU	isotope mass
ITM_MASS_Y_107	106.95414 * ITM_AMU	isotope mass
ITM_MASS_Y_108	107.95948 * ITM_AMU	isotope mass
ITM_MASS_Zr_78	77.95523 * ITM_AMU	isotope mass
ITM_MASS_Zr_79	78.94916 * ITM_AMU	isotope mass
ITM_MASS_Zr_80	79.94040 * ITM_AMU	isotope mass
ITM_MASS_Zr_81	80.93721 * ITM_AMU	isotope mass
ITM_MASS_Zr_82	81.93109 * ITM_AMU	isotope mass
ITM_MASS_Zr_83	82.92865 * ITM_AMU	isotope mass
ITM_MASS_Zr_84	83.92325 * ITM_AMU	isotope mass
ITM_MASS_Zr_85	84.92147 * ITM_AMU	isotope mass
ITM_MASS_Zr_86	85.916470 * ITM_AMU	isotope mass
ITM_MASS_Zr_87	86.914816 * ITM_AMU	isotope mass
ITM_MASS_Zr_88	87.910227 * ITM_AMU	isotope mass
ITM_MASS_Zr_89	88.908890 * ITM_AMU	isotope mass
ITM_MASS_Zr_90	89.9047044 * ITM_AMU	isotope mass
ITM_MASS_Zr_91	90.9056458 * ITM_AMU	isotope mass
ITM_MASS_Zr_92	91.9050408 * ITM_AMU	isotope mass
ITM_MASS_Zr_93	92.9064760 * ITM_AMU	isotope mass
ITM_MASS_Zr_94	93.9063152 * ITM_AMU	isotope mass
ITM_MASS_Zr_95	94.9080426 * ITM_AMU	isotope mass
ITM_MASS_Zr_96	95.9082734 * ITM_AMU	isotope mass
ITM_MASS_Zr_97	96.9109531 * ITM_AMU	isotope mass
ITM_MASS_Zr_98	97.912735 * ITM_AMU	isotope mass
ITM_MASS_Zr_99	98.916512 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Zr_100	`99.917760 * ITM_AMU`	isotope mass
ITM_MASS_Zr_101	`100.921140 * ITM_AMU`	isotope mass
ITM_MASS_Zr_102	`101.922980 * ITM_AMU`	isotope mass
ITM_MASS_Zr_103	`102.92660 * ITM_AMU`	isotope mass
ITM_MASS_Zr_104	`103.92878 * ITM_AMU`	isotope mass
ITM_MASS_Zr_105	`104.93305 * ITM_AMU`	isotope mass
ITM_MASS_Zr_106	`105.93591 * ITM_AMU`	isotope mass
ITM_MASS_Zr_107	`106.94075 * ITM_AMU`	isotope mass
ITM_MASS_Zr_108	`107.94396 * ITM_AMU`	isotope mass
ITM_MASS_Zr_109	`108.94924 * ITM_AMU`	isotope mass
ITM_MASS_Zr_110	`109.95287 * ITM_AMU`	isotope mass
ITM_MASS_Nb_81	`80.94903 * ITM_AMU`	isotope mass
ITM_MASS_Nb_82	`81.94313 * ITM_AMU`	isotope mass
ITM_MASS_Nb_83	`82.93671 * ITM_AMU`	isotope mass
ITM_MASS_Nb_84	`83.93357 * ITM_AMU`	isotope mass
ITM_MASS_Nb_85	`84.92791 * ITM_AMU`	isotope mass
ITM_MASS_Nb_86	`85.925040 * ITM_AMU`	isotope mass
ITM_MASS_Nb_87	`86.920360 * ITM_AMU`	isotope mass
ITM_MASS_Nb_88	`87.91833 * ITM_AMU`	isotope mass
ITM_MASS_Nb_89	`88.913418 * ITM_AMU`	isotope mass
ITM_MASS_Nb_90	`89.911265 * ITM_AMU`	isotope mass
ITM_MASS_Nb_91	`90.906996 * ITM_AMU`	isotope mass
ITM_MASS_Nb_92	`91.907194 * ITM_AMU`	isotope mass
ITM_MASS_Nb_93	`92.9063781 * ITM_AMU`	isotope mass
ITM_MASS_Nb_94	`93.9072839 * ITM_AMU`	isotope mass
ITM_MASS_Nb_95	`94.9068358 * ITM_AMU`	isotope mass
ITM_MASS_Nb_96	`95.908101 * ITM_AMU`	isotope mass
ITM_MASS_Nb_97	`96.9080986 * ITM_AMU`	isotope mass
ITM_MASS_Nb_98	`97.910328 * ITM_AMU`	isotope mass
ITM_MASS_Nb_99	`98.911618 * ITM_AMU`	isotope mass
ITM_MASS_Nb_100	`99.914182 * ITM_AMU`	isotope mass
ITM_MASS_Nb_101	`100.915252 * ITM_AMU`	isotope mass
ITM_MASS_Nb_102	`101.918040 * ITM_AMU`	isotope mass
ITM_MASS_Nb_103	`102.919140 * ITM_AMU`	isotope mass
ITM_MASS_Nb_104	`103.92246 * ITM_AMU`	isotope mass
ITM_MASS_Nb_105	`104.92394 * ITM_AMU`	isotope mass
ITM_MASS_Nb_106	`105.92797 * ITM_AMU`	isotope mass
ITM_MASS_Nb_107	`106.93031 * ITM_AMU`	isotope mass
ITM_MASS_Nb_108	`107.93484 * ITM_AMU`	isotope mass
ITM_MASS_Nb_109	`108.93763 * ITM_AMU`	isotope mass
ITM_MASS_Nb_110	`109.94244 * ITM_AMU`	isotope mass
ITM_MASS_Nb_111	`110.94565 * ITM_AMU`	isotope mass
ITM_MASS_Nb_112	`111.95083 * ITM_AMU`	isotope mass
ITM_MASS_Nb_113	`112.95470 * ITM_AMU`	isotope mass
ITM_MASS_Mo_83	`82.94874 * ITM_AMU`	isotope mass
ITM_MASS_Mo_84	`83.94009 * ITM_AMU`	isotope mass
ITM_MASS_Mo_85	`84.93655 * ITM_AMU`	isotope mass
ITM_MASS_Mo_86	`85.93070 * ITM_AMU`	isotope mass
ITM_MASS_Mo_87	`86.92733 * ITM_AMU`	isotope mass
ITM_MASS_Mo_88	`87.921953 * ITM_AMU`	isotope mass
ITM_MASS_Mo_89	`88.919480 * ITM_AMU`	isotope mass
ITM_MASS_Mo_90	`89.913937 * ITM_AMU`	isotope mass
ITM_MASS_Mo_91	`90.911750 * ITM_AMU`	isotope mass
ITM_MASS_Mo_92	`91.906811 * ITM_AMU`	isotope mass
ITM_MASS_Mo_93	`92.906813 * ITM_AMU`	isotope mass
ITM_MASS_Mo_94	`93.9050883 * ITM_AMU`	isotope mass
ITM_MASS_Mo_95	`94.9058421 * ITM_AMU`	isotope mass
ITM_MASS_Mo_96	`95.9046795 * ITM_AMU`	isotope mass
ITM_MASS_Mo_97	`96.9060215 * ITM_AMU`	isotope mass
ITM_MASS_Mo_98	`97.9054082 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Mo_99	98.9077119 * ITM_AMU	isotope mass
ITM_MASS_Mo_100	99.907477 * ITM_AMU	isotope mass
ITM_MASS_Mo_101	100.910347 * ITM_AMU	isotope mass
ITM_MASS_Mo_102	101.910297 * ITM_AMU	isotope mass
ITM_MASS_Mo_103	102.913210 * ITM_AMU	isotope mass
ITM_MASS_Mo_104	103.913760 * ITM_AMU	isotope mass
ITM_MASS_Mo_105	104.916970 * ITM_AMU	isotope mass
ITM_MASS_Mo_106	105.918137 * ITM_AMU	isotope mass
ITM_MASS_Mo_107	106.92169 * ITM_AMU	isotope mass
ITM_MASS_Mo_108	107.92345 * ITM_AMU	isotope mass
ITM_MASS_Mo_109	108.92781 * ITM_AMU	isotope mass
ITM_MASS_Mo_110	109.92973 * ITM_AMU	isotope mass
ITM_MASS_Mo_111	110.93441 * ITM_AMU	isotope mass
ITM_MASS_Mo_112	111.93684 * ITM_AMU	isotope mass
ITM_MASS_Mo_113	112.94188 * ITM_AMU	isotope mass
ITM_MASS_Mo_114	113.94492 * ITM_AMU	isotope mass
ITM_MASS_Mo_115	114.95029 * ITM_AMU	isotope mass
ITM_MASS_Tc_85	84.94883 * ITM_AMU	isotope mass
ITM_MASS_Tc_86	85.94288 * ITM_AMU	isotope mass
ITM_MASS_Tc_87	86.93653 * ITM_AMU	isotope mass
ITM_MASS_Tc_88	87.93268 * ITM_AMU	isotope mass
ITM_MASS_Tc_89	88.92717 * ITM_AMU	isotope mass
ITM_MASS_Tc_90	89.92356 * ITM_AMU	isotope mass
ITM_MASS_Tc_91	90.91843 * ITM_AMU	isotope mass
ITM_MASS_Tc_92	91.915260 * ITM_AMU	isotope mass
ITM_MASS_Tc_93	92.910249 * ITM_AMU	isotope mass
ITM_MASS_Tc_94	93.909657 * ITM_AMU	isotope mass
ITM_MASS_Tc_95	94.907657 * ITM_AMU	isotope mass
ITM_MASS_Tc_96	95.907871 * ITM_AMU	isotope mass
ITM_MASS_Tc_97	96.906365 * ITM_AMU	isotope mass
ITM_MASS_Tc_98	97.907216 * ITM_AMU	isotope mass
ITM_MASS_Tc_99	98.9062547 * ITM_AMU	isotope mass
ITM_MASS_Tc_100	99.9076578 * ITM_AMU	isotope mass
ITM_MASS_Tc_101	100.907315 * ITM_AMU	isotope mass
ITM_MASS_Tc_102	101.909215 * ITM_AMU	isotope mass
ITM_MASS_Tc_103	102.909181 * ITM_AMU	isotope mass
ITM_MASS_Tc_104	103.911450 * ITM_AMU	isotope mass
ITM_MASS_Tc_105	104.911660 * ITM_AMU	isotope mass
ITM_MASS_Tc_106	105.914358 * ITM_AMU	isotope mass
ITM_MASS_Tc_107	106.91508 * ITM_AMU	isotope mass
ITM_MASS_Tc_108	107.91846 * ITM_AMU	isotope mass
ITM_MASS_Tc_109	108.91998 * ITM_AMU	isotope mass
ITM_MASS_Tc_110	109.923820 * ITM_AMU	isotope mass
ITM_MASS_Tc_111	110.92569 * ITM_AMU	isotope mass
ITM_MASS_Tc_112	111.92915 * ITM_AMU	isotope mass
ITM_MASS_Tc_113	112.93159 * ITM_AMU	isotope mass
ITM_MASS_Tc_114	113.93588 * ITM_AMU	isotope mass
ITM_MASS_Tc_115	114.93869 * ITM_AMU	isotope mass
ITM_MASS_Tc_116	115.94337 * ITM_AMU	isotope mass
ITM_MASS_Tc_117	116.94648 * ITM_AMU	isotope mass
ITM_MASS_Tc_118	117.95148 * ITM_AMU	isotope mass
ITM_MASS_Ru_87	86.94918 * ITM_AMU	isotope mass
ITM_MASS_Ru_88	87.94026 * ITM_AMU	isotope mass
ITM_MASS_Ru_89	88.93611 * ITM_AMU	isotope mass
ITM_MASS_Ru_90	89.92989 * ITM_AMU	isotope mass
ITM_MASS_Ru_91	90.92629 * ITM_AMU	isotope mass
ITM_MASS_Ru_92	91.92012 * ITM_AMU	isotope mass
ITM_MASS_Ru_93	92.917050 * ITM_AMU	isotope mass
ITM_MASS_Ru_94	93.911360 * ITM_AMU	isotope mass
ITM_MASS_Ru_95	94.910413 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ru_96	95.907598 * ITM_AMU	isotope mass
ITM_MASS_Ru_97	96.907555 * ITM_AMU	isotope mass
ITM_MASS_Ru_98	97.905287 * ITM_AMU	isotope mass
ITM_MASS_Ru_99	98.9059393 * ITM_AMU	isotope mass
ITM_MASS_Ru_100	99.9042195 * ITM_AMU	isotope mass
ITM_MASS_Ru_101	100.9055821 * ITM_AMU	isotope mass
ITM_MASS_Ru_102	101.9043493 * ITM_AMU	isotope mass
ITM_MASS_Ru_103	102.9063238 * ITM_AMU	isotope mass
ITM_MASS_Ru_104	103.905433 * ITM_AMU	isotope mass
ITM_MASS_Ru_105	104.907753 * ITM_AMU	isotope mass
ITM_MASS_Ru_106	105.907329 * ITM_AMU	isotope mass
ITM_MASS_Ru_107	106.90991 * ITM_AMU	isotope mass
ITM_MASS_Ru_108	107.91017 * ITM_AMU	isotope mass
ITM_MASS_Ru_109	108.913200 * ITM_AMU	isotope mass
ITM_MASS_Ru_110	109.914140 * ITM_AMU	isotope mass
ITM_MASS_Ru_111	110.917700 * ITM_AMU	isotope mass
ITM_MASS_Ru_112	111.918970 * ITM_AMU	isotope mass
ITM_MASS_Ru_113	112.922490 * ITM_AMU	isotope mass
ITM_MASS_Ru_114	113.92428 * ITM_AMU	isotope mass
ITM_MASS_Ru_115	114.92869 * ITM_AMU	isotope mass
ITM_MASS_Ru_116	115.93081 * ITM_AMU	isotope mass
ITM_MASS_Ru_117	116.93558 * ITM_AMU	isotope mass
ITM_MASS_Ru_118	117.93782 * ITM_AMU	isotope mass
ITM_MASS_Ru_119	118.94284 * ITM_AMU	isotope mass
ITM_MASS_Ru_120	119.94531 * ITM_AMU	isotope mass
ITM_MASS_Rh_89	88.94884 * ITM_AMU	isotope mass
ITM_MASS_Rh_90	89.94287 * ITM_AMU	isotope mass
ITM_MASS_Rh_91	90.93655 * ITM_AMU	isotope mass
ITM_MASS_Rh_92	91.93198 * ITM_AMU	isotope mass
ITM_MASS_Rh_93	92.92574 * ITM_AMU	isotope mass
ITM_MASS_Rh_94	93.92170 * ITM_AMU	isotope mass
ITM_MASS_Rh_95	94.91590 * ITM_AMU	isotope mass
ITM_MASS_Rh_96	95.914461 * ITM_AMU	isotope mass
ITM_MASS_Rh_97	96.911340 * ITM_AMU	isotope mass
ITM_MASS_Rh_98	97.910708 * ITM_AMU	isotope mass
ITM_MASS_Rh_99	98.908132 * ITM_AMU	isotope mass
ITM_MASS_Rh_100	99.908122 * ITM_AMU	isotope mass
ITM_MASS_Rh_101	100.906164 * ITM_AMU	isotope mass
ITM_MASS_Rh_102	101.906843 * ITM_AMU	isotope mass
ITM_MASS_Rh_103	102.905504 * ITM_AMU	isotope mass
ITM_MASS_Rh_104	103.906656 * ITM_AMU	isotope mass
ITM_MASS_Rh_105	104.905694 * ITM_AMU	isotope mass
ITM_MASS_Rh_106	105.907287 * ITM_AMU	isotope mass
ITM_MASS_Rh_107	106.906748 * ITM_AMU	isotope mass
ITM_MASS_Rh_108	107.90873 * ITM_AMU	isotope mass
ITM_MASS_Rh_109	108.908737 * ITM_AMU	isotope mass
ITM_MASS_Rh_110	109.911140 * ITM_AMU	isotope mass
ITM_MASS_Rh_111	110.911590 * ITM_AMU	isotope mass
ITM_MASS_Rh_112	111.914390 * ITM_AMU	isotope mass
ITM_MASS_Rh_113	112.915530 * ITM_AMU	isotope mass
ITM_MASS_Rh_114	113.91881 * ITM_AMU	isotope mass
ITM_MASS_Rh_115	114.920330 * ITM_AMU	isotope mass
ITM_MASS_Rh_116	115.92406 * ITM_AMU	isotope mass
ITM_MASS_Rh_117	116.92598 * ITM_AMU	isotope mass
ITM_MASS_Rh_118	117.93007 * ITM_AMU	isotope mass
ITM_MASS_Rh_119	118.93211 * ITM_AMU	isotope mass
ITM_MASS_Rh_120	119.93641 * ITM_AMU	isotope mass
ITM_MASS_Rh_121	120.93872 * ITM_AMU	isotope mass
ITM_MASS_Rh_122	121.94321 * ITM_AMU	isotope mass
ITM_MASS_Pd_91	90.94911 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Pd_92	`91.94042 * ITM_AMU`	isotope mass
ITM_MASS_Pd_93	`92.93591 * ITM_AMU`	isotope mass
ITM_MASS_Pd_94	`93.92877 * ITM_AMU`	isotope mass
ITM_MASS_Pd_95	`94.92469 * ITM_AMU`	isotope mass
ITM_MASS_Pd_96	`95.91816 * ITM_AMU`	isotope mass
ITM_MASS_Pd_97	`96.91648 * ITM_AMU`	isotope mass
ITM_MASS_Pd_98	`97.912721 * ITM_AMU`	isotope mass
ITM_MASS_Pd_99	`98.911768 * ITM_AMU`	isotope mass
ITM_MASS_Pd_100	`99.908506 * ITM_AMU`	isotope mass
ITM_MASS_Pd_101	`100.908289 * ITM_AMU`	isotope mass
ITM_MASS_Pd_102	`101.905609 * ITM_AMU`	isotope mass
ITM_MASS_Pd_103	`102.906087 * ITM_AMU`	isotope mass
ITM_MASS_Pd_104	`103.904036 * ITM_AMU`	isotope mass
ITM_MASS_Pd_105	`104.905085 * ITM_AMU`	isotope mass
ITM_MASS_Pd_106	`105.903486 * ITM_AMU`	isotope mass
ITM_MASS_Pd_107	`106.905133 * ITM_AMU`	isotope mass
ITM_MASS_Pd_108	`107.903892 * ITM_AMU`	isotope mass
ITM_MASS_Pd_109	`108.905950 * ITM_AMU`	isotope mass
ITM_MASS_Pd_110	`109.905153 * ITM_AMU`	isotope mass
ITM_MASS_Pd_111	`110.907671 * ITM_AMU`	isotope mass
ITM_MASS_Pd_112	`111.907314 * ITM_AMU`	isotope mass
ITM_MASS_Pd_113	`112.910150 * ITM_AMU`	isotope mass
ITM_MASS_Pd_114	`113.910363 * ITM_AMU`	isotope mass
ITM_MASS_Pd_115	`114.913680 * ITM_AMU`	isotope mass
ITM_MASS_Pd_116	`115.914160 * ITM_AMU`	isotope mass
ITM_MASS_Pd_117	`116.917840 * ITM_AMU`	isotope mass
ITM_MASS_Pd_118	`117.91898 * ITM_AMU`	isotope mass
ITM_MASS_Pd_119	`118.92311 * ITM_AMU`	isotope mass
ITM_MASS_Pd_120	`119.92469 * ITM_AMU`	isotope mass
ITM_MASS_Pd_121	`120.92887 * ITM_AMU`	isotope mass
ITM_MASS_Pd_122	`121.93055 * ITM_AMU`	isotope mass
ITM_MASS_Pd_123	`122.93493 * ITM_AMU`	isotope mass
ITM_MASS_Pd_124	`123.93688 * ITM_AMU`	isotope mass
ITM_MASS_Ag_93	`92.94978 * ITM_AMU`	isotope mass
ITM_MASS_Ag_94	`93.94278 * ITM_AMU`	isotope mass
ITM_MASS_Ag_95	`94.93548 * ITM_AMU`	isotope mass
ITM_MASS_Ag_96	`95.93068 * ITM_AMU`	isotope mass
ITM_MASS_Ag_97	`96.92397 * ITM_AMU`	isotope mass
ITM_MASS_Ag_98	`97.921570 * ITM_AMU`	isotope mass
ITM_MASS_Ag_99	`98.91760 * ITM_AMU`	isotope mass
ITM_MASS_Ag_100	`99.916100 * ITM_AMU`	isotope mass
ITM_MASS_Ag_101	`100.91280 * ITM_AMU`	isotope mass
ITM_MASS_Ag_102	`101.911690 * ITM_AMU`	isotope mass
ITM_MASS_Ag_103	`102.908973 * ITM_AMU`	isotope mass
ITM_MASS_Ag_104	`103.908629 * ITM_AMU`	isotope mass
ITM_MASS_Ag_105	`104.906529 * ITM_AMU`	isotope mass
ITM_MASS_Ag_106	`105.906669 * ITM_AMU`	isotope mass
ITM_MASS_Ag_107	`106.905097 * ITM_AMU`	isotope mass
ITM_MASS_Ag_108	`107.905956 * ITM_AMU`	isotope mass
ITM_MASS_Ag_109	`108.904752 * ITM_AMU`	isotope mass
ITM_MASS_Ag_110	`109.906107 * ITM_AMU`	isotope mass
ITM_MASS_Ag_111	`110.905291 * ITM_AMU`	isotope mass
ITM_MASS_Ag_112	`111.907005 * ITM_AMU`	isotope mass
ITM_MASS_Ag_113	`112.906567 * ITM_AMU`	isotope mass
ITM_MASS_Ag_114	`113.908804 * ITM_AMU`	isotope mass
ITM_MASS_Ag_115	`114.908760 * ITM_AMU`	isotope mass
ITM_MASS_Ag_116	`115.911360 * ITM_AMU`	isotope mass
ITM_MASS_Ag_117	`116.911680 * ITM_AMU`	isotope mass
ITM_MASS_Ag_118	`117.914580 * ITM_AMU`	isotope mass
ITM_MASS_Ag_119	`118.91567 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Ag_120	119.918790 * ITM_AMU	isotope mass
ITM_MASS_Ag_121	120.91985 * ITM_AMU	isotope mass
ITM_MASS_Ag_122	121.92353 * ITM_AMU	isotope mass
ITM_MASS_Ag_123	122.92490 * ITM_AMU	isotope mass
ITM_MASS_Ag_124	123.92864 * ITM_AMU	isotope mass
ITM_MASS_Ag_125	124.93043 * ITM_AMU	isotope mass
ITM_MASS_Ag_126	125.93450 * ITM_AMU	isotope mass
ITM_MASS_Ag_127	126.93677 * ITM_AMU	isotope mass
ITM_MASS_Ag_128	127.94117 * ITM_AMU	isotope mass
ITM_MASS_Ag_129	128.94369 * ITM_AMU	isotope mass
ITM_MASS_Ag_130	129.95045 * ITM_AMU	isotope mass
ITM_MASS_Cd_95	94.94987 * ITM_AMU	isotope mass
ITM_MASS_Cd_96	95.93977 * ITM_AMU	isotope mass
ITM_MASS_Cd_97	96.93494 * ITM_AMU	isotope mass
ITM_MASS_Cd_98	97.927400 * ITM_AMU	isotope mass
ITM_MASS_Cd_99	98.92501 * ITM_AMU	isotope mass
ITM_MASS_Cd_100	99.92029 * ITM_AMU	isotope mass
ITM_MASS_Cd_101	100.91868 * ITM_AMU	isotope mass
ITM_MASS_Cd_102	101.914460 * ITM_AMU	isotope mass
ITM_MASS_Cd_103	102.913419 * ITM_AMU	isotope mass
ITM_MASS_Cd_104	103.909849 * ITM_AMU	isotope mass
ITM_MASS_Cd_105	104.909468 * ITM_AMU	isotope mass
ITM_MASS_Cd_106	105.906459 * ITM_AMU	isotope mass
ITM_MASS_Cd_107	106.906618 * ITM_AMU	isotope mass
ITM_MASS_Cd_108	107.904184 * ITM_AMU	isotope mass
ITM_MASS_Cd_109	108.904982 * ITM_AMU	isotope mass
ITM_MASS_Cd_110	109.9030021 * ITM_AMU	isotope mass
ITM_MASS_Cd_111	110.9041781 * ITM_AMU	isotope mass
ITM_MASS_Cd_112	111.9027578 * ITM_AMU	isotope mass
ITM_MASS_Cd_113	112.9044017 * ITM_AMU	isotope mass
ITM_MASS_Cd_114	113.9033585 * ITM_AMU	isotope mass
ITM_MASS_Cd_115	114.9054310 * ITM_AMU	isotope mass
ITM_MASS_Cd_116	115.904756 * ITM_AMU	isotope mass
ITM_MASS_Cd_117	116.907219 * ITM_AMU	isotope mass
ITM_MASS_Cd_118	117.906915 * ITM_AMU	isotope mass
ITM_MASS_Cd_119	118.909920 * ITM_AMU	isotope mass
ITM_MASS_Cd_120	119.909850 * ITM_AMU	isotope mass
ITM_MASS_Cd_121	120.912980 * ITM_AMU	isotope mass
ITM_MASS_Cd_122	121.913330 * ITM_AMU	isotope mass
ITM_MASS_Cd_123	122.917000 * ITM_AMU	isotope mass
ITM_MASS_Cd_124	123.917650 * ITM_AMU	isotope mass
ITM_MASS_Cd_125	124.921250 * ITM_AMU	isotope mass
ITM_MASS_Cd_126	125.922350 * ITM_AMU	isotope mass
ITM_MASS_Cd_127	126.926440 * ITM_AMU	isotope mass
ITM_MASS_Cd_128	127.92776 * ITM_AMU	isotope mass
ITM_MASS_Cd_129	128.93215 * ITM_AMU	isotope mass
ITM_MASS_Cd_130	129.93390 * ITM_AMU	isotope mass
ITM_MASS_Cd_131	130.94067 * ITM_AMU	isotope mass
ITM_MASS_Cd_132	131.94555 * ITM_AMU	isotope mass
ITM_MASS_In_97	96.94954 * ITM_AMU	isotope mass
ITM_MASS_In_98	97.94214 * ITM_AMU	isotope mass
ITM_MASS_In_99	98.93422 * ITM_AMU	isotope mass
ITM_MASS_In_100	99.93111 * ITM_AMU	isotope mass
ITM_MASS_In_101	100.92634 * ITM_AMU	isotope mass
ITM_MASS_In_102	101.92409 * ITM_AMU	isotope mass
ITM_MASS_In_103	102.919914 * ITM_AMU	isotope mass
ITM_MASS_In_104	103.918300 * ITM_AMU	isotope mass
ITM_MASS_In_105	104.914674 * ITM_AMU	isotope mass
ITM_MASS_In_106	105.913465 * ITM_AMU	isotope mass
ITM_MASS_In_107	106.910295 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_In_108	107.909698 * ITM_AMU	isotope mass
ITM_MASS_In_109	108.907151 * ITM_AMU	isotope mass
ITM_MASS_In_110	109.907165 * ITM_AMU	isotope mass
ITM_MASS_In_111	110.905103 * ITM_AMU	isotope mass
ITM_MASS_In_112	111.905532 * ITM_AMU	isotope mass
ITM_MASS_In_113	112.904058 * ITM_AMU	isotope mass
ITM_MASS_In_114	113.904914 * ITM_AMU	isotope mass
ITM_MASS_In_115	114.903878 * ITM_AMU	isotope mass
ITM_MASS_In_116	115.905260 * ITM_AMU	isotope mass
ITM_MASS_In_117	116.904514 * ITM_AMU	isotope mass
ITM_MASS_In_118	117.906354 * ITM_AMU	isotope mass
ITM_MASS_In_119	118.905845 * ITM_AMU	isotope mass
ITM_MASS_In_120	119.907960 * ITM_AMU	isotope mass
ITM_MASS_In_121	120.907846 * ITM_AMU	isotope mass
ITM_MASS_In_122	121.910280 * ITM_AMU	isotope mass
ITM_MASS_In_123	122.910438 * ITM_AMU	isotope mass
ITM_MASS_In_124	123.913180 * ITM_AMU	isotope mass
ITM_MASS_In_125	124.913600 * ITM_AMU	isotope mass
ITM_MASS_In_126	125.916460 * ITM_AMU	isotope mass
ITM_MASS_In_127	126.917350 * ITM_AMU	isotope mass
ITM_MASS_In_128	127.920170 * ITM_AMU	isotope mass
ITM_MASS_In_129	128.921700 * ITM_AMU	isotope mass
ITM_MASS_In_130	129.924970 * ITM_AMU	isotope mass
ITM_MASS_In_131	130.926850 * ITM_AMU	isotope mass
ITM_MASS_In_132	131.932990 * ITM_AMU	isotope mass
ITM_MASS_In_133	132.93781 * ITM_AMU	isotope mass
ITM_MASS_In_134	133.94415 * ITM_AMU	isotope mass
ITM_MASS_In_135	134.94933 * ITM_AMU	isotope mass
ITM_MASS_Sn_99	98.94933 * ITM_AMU	isotope mass
ITM_MASS_Sn_100	99.93904 * ITM_AMU	isotope mass
ITM_MASS_Sn_101	100.93606 * ITM_AMU	isotope mass
ITM_MASS_Sn_102	101.93030 * ITM_AMU	isotope mass
ITM_MASS_Sn_103	102.92810 * ITM_AMU	isotope mass
ITM_MASS_Sn_104	103.92314 * ITM_AMU	isotope mass
ITM_MASS_Sn_105	104.921350 * ITM_AMU	isotope mass
ITM_MASS_Sn_106	105.916880 * ITM_AMU	isotope mass
ITM_MASS_Sn_107	106.915640 * ITM_AMU	isotope mass
ITM_MASS_Sn_108	107.911925 * ITM_AMU	isotope mass
ITM_MASS_Sn_109	108.911283 * ITM_AMU	isotope mass
ITM_MASS_Sn_110	109.907843 * ITM_AMU	isotope mass
ITM_MASS_Sn_111	110.907734 * ITM_AMU	isotope mass
ITM_MASS_Sn_112	111.904818 * ITM_AMU	isotope mass
ITM_MASS_Sn_113	112.905171 * ITM_AMU	isotope mass
ITM_MASS_Sn_114	113.902779 * ITM_AMU	isotope mass
ITM_MASS_Sn_115	114.903342 * ITM_AMU	isotope mass
ITM_MASS_Sn_116	115.901741 * ITM_AMU	isotope mass
ITM_MASS_Sn_117	116.902952 * ITM_AMU	isotope mass
ITM_MASS_Sn_118	117.901603 * ITM_AMU	isotope mass
ITM_MASS_Sn_119	118.903308 * ITM_AMU	isotope mass
ITM_MASS_Sn_120	119.9021947 * ITM_AMU	isotope mass
ITM_MASS_Sn_121	120.9042355 * ITM_AMU	isotope mass
ITM_MASS_Sn_122	121.9034390 * ITM_AMU	isotope mass
ITM_MASS_Sn_123	122.9057208 * ITM_AMU	isotope mass
ITM_MASS_Sn_124	123.9052739 * ITM_AMU	isotope mass
ITM_MASS_Sn_125	124.9077841 * ITM_AMU	isotope mass
ITM_MASS_Sn_126	125.907653 * ITM_AMU	isotope mass
ITM_MASS_Sn_127	126.910360 * ITM_AMU	isotope mass
ITM_MASS_Sn_128	127.910537 * ITM_AMU	isotope mass
ITM_MASS_Sn_129	128.913480 * ITM_AMU	isotope mass
ITM_MASS_Sn_130	129.913967 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Sn_131	130.917000 * ITM_AMU	isotope mass
ITM_MASS_Sn_132	131.917816 * ITM_AMU	isotope mass
ITM_MASS_Sn_133	132.923830 * ITM_AMU	isotope mass
ITM_MASS_Sn_134	133.92829 * ITM_AMU	isotope mass
ITM_MASS_Sn_135	134.93473 * ITM_AMU	isotope mass
ITM_MASS_Sn_136	135.93934 * ITM_AMU	isotope mass
ITM_MASS_Sn_137	136.94599 * ITM_AMU	isotope mass
ITM_MASS_Sb_103	102.93969 * ITM_AMU	isotope mass
ITM_MASS_Sb_104	103.93647 * ITM_AMU	isotope mass
ITM_MASS_Sb_105	104.93149 * ITM_AMU	isotope mass
ITM_MASS_Sb_106	105.92879 * ITM_AMU	isotope mass
ITM_MASS_Sb_107	106.92415 * ITM_AMU	isotope mass
ITM_MASS_Sb_108	107.92216 * ITM_AMU	isotope mass
ITM_MASS_Sb_109	108.918132 * ITM_AMU	isotope mass
ITM_MASS_Sb_110	109.91675 * ITM_AMU	isotope mass
ITM_MASS_Sb_111	110.913160 * ITM_AMU	isotope mass
ITM_MASS_Sb_112	111.912398 * ITM_AMU	isotope mass
ITM_MASS_Sb_113	112.909372 * ITM_AMU	isotope mass
ITM_MASS_Sb_114	113.909270 * ITM_AMU	isotope mass
ITM_MASS_Sb_115	114.906598 * ITM_AMU	isotope mass
ITM_MASS_Sb_116	115.906794 * ITM_AMU	isotope mass
ITM_MASS_Sb_117	116.904836 * ITM_AMU	isotope mass
ITM_MASS_Sb_118	117.905529 * ITM_AMU	isotope mass
ITM_MASS_Sb_119	118.903942 * ITM_AMU	isotope mass
ITM_MASS_Sb_120	119.905072 * ITM_AMU	isotope mass
ITM_MASS_Sb_121	120.9038157 * ITM_AMU	isotope mass
ITM_MASS_Sb_122	121.9051737 * ITM_AMU	isotope mass
ITM_MASS_Sb_123	122.9042140 * ITM_AMU	isotope mass
ITM_MASS_Sb_124	123.9059357 * ITM_AMU	isotope mass
ITM_MASS_Sb_125	124.9052538 * ITM_AMU	isotope mass
ITM_MASS_Sb_126	125.907250 * ITM_AMU	isotope mass
ITM_MASS_Sb_127	126.906924 * ITM_AMU	isotope mass
ITM_MASS_Sb_128	127.909169 * ITM_AMU	isotope mass
ITM_MASS_Sb_129	128.909148 * ITM_AMU	isotope mass
ITM_MASS_Sb_130	129.911656 * ITM_AMU	isotope mass
ITM_MASS_Sb_131	130.911982 * ITM_AMU	isotope mass
ITM_MASS_Sb_132	131.914467 * ITM_AMU	isotope mass
ITM_MASS_Sb_133	132.915252 * ITM_AMU	isotope mass
ITM_MASS_Sb_134	133.920380 * ITM_AMU	isotope mass
ITM_MASS_Sb_135	134.92517 * ITM_AMU	isotope mass
ITM_MASS_Sb_136	135.93035 * ITM_AMU	isotope mass
ITM_MASS_Sb_137	136.93531 * ITM_AMU	isotope mass
ITM_MASS_Sb_138	137.94079 * ITM_AMU	isotope mass
ITM_MASS_Sb_139	138.94598 * ITM_AMU	isotope mass
ITM_MASS_Te_105	104.94364 * ITM_AMU	isotope mass
ITM_MASS_Te_106	105.93750 * ITM_AMU	isotope mass
ITM_MASS_Te_107	106.93501 * ITM_AMU	isotope mass
ITM_MASS_Te_108	107.92944 * ITM_AMU	isotope mass
ITM_MASS_Te_109	108.927420 * ITM_AMU	isotope mass
ITM_MASS_Te_110	109.922410 * ITM_AMU	isotope mass
ITM_MASS_Te_111	110.921110 * ITM_AMU	isotope mass
ITM_MASS_Te_112	111.91701 * ITM_AMU	isotope mass
ITM_MASS_Te_113	112.915890 * ITM_AMU	isotope mass
ITM_MASS_Te_114	113.912090 * ITM_AMU	isotope mass
ITM_MASS_Te_115	114.911900 * ITM_AMU	isotope mass
ITM_MASS_Te_116	115.908460 * ITM_AMU	isotope mass
ITM_MASS_Te_117	116.908645 * ITM_AMU	isotope mass
ITM_MASS_Te_118	117.905828 * ITM_AMU	isotope mass
ITM_MASS_Te_119	118.906404 * ITM_AMU	isotope mass
ITM_MASS_Te_120	119.904020 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Te_121	120.904936 * ITM_AMU	isotope mass
ITM_MASS_Te_122	121.9030439 * ITM_AMU	isotope mass
ITM_MASS_Te_123	122.9042700 * ITM_AMU	isotope mass
ITM_MASS_Te_124	123.9028179 * ITM_AMU	isotope mass
ITM_MASS_Te_125	124.9044307 * ITM_AMU	isotope mass
ITM_MASS_Te_126	125.9033117 * ITM_AMU	isotope mass
ITM_MASS_Te_127	126.9052263 * ITM_AMU	isotope mass
ITM_MASS_Te_128	127.9044631 * ITM_AMU	isotope mass
ITM_MASS_Te_129	128.9065982 * ITM_AMU	isotope mass
ITM_MASS_Te_130	129.9062244 * ITM_AMU	isotope mass
ITM_MASS_Te_131	130.9085239 * ITM_AMU	isotope mass
ITM_MASS_Te_132	131.908553 * ITM_AMU	isotope mass
ITM_MASS_Te_133	132.910955 * ITM_AMU	isotope mass
ITM_MASS_Te_134	133.911369 * ITM_AMU	isotope mass
ITM_MASS_Te_135	134.91645 * ITM_AMU	isotope mass
ITM_MASS_Te_136	135.920100 * ITM_AMU	isotope mass
ITM_MASS_Te_137	136.92532 * ITM_AMU	isotope mass
ITM_MASS_Te_138	137.92922 * ITM_AMU	isotope mass
ITM_MASS_Te_139	138.93473 * ITM_AMU	isotope mass
ITM_MASS_Te_140	139.93885 * ITM_AMU	isotope mass
ITM_MASS_Te_141	140.94465 * ITM_AMU	isotope mass
ITM_MASS_Te_142	141.94908 * ITM_AMU	isotope mass
ITM_MASS_I_108	107.94348 * ITM_AMU	isotope mass
ITM_MASS_I_109	108.93815 * ITM_AMU	isotope mass
ITM_MASS_I_110	109.93524 * ITM_AMU	isotope mass
ITM_MASS_I_111	110.93028 * ITM_AMU	isotope mass
ITM_MASS_I_112	111.92797 * ITM_AMU	isotope mass
ITM_MASS_I_113	112.923640 * ITM_AMU	isotope mass
ITM_MASS_I_114	113.92185 * ITM_AMU	isotope mass
ITM_MASS_I_115	114.918050 * ITM_AMU	isotope mass
ITM_MASS_I_116	115.91681 * ITM_AMU	isotope mass
ITM_MASS_I_117	116.913650 * ITM_AMU	isotope mass
ITM_MASS_I_118	117.913074 * ITM_AMU	isotope mass
ITM_MASS_I_119	118.910070 * ITM_AMU	isotope mass
ITM_MASS_I_120	119.910048 * ITM_AMU	isotope mass
ITM_MASS_I_121	120.907367 * ITM_AMU	isotope mass
ITM_MASS_I_122	121.907589 * ITM_AMU	isotope mass
ITM_MASS_I_123	122.905589 * ITM_AMU	isotope mass
ITM_MASS_I_124	123.9062099 * ITM_AMU	isotope mass
ITM_MASS_I_125	124.9046302 * ITM_AMU	isotope mass
ITM_MASS_I_126	125.905624 * ITM_AMU	isotope mass
ITM_MASS_I_127	126.904473 * ITM_AMU	isotope mass
ITM_MASS_I_128	127.905809 * ITM_AMU	isotope mass
ITM_MASS_I_129	128.904988 * ITM_AMU	isotope mass
ITM_MASS_I_130	129.906674 * ITM_AMU	isotope mass
ITM_MASS_I_131	130.9061246 * ITM_AMU	isotope mass
ITM_MASS_I_132	131.907997 * ITM_AMU	isotope mass
ITM_MASS_I_133	132.907797 * ITM_AMU	isotope mass
ITM_MASS_I_134	133.909744 * ITM_AMU	isotope mass
ITM_MASS_I_135	134.910048 * ITM_AMU	isotope mass
ITM_MASS_I_136	135.914650 * ITM_AMU	isotope mass
ITM_MASS_I_137	136.917871 * ITM_AMU	isotope mass
ITM_MASS_I_138	137.922350 * ITM_AMU	isotope mass
ITM_MASS_I_139	138.926100 * ITM_AMU	isotope mass
ITM_MASS_I_140	139.93100 * ITM_AMU	isotope mass
ITM_MASS_I_141	140.93503 * ITM_AMU	isotope mass
ITM_MASS_I_142	141.94018 * ITM_AMU	isotope mass
ITM_MASS_I_143	142.94456 * ITM_AMU	isotope mass
ITM_MASS_I_144	143.94999 * ITM_AMU	isotope mass
ITM_MASS_Xe_110	109.94428 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Xe_111	110.94160 * ITM_AMU	isotope mass
ITM_MASS_Xe_112	111.93562 * ITM_AMU	isotope mass
ITM_MASS_Xe_113	112.933340 * ITM_AMU	isotope mass
ITM_MASS_Xe_114	113.927980 * ITM_AMU	isotope mass
ITM_MASS_Xe_115	114.926294 * ITM_AMU	isotope mass
ITM_MASS_Xe_116	115.921581 * ITM_AMU	isotope mass
ITM_MASS_Xe_117	116.920359 * ITM_AMU	isotope mass
ITM_MASS_Xe_118	117.916179 * ITM_AMU	isotope mass
ITM_MASS_Xe_119	118.915411 * ITM_AMU	isotope mass
ITM_MASS_Xe_120	119.911784 * ITM_AMU	isotope mass
ITM_MASS_Xe_121	120.911462 * ITM_AMU	isotope mass
ITM_MASS_Xe_122	121.908368 * ITM_AMU	isotope mass
ITM_MASS_Xe_123	122.908482 * ITM_AMU	isotope mass
ITM_MASS_Xe_124	123.9058930 * ITM_AMU	isotope mass
ITM_MASS_Xe_125	124.9063955 * ITM_AMU	isotope mass
ITM_MASS_Xe_126	125.904274 * ITM_AMU	isotope mass
ITM_MASS_Xe_127	126.905184 * ITM_AMU	isotope mass
ITM_MASS_Xe_128	127.9035313 * ITM_AMU	isotope mass
ITM_MASS_Xe_129	128.9047794 * ITM_AMU	isotope mass
ITM_MASS_Xe_130	129.9035080 * ITM_AMU	isotope mass
ITM_MASS_Xe_131	130.9050824 * ITM_AMU	isotope mass
ITM_MASS_Xe_132	131.9041535 * ITM_AMU	isotope mass
ITM_MASS_Xe_133	132.9059107 * ITM_AMU	isotope mass
ITM_MASS_Xe_134	133.9053945 * ITM_AMU	isotope mass
ITM_MASS_Xe_135	134.907227 * ITM_AMU	isotope mass
ITM_MASS_Xe_136	135.907219 * ITM_AMU	isotope mass
ITM_MASS_Xe_137	136.911562 * ITM_AMU	isotope mass
ITM_MASS_Xe_138	137.913950 * ITM_AMU	isotope mass
ITM_MASS_Xe_139	138.918793 * ITM_AMU	isotope mass
ITM_MASS_Xe_140	139.921640 * ITM_AMU	isotope mass
ITM_MASS_Xe_141	140.92665 * ITM_AMU	isotope mass
ITM_MASS_Xe_142	141.92971 * ITM_AMU	isotope mass
ITM_MASS_Xe_143	142.93511 * ITM_AMU	isotope mass
ITM_MASS_Xe_144	143.93851 * ITM_AMU	isotope mass
ITM_MASS_Xe_145	144.94407 * ITM_AMU	isotope mass
ITM_MASS_Xe_146	145.94775 * ITM_AMU	isotope mass
ITM_MASS_Xe_147	146.95356 * ITM_AMU	isotope mass
ITM_MASS_Cs_112	111.95030 * ITM_AMU	isotope mass
ITM_MASS_Cs_113	112.94449 * ITM_AMU	isotope mass
ITM_MASS_Cs_114	113.94145 * ITM_AMU	isotope mass
ITM_MASS_Cs_115	114.93591 * ITM_AMU	isotope mass
ITM_MASS_Cs_116	115.93337 * ITM_AMU	isotope mass
ITM_MASS_Cs_117	116.928670 * ITM_AMU	isotope mass
ITM_MASS_Cs_118	117.926559 * ITM_AMU	isotope mass
ITM_MASS_Cs_119	118.922377 * ITM_AMU	isotope mass
ITM_MASS_Cs_120	119.920677 * ITM_AMU	isotope mass
ITM_MASS_Cs_121	120.917229 * ITM_AMU	isotope mass
ITM_MASS_Cs_122	121.916110 * ITM_AMU	isotope mass
ITM_MASS_Cs_123	122.912996 * ITM_AMU	isotope mass
ITM_MASS_Cs_124	123.912258 * ITM_AMU	isotope mass
ITM_MASS_Cs_125	124.909728 * ITM_AMU	isotope mass
ITM_MASS_Cs_126	125.909452 * ITM_AMU	isotope mass
ITM_MASS_Cs_127	126.907418 * ITM_AMU	isotope mass
ITM_MASS_Cs_128	127.907749 * ITM_AMU	isotope mass
ITM_MASS_Cs_129	128.906064 * ITM_AMU	isotope mass
ITM_MASS_Cs_130	129.906709 * ITM_AMU	isotope mass
ITM_MASS_Cs_131	130.905464 * ITM_AMU	isotope mass
ITM_MASS_Cs_132	131.9064343 * ITM_AMU	isotope mass
ITM_MASS_Cs_133	132.905451933 * ITM_AMU	isotope mass
ITM_MASS_Cs_134	133.906718475 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Cs_135	134.9059770 * ITM_AMU	isotope mass
ITM_MASS_Cs_136	135.9073116 * ITM_AMU	isotope mass
ITM_MASS_Cs_137	136.9070895 * ITM_AMU	isotope mass
ITM_MASS_Cs_138	137.911017 * ITM_AMU	isotope mass
ITM_MASS_Cs_139	138.913364 * ITM_AMU	isotope mass
ITM_MASS_Cs_140	139.917282 * ITM_AMU	isotope mass
ITM_MASS_Cs_141	140.920046 * ITM_AMU	isotope mass
ITM_MASS_Cs_142	141.924299 * ITM_AMU	isotope mass
ITM_MASS_Cs_143	142.927352 * ITM_AMU	isotope mass
ITM_MASS_Cs_144	143.932077 * ITM_AMU	isotope mass
ITM_MASS_Cs_145	144.935526 * ITM_AMU	isotope mass
ITM_MASS_Cs_146	145.940290 * ITM_AMU	isotope mass
ITM_MASS_Cs_147	146.944160 * ITM_AMU	isotope mass
ITM_MASS_Cs_148	147.94922 * ITM_AMU	isotope mass
ITM_MASS_Cs_149	148.95293 * ITM_AMU	isotope mass
ITM_MASS_Cs_150	149.95817 * ITM_AMU	isotope mass
ITM_MASS_Cs_151	150.96219 * ITM_AMU	isotope mass
ITM_MASS_Ba_114	113.95068 * ITM_AMU	isotope mass
ITM_MASS_Ba_115	114.94737 * ITM_AMU	isotope mass
ITM_MASS_Ba_116	115.94138 * ITM_AMU	isotope mass
ITM_MASS_Ba_117	116.93850 * ITM_AMU	isotope mass
ITM_MASS_Ba_118	117.93304 * ITM_AMU	isotope mass
ITM_MASS_Ba_119	118.93066 * ITM_AMU	isotope mass
ITM_MASS_Ba_120	119.92604 * ITM_AMU	isotope mass
ITM_MASS_Ba_121	120.92405 * ITM_AMU	isotope mass
ITM_MASS_Ba_122	121.919900 * ITM_AMU	isotope mass
ITM_MASS_Ba_123	122.918781 * ITM_AMU	isotope mass
ITM_MASS_Ba_124	123.915094 * ITM_AMU	isotope mass
ITM_MASS_Ba_125	124.914473 * ITM_AMU	isotope mass
ITM_MASS_Ba_126	125.911250 * ITM_AMU	isotope mass
ITM_MASS_Ba_127	126.911094 * ITM_AMU	isotope mass
ITM_MASS_Ba_128	127.908318 * ITM_AMU	isotope mass
ITM_MASS_Ba_129	128.908679 * ITM_AMU	isotope mass
ITM_MASS_Ba_130	129.9063208 * ITM_AMU	isotope mass
ITM_MASS_Ba_131	130.906941 * ITM_AMU	isotope mass
ITM_MASS_Ba_132	131.9050613 * ITM_AMU	isotope mass
ITM_MASS_Ba_133	132.9060075 * ITM_AMU	isotope mass
ITM_MASS_Ba_134	133.9045084 * ITM_AMU	isotope mass
ITM_MASS_Ba_135	134.9056886 * ITM_AMU	isotope mass
ITM_MASS_Ba_136	135.9045759 * ITM_AMU	isotope mass
ITM_MASS_Ba_137	136.9058274 * ITM_AMU	isotope mass
ITM_MASS_Ba_138	137.9052472 * ITM_AMU	isotope mass
ITM_MASS_Ba_139	138.9088413 * ITM_AMU	isotope mass
ITM_MASS_Ba_140	139.910605 * ITM_AMU	isotope mass
ITM_MASS_Ba_141	140.914411 * ITM_AMU	isotope mass
ITM_MASS_Ba_142	141.916453 * ITM_AMU	isotope mass
ITM_MASS_Ba_143	142.920627 * ITM_AMU	isotope mass
ITM_MASS_Ba_144	143.922953 * ITM_AMU	isotope mass
ITM_MASS_Ba_145	144.927630 * ITM_AMU	isotope mass
ITM_MASS_Ba_146	145.930220 * ITM_AMU	isotope mass
ITM_MASS_Ba_147	146.93495 * ITM_AMU	isotope mass
ITM_MASS_Ba_148	147.937720 * ITM_AMU	isotope mass
ITM_MASS_Ba_149	148.94258 * ITM_AMU	isotope mass
ITM_MASS_Ba_150	149.94568 * ITM_AMU	isotope mass
ITM_MASS_Ba_151	150.95081 * ITM_AMU	isotope mass
ITM_MASS_Ba_152	151.95427 * ITM_AMU	isotope mass
ITM_MASS_Ba_153	152.95961 * ITM_AMU	isotope mass
ITM_MASS_La_117	116.95007 * ITM_AMU	isotope mass
ITM_MASS_La_118	117.94673 * ITM_AMU	isotope mass
ITM_MASS_La_119	118.94099 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_La_120	119.93807 * ITM_AMU	isotope mass
ITM_MASS_La_121	120.93301 * ITM_AMU	isotope mass
ITM_MASS_La_122	121.93071 * ITM_AMU	isotope mass
ITM_MASS_La_123	122.92624 * ITM_AMU	isotope mass
ITM_MASS_La_124	123.924570 * ITM_AMU	isotope mass
ITM_MASS_La_125	124.920816 * ITM_AMU	isotope mass
ITM_MASS_La_126	125.91951 * ITM_AMU	isotope mass
ITM_MASS_La_127	126.916375 * ITM_AMU	isotope mass
ITM_MASS_La_128	127.915590 * ITM_AMU	isotope mass
ITM_MASS_La_129	128.912693 * ITM_AMU	isotope mass
ITM_MASS_La_130	129.912369 * ITM_AMU	isotope mass
ITM_MASS_La_131	130.910070 * ITM_AMU	isotope mass
ITM_MASS_La_132	131.910100 * ITM_AMU	isotope mass
ITM_MASS_La_133	132.908220 * ITM_AMU	isotope mass
ITM_MASS_La_134	133.908514 * ITM_AMU	isotope mass
ITM_MASS_La_135	134.906977 * ITM_AMU	isotope mass
ITM_MASS_La_136	135.907640 * ITM_AMU	isotope mass
ITM_MASS_La_137	136.906494 * ITM_AMU	isotope mass
ITM_MASS_La_138	137.907112 * ITM_AMU	isotope mass
ITM_MASS_La_139	138.9063533 * ITM_AMU	isotope mass
ITM_MASS_La_140	139.9094776 * ITM_AMU	isotope mass
ITM_MASS_La_141	140.910962 * ITM_AMU	isotope mass
ITM_MASS_La_142	141.914079 * ITM_AMU	isotope mass
ITM_MASS_La_143	142.916063 * ITM_AMU	isotope mass
ITM_MASS_La_144	143.919600 * ITM_AMU	isotope mass
ITM_MASS_La_145	144.92165 * ITM_AMU	isotope mass
ITM_MASS_La_146	145.925790 * ITM_AMU	isotope mass
ITM_MASS_La_147	146.928240 * ITM_AMU	isotope mass
ITM_MASS_La_148	147.932230 * ITM_AMU	isotope mass
ITM_MASS_La_149	148.93473 * ITM_AMU	isotope mass
ITM_MASS_La_150	149.93877 * ITM_AMU	isotope mass
ITM_MASS_La_151	150.94172 * ITM_AMU	isotope mass
ITM_MASS_La_152	151.94625 * ITM_AMU	isotope mass
ITM_MASS_La_153	152.94962 * ITM_AMU	isotope mass
ITM_MASS_La_154	153.95450 * ITM_AMU	isotope mass
ITM_MASS_La_155	154.95835 * ITM_AMU	isotope mass
ITM_MASS_Ce_119	118.95276 * ITM_AMU	isotope mass
ITM_MASS_Ce_120	119.94664 * ITM_AMU	isotope mass
ITM_MASS_Ce_121	120.94342 * ITM_AMU	isotope mass
ITM_MASS_Ce_122	121.93791 * ITM_AMU	isotope mass
ITM_MASS_Ce_123	122.93540 * ITM_AMU	isotope mass
ITM_MASS_Ce_124	123.93041 * ITM_AMU	isotope mass
ITM_MASS_Ce_125	124.92844 * ITM_AMU	isotope mass
ITM_MASS_Ce_126	125.923970 * ITM_AMU	isotope mass
ITM_MASS_Ce_127	126.922730 * ITM_AMU	isotope mass
ITM_MASS_Ce_128	127.918910 * ITM_AMU	isotope mass
ITM_MASS_Ce_129	128.918100 * ITM_AMU	isotope mass
ITM_MASS_Ce_130	129.914740 * ITM_AMU	isotope mass
ITM_MASS_Ce_131	130.914420 * ITM_AMU	isotope mass
ITM_MASS_Ce_132	131.911460 * ITM_AMU	isotope mass
ITM_MASS_Ce_133	132.911515 * ITM_AMU	isotope mass
ITM_MASS_Ce_134	133.908925 * ITM_AMU	isotope mass
ITM_MASS_Ce_135	134.909151 * ITM_AMU	isotope mass
ITM_MASS_Ce_136	135.907172 * ITM_AMU	isotope mass
ITM_MASS_Ce_137	136.907806 * ITM_AMU	isotope mass
ITM_MASS_Ce_138	137.905991 * ITM_AMU	isotope mass
ITM_MASS_Ce_139	138.906653 * ITM_AMU	isotope mass
ITM_MASS_Ce_140	139.9054387 * ITM_AMU	isotope mass
ITM_MASS_Ce_141	140.9082763 * ITM_AMU	isotope mass
ITM_MASS_Ce_142	141.909244 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ce_143	142.912386 * ITM_AMU	isotope mass
ITM_MASS_Ce_144	143.913647 * ITM_AMU	isotope mass
ITM_MASS_Ce_145	144.917230 * ITM_AMU	isotope mass
ITM_MASS_Ce_146	145.918760 * ITM_AMU	isotope mass
ITM_MASS_Ce_147	146.922670 * ITM_AMU	isotope mass
ITM_MASS_Ce_148	147.924430 * ITM_AMU	isotope mass
ITM_MASS_Ce_149	148.92840 * ITM_AMU	isotope mass
ITM_MASS_Ce_150	149.930410 * ITM_AMU	isotope mass
ITM_MASS_Ce_151	150.93398 * ITM_AMU	isotope mass
ITM_MASS_Ce_152	151.93654 * ITM_AMU	isotope mass
ITM_MASS_Ce_153	152.94058 * ITM_AMU	isotope mass
ITM_MASS_Ce_154	153.94342 * ITM_AMU	isotope mass
ITM_MASS_Ce_155	154.94804 * ITM_AMU	isotope mass
ITM_MASS_Ce_156	155.95126 * ITM_AMU	isotope mass
ITM_MASS_Ce_157	156.95634 * ITM_AMU	isotope mass
ITM_MASS_Pr_121	120.95536 * ITM_AMU	isotope mass
ITM_MASS_Pr_122	121.95181 * ITM_AMU	isotope mass
ITM_MASS_Pr_123	122.94596 * ITM_AMU	isotope mass
ITM_MASS_Pr_124	123.94296 * ITM_AMU	isotope mass
ITM_MASS_Pr_125	124.93783 * ITM_AMU	isotope mass
ITM_MASS_Pr_126	125.93531 * ITM_AMU	isotope mass
ITM_MASS_Pr_127	126.93083 * ITM_AMU	isotope mass
ITM_MASS_Pr_128	127.928790 * ITM_AMU	isotope mass
ITM_MASS_Pr_129	128.925100 * ITM_AMU	isotope mass
ITM_MASS_Pr_130	129.923590 * ITM_AMU	isotope mass
ITM_MASS_Pr_131	130.920260 * ITM_AMU	isotope mass
ITM_MASS_Pr_132	131.919260 * ITM_AMU	isotope mass
ITM_MASS_Pr_133	132.916331 * ITM_AMU	isotope mass
ITM_MASS_Pr_134	133.915710 * ITM_AMU	isotope mass
ITM_MASS_Pr_135	134.913112 * ITM_AMU	isotope mass
ITM_MASS_Pr_136	135.912692 * ITM_AMU	isotope mass
ITM_MASS_Pr_137	136.910705 * ITM_AMU	isotope mass
ITM_MASS_Pr_138	137.910755 * ITM_AMU	isotope mass
ITM_MASS_Pr_139	138.908938 * ITM_AMU	isotope mass
ITM_MASS_Pr_140	139.909076 * ITM_AMU	isotope mass
ITM_MASS_Pr_141	140.9076528 * ITM_AMU	isotope mass
ITM_MASS_Pr_142	141.9100448 * ITM_AMU	isotope mass
ITM_MASS_Pr_143	142.9108169 * ITM_AMU	isotope mass
ITM_MASS_Pr_144	143.913305 * ITM_AMU	isotope mass
ITM_MASS_Pr_145	144.914512 * ITM_AMU	isotope mass
ITM_MASS_Pr_146	145.917640 * ITM_AMU	isotope mass
ITM_MASS_Pr_147	146.918996 * ITM_AMU	isotope mass
ITM_MASS_Pr_148	147.922135 * ITM_AMU	isotope mass
ITM_MASS_Pr_149	148.923720 * ITM_AMU	isotope mass
ITM_MASS_Pr_150	149.926673 * ITM_AMU	isotope mass
ITM_MASS_Pr_151	150.928319 * ITM_AMU	isotope mass
ITM_MASS_Pr_152	151.93150 * ITM_AMU	isotope mass
ITM_MASS_Pr_153	152.93384 * ITM_AMU	isotope mass
ITM_MASS_Pr_154	153.93752 * ITM_AMU	isotope mass
ITM_MASS_Pr_155	154.94012 * ITM_AMU	isotope mass
ITM_MASS_Pr_156	155.94427 * ITM_AMU	isotope mass
ITM_MASS_Pr_157	156.94743 * ITM_AMU	isotope mass
ITM_MASS_Pr_158	157.95198 * ITM_AMU	isotope mass
ITM_MASS_Pr_159	158.95550 * ITM_AMU	isotope mass
ITM_MASS_Nd_124	123.95223 * ITM_AMU	isotope mass
ITM_MASS_Nd_125	124.94888 * ITM_AMU	isotope mass
ITM_MASS_Nd_126	125.94322 * ITM_AMU	isotope mass
ITM_MASS_Nd_127	126.94050 * ITM_AMU	isotope mass
ITM_MASS_Nd_128	127.93539 * ITM_AMU	isotope mass
ITM_MASS_Nd_129	128.93319 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Nd_130	129.928510 * ITM_AMU	isotope mass
ITM_MASS_Nd_131	130.927250 * ITM_AMU	isotope mass
ITM_MASS_Nd_132	131.923321 * ITM_AMU	isotope mass
ITM_MASS_Nd_133	132.922350 * ITM_AMU	isotope mass
ITM_MASS_Nd_134	133.918790 * ITM_AMU	isotope mass
ITM_MASS_Nd_135	134.918181 * ITM_AMU	isotope mass
ITM_MASS_Nd_136	135.914976 * ITM_AMU	isotope mass
ITM_MASS_Nd_137	136.914567 * ITM_AMU	isotope mass
ITM_MASS_Nd_138	137.911950 * ITM_AMU	isotope mass
ITM_MASS_Nd_139	138.911978 * ITM_AMU	isotope mass
ITM_MASS_Nd_140	139.909550 * ITM_AMU	isotope mass
ITM_MASS_Nd_141	140.909610 * ITM_AMU	isotope mass
ITM_MASS_Nd_142	141.9077233 * ITM_AMU	isotope mass
ITM_MASS_Nd_143	142.9098143 * ITM_AMU	isotope mass
ITM_MASS_Nd_144	143.9100873 * ITM_AMU	isotope mass
ITM_MASS_Nd_145	144.9125736 * ITM_AMU	isotope mass
ITM_MASS_Nd_146	145.9131169 * ITM_AMU	isotope mass
ITM_MASS_Nd_147	146.9161004 * ITM_AMU	isotope mass
ITM_MASS_Nd_148	147.916893 * ITM_AMU	isotope mass
ITM_MASS_Nd_149	148.920149 * ITM_AMU	isotope mass
ITM_MASS_Nd_150	149.920891 * ITM_AMU	isotope mass
ITM_MASS_Nd_151	150.923829 * ITM_AMU	isotope mass
ITM_MASS_Nd_152	151.924682 * ITM_AMU	isotope mass
ITM_MASS_Nd_153	152.927698 * ITM_AMU	isotope mass
ITM_MASS_Nd_154	153.92948 * ITM_AMU	isotope mass
ITM_MASS_Nd_155	154.93293 * ITM_AMU	isotope mass
ITM_MASS_Nd_156	155.93502 * ITM_AMU	isotope mass
ITM_MASS_Nd_157	156.93903 * ITM_AMU	isotope mass
ITM_MASS_Nd_158	157.94160 * ITM_AMU	isotope mass
ITM_MASS_Nd_159	158.94609 * ITM_AMU	isotope mass
ITM_MASS_Nd_160	159.94909 * ITM_AMU	isotope mass
ITM_MASS_Nd_161	160.95388 * ITM_AMU	isotope mass
ITM_MASS_Pm_126	125.95752 * ITM_AMU	isotope mass
ITM_MASS_Pm_127	126.95163 * ITM_AMU	isotope mass
ITM_MASS_Pm_128	127.94842 * ITM_AMU	isotope mass
ITM_MASS_Pm_129	128.94316 * ITM_AMU	isotope mass
ITM_MASS_Pm_130	129.94045 * ITM_AMU	isotope mass
ITM_MASS_Pm_131	130.93587 * ITM_AMU	isotope mass
ITM_MASS_Pm_132	131.93375 * ITM_AMU	isotope mass
ITM_MASS_Pm_133	132.929780 * ITM_AMU	isotope mass
ITM_MASS_Pm_134	133.928350 * ITM_AMU	isotope mass
ITM_MASS_Pm_135	134.924880 * ITM_AMU	isotope mass
ITM_MASS_Pm_136	135.923570 * ITM_AMU	isotope mass
ITM_MASS_Pm_137	136.920479 * ITM_AMU	isotope mass
ITM_MASS_Pm_138	137.919548 * ITM_AMU	isotope mass
ITM_MASS_Pm_139	138.916804 * ITM_AMU	isotope mass
ITM_MASS_Pm_140	139.916040 * ITM_AMU	isotope mass
ITM_MASS_Pm_141	140.913555 * ITM_AMU	isotope mass
ITM_MASS_Pm_142	141.912874 * ITM_AMU	isotope mass
ITM_MASS_Pm_143	142.910933 * ITM_AMU	isotope mass
ITM_MASS_Pm_144	143.912591 * ITM_AMU	isotope mass
ITM_MASS_Pm_145	144.912749 * ITM_AMU	isotope mass
ITM_MASS_Pm_146	145.914696 * ITM_AMU	isotope mass
ITM_MASS_Pm_147	146.9151385 * ITM_AMU	isotope mass
ITM_MASS_Pm_148	147.917475 * ITM_AMU	isotope mass
ITM_MASS_Pm_149	148.918334 * ITM_AMU	isotope mass
ITM_MASS_Pm_150	149.920984 * ITM_AMU	isotope mass
ITM_MASS_Pm_151	150.921207 * ITM_AMU	isotope mass
ITM_MASS_Pm_152	151.923497 * ITM_AMU	isotope mass
ITM_MASS_Pm_153	152.924117 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Pm_154	153.926460 * ITM_AMU	isotope mass
ITM_MASS_Pm_155	154.928100 * ITM_AMU	isotope mass
ITM_MASS_Pm_156	155.931060 * ITM_AMU	isotope mass
ITM_MASS_Pm_157	156.93304 * ITM_AMU	isotope mass
ITM_MASS_Pm_158	157.93656 * ITM_AMU	isotope mass
ITM_MASS_Pm_159	158.93897 * ITM_AMU	isotope mass
ITM_MASS_Pm_160	159.94299 * ITM_AMU	isotope mass
ITM_MASS_Pm_161	160.94586 * ITM_AMU	isotope mass
ITM_MASS_Pm_162	161.95029 * ITM_AMU	isotope mass
ITM_MASS_Pm_163	162.95368 * ITM_AMU	isotope mass
ITM_MASS_Sm_128	127.95808 * ITM_AMU	isotope mass
ITM_MASS_Sm_129	128.95464 * ITM_AMU	isotope mass
ITM_MASS_Sm_130	129.94892 * ITM_AMU	isotope mass
ITM_MASS_Sm_131	130.94611 * ITM_AMU	isotope mass
ITM_MASS_Sm_132	131.94069 * ITM_AMU	isotope mass
ITM_MASS_Sm_133	132.93867 * ITM_AMU	isotope mass
ITM_MASS_Sm_134	133.93397 * ITM_AMU	isotope mass
ITM_MASS_Sm_135	134.93252 * ITM_AMU	isotope mass
ITM_MASS_Sm_136	135.928276 * ITM_AMU	isotope mass
ITM_MASS_Sm_137	136.926970 * ITM_AMU	isotope mass
ITM_MASS_Sm_138	137.923244 * ITM_AMU	isotope mass
ITM_MASS_Sm_139	138.922297 * ITM_AMU	isotope mass
ITM_MASS_Sm_140	139.918995 * ITM_AMU	isotope mass
ITM_MASS_Sm_141	140.918476 * ITM_AMU	isotope mass
ITM_MASS_Sm_142	141.915198 * ITM_AMU	isotope mass
ITM_MASS_Sm_143	142.914628 * ITM_AMU	isotope mass
ITM_MASS_Sm_144	143.911999 * ITM_AMU	isotope mass
ITM_MASS_Sm_145	144.913410 * ITM_AMU	isotope mass
ITM_MASS_Sm_146	145.913041 * ITM_AMU	isotope mass
ITM_MASS_Sm_147	146.9148979 * ITM_AMU	isotope mass
ITM_MASS_Sm_148	147.9148227 * ITM_AMU	isotope mass
ITM_MASS_Sm_149	148.9171847 * ITM_AMU	isotope mass
ITM_MASS_Sm_150	149.9172755 * ITM_AMU	isotope mass
ITM_MASS_Sm_151	150.9199324 * ITM_AMU	isotope mass
ITM_MASS_Sm_152	151.9197324 * ITM_AMU	isotope mass
ITM_MASS_Sm_153	152.9220974 * ITM_AMU	isotope mass
ITM_MASS_Sm_154	153.9222093 * ITM_AMU	isotope mass
ITM_MASS_Sm_155	154.9246402 * ITM_AMU	isotope mass
ITM_MASS_Sm_156	155.925528 * ITM_AMU	isotope mass
ITM_MASS_Sm_157	156.928360 * ITM_AMU	isotope mass
ITM_MASS_Sm_158	157.929990 * ITM_AMU	isotope mass
ITM_MASS_Sm_159	158.93321 * ITM_AMU	isotope mass
ITM_MASS_Sm_160	159.93514 * ITM_AMU	isotope mass
ITM_MASS_Sm_161	160.93883 * ITM_AMU	isotope mass
ITM_MASS_Sm_162	161.94122 * ITM_AMU	isotope mass
ITM_MASS_Sm_163	162.94536 * ITM_AMU	isotope mass
ITM_MASS_Sm_164	163.94828 * ITM_AMU	isotope mass
ITM_MASS_Sm_165	164.95298 * ITM_AMU	isotope mass
ITM_MASS_Eu_130	129.96357 * ITM_AMU	isotope mass
ITM_MASS_Eu_131	130.95775 * ITM_AMU	isotope mass
ITM_MASS_Eu_132	131.95437 * ITM_AMU	isotope mass
ITM_MASS_Eu_133	132.94924 * ITM_AMU	isotope mass
ITM_MASS_Eu_134	133.94651 * ITM_AMU	isotope mass
ITM_MASS_Eu_135	134.94182 * ITM_AMU	isotope mass
ITM_MASS_Eu_136	135.93960 * ITM_AMU	isotope mass
ITM_MASS_Eu_137	136.93557 * ITM_AMU	isotope mass
ITM_MASS_Eu_138	137.933710 * ITM_AMU	isotope mass
ITM_MASS_Eu_139	138.929792 * ITM_AMU	isotope mass
ITM_MASS_Eu_140	139.928090 * ITM_AMU	isotope mass
ITM_MASS_Eu_141	140.924931 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Eu_142	141.923430 * ITM_AMU	isotope mass
ITM_MASS_Eu_143	142.920298 * ITM_AMU	isotope mass
ITM_MASS_Eu_144	143.918817 * ITM_AMU	isotope mass
ITM_MASS_Eu_145	144.916265 * ITM_AMU	isotope mass
ITM_MASS_Eu_146	145.917206 * ITM_AMU	isotope mass
ITM_MASS_Eu_147	146.916746 * ITM_AMU	isotope mass
ITM_MASS_Eu_148	147.918086 * ITM_AMU	isotope mass
ITM_MASS_Eu_149	148.917931 * ITM_AMU	isotope mass
ITM_MASS_Eu_150	149.919702 * ITM_AMU	isotope mass
ITM_MASS_Eu_151	150.9198502 * ITM_AMU	isotope mass
ITM_MASS_Eu_152	151.9217445 * ITM_AMU	isotope mass
ITM_MASS_Eu_153	152.9212303 * ITM_AMU	isotope mass
ITM_MASS_Eu_154	153.9229792 * ITM_AMU	isotope mass
ITM_MASS_Eu_155	154.9228933 * ITM_AMU	isotope mass
ITM_MASS_Eu_156	155.924752 * ITM_AMU	isotope mass
ITM_MASS_Eu_157	156.925424 * ITM_AMU	isotope mass
ITM_MASS_Eu_158	157.927850 * ITM_AMU	isotope mass
ITM_MASS_Eu_159	158.929089 * ITM_AMU	isotope mass
ITM_MASS_Eu_160	159.93197 * ITM_AMU	isotope mass
ITM_MASS_Eu_161	160.93368 * ITM_AMU	isotope mass
ITM_MASS_Eu_162	161.93704 * ITM_AMU	isotope mass
ITM_MASS_Eu_163	162.93921 * ITM_AMU	isotope mass
ITM_MASS_Eu_164	163.94299 * ITM_AMU	isotope mass
ITM_MASS_Eu_165	164.94572 * ITM_AMU	isotope mass
ITM_MASS_Eu_166	165.94997 * ITM_AMU	isotope mass
ITM_MASS_Eu_167	166.95321 * ITM_AMU	isotope mass
ITM_MASS_Gd_134	133.95537 * ITM_AMU	isotope mass
ITM_MASS_Gd_135	134.95257 * ITM_AMU	isotope mass
ITM_MASS_Gd_136	135.94734 * ITM_AMU	isotope mass
ITM_MASS_Gd_137	136.94502 * ITM_AMU	isotope mass
ITM_MASS_Gd_138	137.94012 * ITM_AMU	isotope mass
ITM_MASS_Gd_139	138.93824 * ITM_AMU	isotope mass
ITM_MASS_Gd_140	139.933670 * ITM_AMU	isotope mass
ITM_MASS_Gd_141	140.932126 * ITM_AMU	isotope mass
ITM_MASS_Gd_142	141.928120 * ITM_AMU	isotope mass
ITM_MASS_Gd_143	142.92675 * ITM_AMU	isotope mass
ITM_MASS_Gd_144	143.922960 * ITM_AMU	isotope mass
ITM_MASS_Gd_145	144.921709 * ITM_AMU	isotope mass
ITM_MASS_Gd_146	145.918311 * ITM_AMU	isotope mass
ITM_MASS_Gd_147	146.919094 * ITM_AMU	isotope mass
ITM_MASS_Gd_148	147.918115 * ITM_AMU	isotope mass
ITM_MASS_Gd_149	148.919341 * ITM_AMU	isotope mass
ITM_MASS_Gd_150	149.918659 * ITM_AMU	isotope mass
ITM_MASS_Gd_151	150.920348 * ITM_AMU	isotope mass
ITM_MASS_Gd_152	151.9197910 * ITM_AMU	isotope mass
ITM_MASS_Gd_153	152.9217495 * ITM_AMU	isotope mass
ITM_MASS_Gd_154	153.9208656 * ITM_AMU	isotope mass
ITM_MASS_Gd_155	154.9226220 * ITM_AMU	isotope mass
ITM_MASS_Gd_156	155.9221227 * ITM_AMU	isotope mass
ITM_MASS_Gd_157	156.9239601 * ITM_AMU	isotope mass
ITM_MASS_Gd_158	157.9241039 * ITM_AMU	isotope mass
ITM_MASS_Gd_159	158.9263887 * ITM_AMU	isotope mass
ITM_MASS_Gd_160	159.9270541 * ITM_AMU	isotope mass
ITM_MASS_Gd_161	160.9296692 * ITM_AMU	isotope mass
ITM_MASS_Gd_162	161.930985 * ITM_AMU	isotope mass
ITM_MASS_Gd_163	162.93399 * ITM_AMU	isotope mass
ITM_MASS_Gd_164	163.93586 * ITM_AMU	isotope mass
ITM_MASS_Gd_165	164.93938 * ITM_AMU	isotope mass
ITM_MASS_Gd_166	165.94160 * ITM_AMU	isotope mass
ITM_MASS_Gd_167	166.94557 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Gd_168	167.94836 * ITM_AMU	isotope mass
ITM_MASS_Gd_169	168.95287 * ITM_AMU	isotope mass
ITM_MASS_Tb_136	135.96138 * ITM_AMU	isotope mass
ITM_MASS_Tb_137	136.95598 * ITM_AMU	isotope mass
ITM_MASS_Tb_138	137.95316 * ITM_AMU	isotope mass
ITM_MASS_Tb_139	138.94829 * ITM_AMU	isotope mass
ITM_MASS_Tb_140	139.94581 * ITM_AMU	isotope mass
ITM_MASS_Tb_141	140.94145 * ITM_AMU	isotope mass
ITM_MASS_Tb_142	141.93874 * ITM_AMU	isotope mass
ITM_MASS_Tb_143	142.935120 * ITM_AMU	isotope mass
ITM_MASS_Tb_144	143.933050 * ITM_AMU	isotope mass
ITM_MASS_Tb_145	144.929270 * ITM_AMU	isotope mass
ITM_MASS_Tb_146	145.927250 * ITM_AMU	isotope mass
ITM_MASS_Tb_147	146.924045 * ITM_AMU	isotope mass
ITM_MASS_Tb_148	147.924272 * ITM_AMU	isotope mass
ITM_MASS_Tb_149	148.923246 * ITM_AMU	isotope mass
ITM_MASS_Tb_150	149.923660 * ITM_AMU	isotope mass
ITM_MASS_Tb_151	150.923103 * ITM_AMU	isotope mass
ITM_MASS_Tb_152	151.924070 * ITM_AMU	isotope mass
ITM_MASS_Tb_153	152.923435 * ITM_AMU	isotope mass
ITM_MASS_Tb_154	153.924680 * ITM_AMU	isotope mass
ITM_MASS_Tb_155	154.923505 * ITM_AMU	isotope mass
ITM_MASS_Tb_156	155.924747 * ITM_AMU	isotope mass
ITM_MASS_Tb_157	156.9240246 * ITM_AMU	isotope mass
ITM_MASS_Tb_158	157.9254131 * ITM_AMU	isotope mass
ITM_MASS_Tb_159	158.9253468 * ITM_AMU	isotope mass
ITM_MASS_Tb_160	159.9271676 * ITM_AMU	isotope mass
ITM_MASS_Tb_161	160.9275699 * ITM_AMU	isotope mass
ITM_MASS_Tb_162	161.929490 * ITM_AMU	isotope mass
ITM_MASS_Tb_163	162.930648 * ITM_AMU	isotope mass
ITM_MASS_Tb_164	163.93335 * ITM_AMU	isotope mass
ITM_MASS_Tb_165	164.93488 * ITM_AMU	isotope mass
ITM_MASS_Tb_166	165.93799 * ITM_AMU	isotope mass
ITM_MASS_Tb_167	166.94005 * ITM_AMU	isotope mass
ITM_MASS_Tb_168	167.94364 * ITM_AMU	isotope mass
ITM_MASS_Tb_169	168.94622 * ITM_AMU	isotope mass
ITM_MASS_Tb_170	169.95025 * ITM_AMU	isotope mass
ITM_MASS_Tb_171	170.95330 * ITM_AMU	isotope mass
ITM_MASS_Dy_138	137.96249 * ITM_AMU	isotope mass
ITM_MASS_Dy_139	138.95954 * ITM_AMU	isotope mass
ITM_MASS_Dy_140	139.95401 * ITM_AMU	isotope mass
ITM_MASS_Dy_141	140.95135 * ITM_AMU	isotope mass
ITM_MASS_Dy_142	141.94637 * ITM_AMU	isotope mass
ITM_MASS_Dy_143	142.94383 * ITM_AMU	isotope mass
ITM_MASS_Dy_144	143.939250 * ITM_AMU	isotope mass
ITM_MASS_Dy_145	144.937430 * ITM_AMU	isotope mass
ITM_MASS_Dy_146	145.932845 * ITM_AMU	isotope mass
ITM_MASS_Dy_147	146.931092 * ITM_AMU	isotope mass
ITM_MASS_Dy_148	147.927150 * ITM_AMU	isotope mass
ITM_MASS_Dy_149	148.927305 * ITM_AMU	isotope mass
ITM_MASS_Dy_150	149.925585 * ITM_AMU	isotope mass
ITM_MASS_Dy_151	150.926185 * ITM_AMU	isotope mass
ITM_MASS_Dy_152	151.924718 * ITM_AMU	isotope mass
ITM_MASS_Dy_153	152.925765 * ITM_AMU	isotope mass
ITM_MASS_Dy_154	153.924424 * ITM_AMU	isotope mass
ITM_MASS_Dy_155	154.925754 * ITM_AMU	isotope mass
ITM_MASS_Dy_156	155.924283 * ITM_AMU	isotope mass
ITM_MASS_Dy_157	156.925466 * ITM_AMU	isotope mass
ITM_MASS_Dy_158	157.924409 * ITM_AMU	isotope mass
ITM_MASS_Dy_159	158.9257392 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Dy_160	159.9251975 * ITM_AMU	isotope mass
ITM_MASS_Dy_161	160.9269334 * ITM_AMU	isotope mass
ITM_MASS_Dy_162	161.9267984 * ITM_AMU	isotope mass
ITM_MASS_Dy_163	162.9287312 * ITM_AMU	isotope mass
ITM_MASS_Dy_164	163.9291748 * ITM_AMU	isotope mass
ITM_MASS_Dy_165	164.9317033 * ITM_AMU	isotope mass
ITM_MASS_Dy_166	165.9328067 * ITM_AMU	isotope mass
ITM_MASS_Dy_167	166.935660 * ITM_AMU	isotope mass
ITM_MASS_Dy_168	167.93713 * ITM_AMU	isotope mass
ITM_MASS_Dy_169	168.94031 * ITM_AMU	isotope mass
ITM_MASS_Dy_170	169.94239 * ITM_AMU	isotope mass
ITM_MASS_Dy_171	170.94620 * ITM_AMU	isotope mass
ITM_MASS_Dy_172	171.94876 * ITM_AMU	isotope mass
ITM_MASS_Dy_173	172.95300 * ITM_AMU	isotope mass
ITM_MASS_Ho_140	139.96854 * ITM_AMU	isotope mass
ITM_MASS_Ho_141	140.96310 * ITM_AMU	isotope mass
ITM_MASS_Ho_142	141.95977 * ITM_AMU	isotope mass
ITM_MASS_Ho_143	142.95461 * ITM_AMU	isotope mass
ITM_MASS_Ho_144	143.95148 * ITM_AMU	isotope mass
ITM_MASS_Ho_145	144.94720 * ITM_AMU	isotope mass
ITM_MASS_Ho_146	145.94464 * ITM_AMU	isotope mass
ITM_MASS_Ho_147	146.940060 * ITM_AMU	isotope mass
ITM_MASS_Ho_148	147.93772 * ITM_AMU	isotope mass
ITM_MASS_Ho_149	148.933775 * ITM_AMU	isotope mass
ITM_MASS_Ho_150	149.933496 * ITM_AMU	isotope mass
ITM_MASS_Ho_151	150.931688 * ITM_AMU	isotope mass
ITM_MASS_Ho_152	151.931714 * ITM_AMU	isotope mass
ITM_MASS_Ho_153	152.930199 * ITM_AMU	isotope mass
ITM_MASS_Ho_154	153.930602 * ITM_AMU	isotope mass
ITM_MASS_Ho_155	154.929103 * ITM_AMU	isotope mass
ITM_MASS_Ho_156	155.929840 * ITM_AMU	isotope mass
ITM_MASS_Ho_157	156.928256 * ITM_AMU	isotope mass
ITM_MASS_Ho_158	157.928941 * ITM_AMU	isotope mass
ITM_MASS_Ho_159	158.927712 * ITM_AMU	isotope mass
ITM_MASS_Ho_160	159.928729 * ITM_AMU	isotope mass
ITM_MASS_Ho_161	160.927855 * ITM_AMU	isotope mass
ITM_MASS_Ho_162	161.929096 * ITM_AMU	isotope mass
ITM_MASS_Ho_163	162.9287339 * ITM_AMU	isotope mass
ITM_MASS_Ho_164	163.9302335 * ITM_AMU	isotope mass
ITM_MASS_Ho_165	164.9303221 * ITM_AMU	isotope mass
ITM_MASS_Ho_166	165.9322842 * ITM_AMU	isotope mass
ITM_MASS_Ho_167	166.933133 * ITM_AMU	isotope mass
ITM_MASS_Ho_168	167.935520 * ITM_AMU	isotope mass
ITM_MASS_Ho_169	168.936872 * ITM_AMU	isotope mass
ITM_MASS_Ho_170	169.939620 * ITM_AMU	isotope mass
ITM_MASS_Ho_171	170.94147 * ITM_AMU	isotope mass
ITM_MASS_Ho_172	171.94482 * ITM_AMU	isotope mass
ITM_MASS_Ho_173	172.94729 * ITM_AMU	isotope mass
ITM_MASS_Ho_174	173.95115 * ITM_AMU	isotope mass
ITM_MASS_Ho_175	174.95405 * ITM_AMU	isotope mass
ITM_MASS_Er_143	142.96634 * ITM_AMU	isotope mass
ITM_MASS_Er_144	143.96038 * ITM_AMU	isotope mass
ITM_MASS_Er_145	144.95739 * ITM_AMU	isotope mass
ITM_MASS_Er_146	145.95200 * ITM_AMU	isotope mass
ITM_MASS_Er_147	146.94949 * ITM_AMU	isotope mass
ITM_MASS_Er_148	147.94455 * ITM_AMU	isotope mass
ITM_MASS_Er_149	148.942310 * ITM_AMU	isotope mass
ITM_MASS_Er_150	149.937914 * ITM_AMU	isotope mass
ITM_MASS_Er_151	150.937449 * ITM_AMU	isotope mass
ITM_MASS_Er_152	151.935050 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Er_153	152.935063 * ITM_AMU	isotope mass
ITM_MASS_Er_154	153.932783 * ITM_AMU	isotope mass
ITM_MASS_Er_155	154.933209 * ITM_AMU	isotope mass
ITM_MASS_Er_156	155.931065 * ITM_AMU	isotope mass
ITM_MASS_Er_157	156.931920 * ITM_AMU	isotope mass
ITM_MASS_Er_158	157.929893 * ITM_AMU	isotope mass
ITM_MASS_Er_159	158.930684 * ITM_AMU	isotope mass
ITM_MASS_Er_160	159.929083 * ITM_AMU	isotope mass
ITM_MASS_Er_161	160.929995 * ITM_AMU	isotope mass
ITM_MASS_Er_162	161.928778 * ITM_AMU	isotope mass
ITM_MASS_Er_163	162.930033 * ITM_AMU	isotope mass
ITM_MASS_Er_164	163.929200 * ITM_AMU	isotope mass
ITM_MASS_Er_165	164.930726 * ITM_AMU	isotope mass
ITM_MASS_Er_166	165.9302931 * ITM_AMU	isotope mass
ITM_MASS_Er_167	166.9320482 * ITM_AMU	isotope mass
ITM_MASS_Er_168	167.9323702 * ITM_AMU	isotope mass
ITM_MASS_Er_169	168.9345904 * ITM_AMU	isotope mass
ITM_MASS_Er_170	169.9354643 * ITM_AMU	isotope mass
ITM_MASS_Er_171	170.9380298 * ITM_AMU	isotope mass
ITM_MASS_Er_172	171.939356 * ITM_AMU	isotope mass
ITM_MASS_Er_173	172.94240 * ITM_AMU	isotope mass
ITM_MASS_Er_174	173.94423 * ITM_AMU	isotope mass
ITM_MASS_Er_175	174.94777 * ITM_AMU	isotope mass
ITM_MASS_Er_176	175.95008 * ITM_AMU	isotope mass
ITM_MASS_Er_177	176.95405 * ITM_AMU	isotope mass
ITM_MASS_Tm_145	144.97007 * ITM_AMU	isotope mass
ITM_MASS_Tm_146	145.96643 * ITM_AMU	isotope mass
ITM_MASS_Tm_147	146.96096 * ITM_AMU	isotope mass
ITM_MASS_Tm_148	147.95784 * ITM_AMU	isotope mass
ITM_MASS_Tm_149	148.95272 * ITM_AMU	isotope mass
ITM_MASS_Tm_150	149.94996 * ITM_AMU	isotope mass
ITM_MASS_Tm_151	150.945483 * ITM_AMU	isotope mass
ITM_MASS_Tm_152	151.944420 * ITM_AMU	isotope mass
ITM_MASS_Tm_153	152.942012 * ITM_AMU	isotope mass
ITM_MASS_Tm_154	153.941568 * ITM_AMU	isotope mass
ITM_MASS_Tm_155	154.939199 * ITM_AMU	isotope mass
ITM_MASS_Tm_156	155.938980 * ITM_AMU	isotope mass
ITM_MASS_Tm_157	156.936970 * ITM_AMU	isotope mass
ITM_MASS_Tm_158	157.936980 * ITM_AMU	isotope mass
ITM_MASS_Tm_159	158.934980 * ITM_AMU	isotope mass
ITM_MASS_Tm_160	159.935260 * ITM_AMU	isotope mass
ITM_MASS_Tm_161	160.933550 * ITM_AMU	isotope mass
ITM_MASS_Tm_162	161.933995 * ITM_AMU	isotope mass
ITM_MASS_Tm_163	162.932651 * ITM_AMU	isotope mass
ITM_MASS_Tm_164	163.933560 * ITM_AMU	isotope mass
ITM_MASS_Tm_165	164.932435 * ITM_AMU	isotope mass
ITM_MASS_Tm_166	165.933554 * ITM_AMU	isotope mass
ITM_MASS_Tm_167	166.9328516 * ITM_AMU	isotope mass
ITM_MASS_Tm_168	167.934173 * ITM_AMU	isotope mass
ITM_MASS_Tm_169	168.9342133 * ITM_AMU	isotope mass
ITM_MASS_Tm_170	169.9358014 * ITM_AMU	isotope mass
ITM_MASS_Tm_171	170.9364294 * ITM_AMU	isotope mass
ITM_MASS_Tm_172	171.938400 * ITM_AMU	isotope mass
ITM_MASS_Tm_173	172.939604 * ITM_AMU	isotope mass
ITM_MASS_Tm_174	173.942170 * ITM_AMU	isotope mass
ITM_MASS_Tm_175	174.943840 * ITM_AMU	isotope mass
ITM_MASS_Tm_176	175.94699 * ITM_AMU	isotope mass
ITM_MASS_Tm_177	176.94904 * ITM_AMU	isotope mass
ITM_MASS_Tm_178	177.95264 * ITM_AMU	isotope mass
ITM_MASS_Tm_179	178.95534 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Yb_148	147.96742 * ITM_AMU	isotope mass
ITM_MASS_Yb_149	148.96404 * ITM_AMU	isotope mass
ITM_MASS_Yb_150	149.95842 * ITM_AMU	isotope mass
ITM_MASS_Yb_151	150.95540 * ITM_AMU	isotope mass
ITM_MASS_Yb_152	151.95029 * ITM_AMU	isotope mass
ITM_MASS_Yb_153	152.94948 * ITM_AMU	isotope mass
ITM_MASS_Yb_154	153.946394 * ITM_AMU	isotope mass
ITM_MASS_Yb_155	154.945782 * ITM_AMU	isotope mass
ITM_MASS_Yb_156	155.942818 * ITM_AMU	isotope mass
ITM_MASS_Yb_157	156.942628 * ITM_AMU	isotope mass
ITM_MASS_Yb_158	157.939866 * ITM_AMU	isotope mass
ITM_MASS_Yb_159	158.940050 * ITM_AMU	isotope mass
ITM_MASS_Yb_160	159.937552 * ITM_AMU	isotope mass
ITM_MASS_Yb_161	160.937902 * ITM_AMU	isotope mass
ITM_MASS_Yb_162	161.935768 * ITM_AMU	isotope mass
ITM_MASS_Yb_163	162.936334 * ITM_AMU	isotope mass
ITM_MASS_Yb_164	163.934489 * ITM_AMU	isotope mass
ITM_MASS_Yb_165	164.935280 * ITM_AMU	isotope mass
ITM_MASS_Yb_166	165.933882 * ITM_AMU	isotope mass
ITM_MASS_Yb_167	166.934950 * ITM_AMU	isotope mass
ITM_MASS_Yb_168	167.933897 * ITM_AMU	isotope mass
ITM_MASS_Yb_169	168.935190 * ITM_AMU	isotope mass
ITM_MASS_Yb_170	169.9347618 * ITM_AMU	isotope mass
ITM_MASS_Yb_171	170.9363258 * ITM_AMU	isotope mass
ITM_MASS_Yb_172	171.9363815 * ITM_AMU	isotope mass
ITM_MASS_Yb_173	172.9382108 * ITM_AMU	isotope mass
ITM_MASS_Yb_174	173.9388621 * ITM_AMU	isotope mass
ITM_MASS_Yb_175	174.9412765 * ITM_AMU	isotope mass
ITM_MASS_Yb_176	175.9425717 * ITM_AMU	isotope mass
ITM_MASS_Yb_177	176.9452608 * ITM_AMU	isotope mass
ITM_MASS_Yb_178	177.946647 * ITM_AMU	isotope mass
ITM_MASS_Yb_179	178.95017 * ITM_AMU	isotope mass
ITM_MASS_Yb_180	179.95233 * ITM_AMU	isotope mass
ITM_MASS_Yb_181	180.95615 * ITM_AMU	isotope mass
ITM_MASS_Lu_150	149.97323 * ITM_AMU	isotope mass
ITM_MASS_Lu_151	150.96758 * ITM_AMU	isotope mass
ITM_MASS_Lu_152	151.96412 * ITM_AMU	isotope mass
ITM_MASS_Lu_153	152.95877 * ITM_AMU	isotope mass
ITM_MASS_Lu_154	153.95752 * ITM_AMU	isotope mass
ITM_MASS_Lu_155	154.954316 * ITM_AMU	isotope mass
ITM_MASS_Lu_156	155.953030 * ITM_AMU	isotope mass
ITM_MASS_Lu_157	156.950098 * ITM_AMU	isotope mass
ITM_MASS_Lu_158	157.949313 * ITM_AMU	isotope mass
ITM_MASS_Lu_159	158.946630 * ITM_AMU	isotope mass
ITM_MASS_Lu_160	159.946030 * ITM_AMU	isotope mass
ITM_MASS_Lu_161	160.943570 * ITM_AMU	isotope mass
ITM_MASS_Lu_162	161.943280 * ITM_AMU	isotope mass
ITM_MASS_Lu_163	162.941180 * ITM_AMU	isotope mass
ITM_MASS_Lu_164	163.941340 * ITM_AMU	isotope mass
ITM_MASS_Lu_165	164.939407 * ITM_AMU	isotope mass
ITM_MASS_Lu_166	165.939860 * ITM_AMU	isotope mass
ITM_MASS_Lu_167	166.938270 * ITM_AMU	isotope mass
ITM_MASS_Lu_168	167.938740 * ITM_AMU	isotope mass
ITM_MASS_Lu_169	168.937651 * ITM_AMU	isotope mass
ITM_MASS_Lu_170	169.938475 * ITM_AMU	isotope mass
ITM_MASS_Lu_171	170.9379131 * ITM_AMU	isotope mass
ITM_MASS_Lu_172	171.939086 * ITM_AMU	isotope mass
ITM_MASS_Lu_173	172.9389306 * ITM_AMU	isotope mass
ITM_MASS_Lu_174	173.9403375 * ITM_AMU	isotope mass
ITM_MASS_Lu_175	174.9407718 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Lu_176	175.9426863 * ITM_AMU	isotope mass
ITM_MASS_Lu_177	176.9437581 * ITM_AMU	isotope mass
ITM_MASS_Lu_178	177.945955 * ITM_AMU	isotope mass
ITM_MASS_Lu_179	178.947327 * ITM_AMU	isotope mass
ITM_MASS_Lu_180	179.949880 * ITM_AMU	isotope mass
ITM_MASS_Lu_181	180.95197 * ITM_AMU	isotope mass
ITM_MASS_Lu_182	181.95504 * ITM_AMU	isotope mass
ITM_MASS_Lu_183	182.95757 * ITM_AMU	isotope mass
ITM_MASS_Lu_184	183.96091 * ITM_AMU	isotope mass
ITM_MASS_Hf_153	152.97069 * ITM_AMU	isotope mass
ITM_MASS_Hf_154	153.96486 * ITM_AMU	isotope mass
ITM_MASS_Hf_155	154.96339 * ITM_AMU	isotope mass
ITM_MASS_Hf_156	155.95936 * ITM_AMU	isotope mass
ITM_MASS_Hf_157	156.95840 * ITM_AMU	isotope mass
ITM_MASS_Hf_158	157.954799 * ITM_AMU	isotope mass
ITM_MASS_Hf_159	158.953995 * ITM_AMU	isotope mass
ITM_MASS_Hf_160	159.950684 * ITM_AMU	isotope mass
ITM_MASS_Hf_161	160.950275 * ITM_AMU	isotope mass
ITM_MASS_Hf_162	161.947210 * ITM_AMU	isotope mass
ITM_MASS_Hf_163	162.947090 * ITM_AMU	isotope mass
ITM_MASS_Hf_164	163.944367 * ITM_AMU	isotope mass
ITM_MASS_Hf_165	164.944570 * ITM_AMU	isotope mass
ITM_MASS_Hf_166	165.942180 * ITM_AMU	isotope mass
ITM_MASS_Hf_167	166.942600 * ITM_AMU	isotope mass
ITM_MASS_Hf_168	167.940570 * ITM_AMU	isotope mass
ITM_MASS_Hf_169	168.941260 * ITM_AMU	isotope mass
ITM_MASS_Hf_170	169.939610 * ITM_AMU	isotope mass
ITM_MASS_Hf_171	170.940490 * ITM_AMU	isotope mass
ITM_MASS_Hf_172	171.939448 * ITM_AMU	isotope mass
ITM_MASS_Hf_173	172.940510 * ITM_AMU	isotope mass
ITM_MASS_Hf_174	173.940046 * ITM_AMU	isotope mass
ITM_MASS_Hf_175	174.941509 * ITM_AMU	isotope mass
ITM_MASS_Hf_176	175.9414086 * ITM_AMU	isotope mass
ITM_MASS_Hf_177	176.9432207 * ITM_AMU	isotope mass
ITM_MASS_Hf_178	177.9436988 * ITM_AMU	isotope mass
ITM_MASS_Hf_179	178.9458161 * ITM_AMU	isotope mass
ITM_MASS_Hf_180	179.9465500 * ITM_AMU	isotope mass
ITM_MASS_Hf_181	180.9491012 * ITM_AMU	isotope mass
ITM_MASS_Hf_182	181.950554 * ITM_AMU	isotope mass
ITM_MASS_Hf_183	182.953530 * ITM_AMU	isotope mass
ITM_MASS_Hf_184	183.955450 * ITM_AMU	isotope mass
ITM_MASS_Hf_185	184.95882 * ITM_AMU	isotope mass
ITM_MASS_Hf_186	185.96089 * ITM_AMU	isotope mass
ITM_MASS_Hf_187	186.96459 * ITM_AMU	isotope mass
ITM_MASS_Hf_188	187.96685 * ITM_AMU	isotope mass
ITM_MASS_Ta_155	154.97459 * ITM_AMU	isotope mass
ITM_MASS_Ta_156	155.97230 * ITM_AMU	isotope mass
ITM_MASS_Ta_157	156.96819 * ITM_AMU	isotope mass
ITM_MASS_Ta_158	157.96670 * ITM_AMU	isotope mass
ITM_MASS_Ta_159	158.963018 * ITM_AMU	isotope mass
ITM_MASS_Ta_160	159.96149 * ITM_AMU	isotope mass
ITM_MASS_Ta_161	160.958420 * ITM_AMU	isotope mass
ITM_MASS_Ta_162	161.957290 * ITM_AMU	isotope mass
ITM_MASS_Ta_163	162.954330 * ITM_AMU	isotope mass
ITM_MASS_Ta_164	163.953530 * ITM_AMU	isotope mass
ITM_MASS_Ta_165	164.950773 * ITM_AMU	isotope mass
ITM_MASS_Ta_166	165.950510 * ITM_AMU	isotope mass
ITM_MASS_Ta_167	166.948090 * ITM_AMU	isotope mass
ITM_MASS_Ta_168	167.948050 * ITM_AMU	isotope mass
ITM_MASS_Ta_169	168.946010 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ta_170	169.946180 * ITM_AMU	isotope mass
ITM_MASS_Ta_171	170.944480 * ITM_AMU	isotope mass
ITM_MASS_Ta_172	171.944900 * ITM_AMU	isotope mass
ITM_MASS_Ta_173	172.943750 * ITM_AMU	isotope mass
ITM_MASS_Ta_174	173.944450 * ITM_AMU	isotope mass
ITM_MASS_Ta_175	174.943740 * ITM_AMU	isotope mass
ITM_MASS_Ta_176	175.944860 * ITM_AMU	isotope mass
ITM_MASS_Ta_177	176.944472 * ITM_AMU	isotope mass
ITM_MASS_Ta_178	177.945778 * ITM_AMU	isotope mass
ITM_MASS_Ta_179	178.9459295 * ITM_AMU	isotope mass
ITM_MASS_Ta_180	179.9474648 * ITM_AMU	isotope mass
ITM_MASS_Ta_181	180.9479958 * ITM_AMU	isotope mass
ITM_MASS_Ta_182	181.9501518 * ITM_AMU	isotope mass
ITM_MASS_Ta_183	182.9513726 * ITM_AMU	isotope mass
ITM_MASS_Ta_184	183.954008 * ITM_AMU	isotope mass
ITM_MASS_Ta_185	184.955559 * ITM_AMU	isotope mass
ITM_MASS_Ta_186	185.958550 * ITM_AMU	isotope mass
ITM_MASS_Ta_187	186.96053 * ITM_AMU	isotope mass
ITM_MASS_Ta_188	187.96370 * ITM_AMU	isotope mass
ITM_MASS_Ta_189	188.96583 * ITM_AMU	isotope mass
ITM_MASS_Ta_190	189.96923 * ITM_AMU	isotope mass
ITM_MASS_W_158	157.97456 * ITM_AMU	isotope mass
ITM_MASS_W_159	158.97292 * ITM_AMU	isotope mass
ITM_MASS_W_160	159.96848 * ITM_AMU	isotope mass
ITM_MASS_W_161	160.96736 * ITM_AMU	isotope mass
ITM_MASS_W_162	161.963497 * ITM_AMU	isotope mass
ITM_MASS_W_163	162.962520 * ITM_AMU	isotope mass
ITM_MASS_W_164	163.958954 * ITM_AMU	isotope mass
ITM_MASS_W_165	164.958280 * ITM_AMU	isotope mass
ITM_MASS_W_166	165.955027 * ITM_AMU	isotope mass
ITM_MASS_W_167	166.954816 * ITM_AMU	isotope mass
ITM_MASS_W_168	167.951808 * ITM_AMU	isotope mass
ITM_MASS_W_169	168.951779 * ITM_AMU	isotope mass
ITM_MASS_W_170	169.949228 * ITM_AMU	isotope mass
ITM_MASS_W_171	170.949450 * ITM_AMU	isotope mass
ITM_MASS_W_172	171.947290 * ITM_AMU	isotope mass
ITM_MASS_W_173	172.947690 * ITM_AMU	isotope mass
ITM_MASS_W_174	173.946080 * ITM_AMU	isotope mass
ITM_MASS_W_175	174.946720 * ITM_AMU	isotope mass
ITM_MASS_W_176	175.945630 * ITM_AMU	isotope mass
ITM_MASS_W_177	176.946640 * ITM_AMU	isotope mass
ITM_MASS_W_178	177.945876 * ITM_AMU	isotope mass
ITM_MASS_W_179	178.947070 * ITM_AMU	isotope mass
ITM_MASS_W_180	179.946704 * ITM_AMU	isotope mass
ITM_MASS_W_181	180.948197 * ITM_AMU	isotope mass
ITM_MASS_W_182	181.9482042 * ITM_AMU	isotope mass
ITM_MASS_W_183	182.9502230 * ITM_AMU	isotope mass
ITM_MASS_W_184	183.9509312 * ITM_AMU	isotope mass
ITM_MASS_W_185	184.9534193 * ITM_AMU	isotope mass
ITM_MASS_W_186	185.9543641 * ITM_AMU	isotope mass
ITM_MASS_W_187	186.9571605 * ITM_AMU	isotope mass
ITM_MASS_W_188	187.958489 * ITM_AMU	isotope mass
ITM_MASS_W_189	188.96191 * ITM_AMU	isotope mass
ITM_MASS_W_190	189.96318 * ITM_AMU	isotope mass
ITM_MASS_W_191	190.96660 * ITM_AMU	isotope mass
ITM_MASS_W_192	191.96817 * ITM_AMU	isotope mass
ITM_MASS_Re_160	159.98212 * ITM_AMU	isotope mass
ITM_MASS_Re_161	160.97759 * ITM_AMU	isotope mass
ITM_MASS_Re_162	161.97600 * ITM_AMU	isotope mass
ITM_MASS_Re_163	162.972081 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Re_164	163.97032 * ITM_AMU	isotope mass
ITM_MASS_Re_165	164.967089 * ITM_AMU	isotope mass
ITM_MASS_Re_166	165.965810 * ITM_AMU	isotope mass
ITM_MASS_Re_167	166.962600 * ITM_AMU	isotope mass
ITM_MASS_Re_168	167.961570 * ITM_AMU	isotope mass
ITM_MASS_Re_169	168.958790 * ITM_AMU	isotope mass
ITM_MASS_Re_170	169.958220 * ITM_AMU	isotope mass
ITM_MASS_Re_171	170.955720 * ITM_AMU	isotope mass
ITM_MASS_Re_172	171.955420 * ITM_AMU	isotope mass
ITM_MASS_Re_173	172.953240 * ITM_AMU	isotope mass
ITM_MASS_Re_174	173.953120 * ITM_AMU	isotope mass
ITM_MASS_Re_175	174.951380 * ITM_AMU	isotope mass
ITM_MASS_Re_176	175.951620 * ITM_AMU	isotope mass
ITM_MASS_Re_177	176.950330 * ITM_AMU	isotope mass
ITM_MASS_Re_178	177.950990 * ITM_AMU	isotope mass
ITM_MASS_Re_179	178.949988 * ITM_AMU	isotope mass
ITM_MASS_Re_180	179.950789 * ITM_AMU	isotope mass
ITM_MASS_Re_181	180.950068 * ITM_AMU	isotope mass
ITM_MASS_Re_182	181.95121 * ITM_AMU	isotope mass
ITM_MASS_Re_183	182.950820 * ITM_AMU	isotope mass
ITM_MASS_Re_184	183.952521 * ITM_AMU	isotope mass
ITM_MASS_Re_185	184.9529550 * ITM_AMU	isotope mass
ITM_MASS_Re_186	185.9549861 * ITM_AMU	isotope mass
ITM_MASS_Re_187	186.9557531 * ITM_AMU	isotope mass
ITM_MASS_Re_188	187.9581144 * ITM_AMU	isotope mass
ITM_MASS_Re_189	188.959229 * ITM_AMU	isotope mass
ITM_MASS_Re_190	189.96182 * ITM_AMU	isotope mass
ITM_MASS_Re_191	190.963125 * ITM_AMU	isotope mass
ITM_MASS_Re_192	191.96596 * ITM_AMU	isotope mass
ITM_MASS_Re_193	192.96747 * ITM_AMU	isotope mass
ITM_MASS_Re_194	193.97042 * ITM_AMU	isotope mass
ITM_MASS_Os_162	161.98443 * ITM_AMU	isotope mass
ITM_MASS_Os_163	162.98269 * ITM_AMU	isotope mass
ITM_MASS_Os_164	163.97804 * ITM_AMU	isotope mass
ITM_MASS_Os_165	164.97676 * ITM_AMU	isotope mass
ITM_MASS_Os_166	165.972691 * ITM_AMU	isotope mass
ITM_MASS_Os_167	166.971550 * ITM_AMU	isotope mass
ITM_MASS_Os_168	167.967804 * ITM_AMU	isotope mass
ITM_MASS_Os_169	168.967019 * ITM_AMU	isotope mass
ITM_MASS_Os_170	169.963577 * ITM_AMU	isotope mass
ITM_MASS_Os_171	170.963185 * ITM_AMU	isotope mass
ITM_MASS_Os_172	171.960023 * ITM_AMU	isotope mass
ITM_MASS_Os_173	172.959808 * ITM_AMU	isotope mass
ITM_MASS_Os_174	173.957062 * ITM_AMU	isotope mass
ITM_MASS_Os_175	174.956946 * ITM_AMU	isotope mass
ITM_MASS_Os_176	175.954810 * ITM_AMU	isotope mass
ITM_MASS_Os_177	176.954965 * ITM_AMU	isotope mass
ITM_MASS_Os_178	177.953251 * ITM_AMU	isotope mass
ITM_MASS_Os_179	178.953816 * ITM_AMU	isotope mass
ITM_MASS_Os_180	179.952379 * ITM_AMU	isotope mass
ITM_MASS_Os_181	180.953240 * ITM_AMU	isotope mass
ITM_MASS_Os_182	181.952110 * ITM_AMU	isotope mass
ITM_MASS_Os_183	182.953130 * ITM_AMU	isotope mass
ITM_MASS_Os_184	183.9524891 * ITM_AMU	isotope mass
ITM_MASS_Os_185	184.9540423 * ITM_AMU	isotope mass
ITM_MASS_Os_186	185.9538382 * ITM_AMU	isotope mass
ITM_MASS_Os_187	186.9557505 * ITM_AMU	isotope mass
ITM_MASS_Os_188	187.9558382 * ITM_AMU	isotope mass
ITM_MASS_Os_189	188.9581475 * ITM_AMU	isotope mass
ITM_MASS_Os_190	189.9584470 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Os_191	190.9609297 * ITM_AMU	isotope mass
ITM_MASS_Os_192	191.9614807 * ITM_AMU	isotope mass
ITM_MASS_Os_193	192.9641516 * ITM_AMU	isotope mass
ITM_MASS_Os_194	193.9651821 * ITM_AMU	isotope mass
ITM_MASS_Os_195	194.96813 * ITM_AMU	isotope mass
ITM_MASS_Os_196	195.969640 * ITM_AMU	isotope mass
ITM_MASS_Ir_164	163.99220 * ITM_AMU	isotope mass
ITM_MASS_Ir_165	164.98752 * ITM_AMU	isotope mass
ITM_MASS_Ir_166	165.98582 * ITM_AMU	isotope mass
ITM_MASS_Ir_167	166.981665 * ITM_AMU	isotope mass
ITM_MASS_Ir_168	167.97988 * ITM_AMU	isotope mass
ITM_MASS_Ir_169	168.976295 * ITM_AMU	isotope mass
ITM_MASS_Ir_170	169.97497 * ITM_AMU	isotope mass
ITM_MASS_Ir_171	170.971630 * ITM_AMU	isotope mass
ITM_MASS_Ir_172	171.97046 * ITM_AMU	isotope mass
ITM_MASS_Ir_173	172.967502 * ITM_AMU	isotope mass
ITM_MASS_Ir_174	173.966861 * ITM_AMU	isotope mass
ITM_MASS_Ir_175	174.964113 * ITM_AMU	isotope mass
ITM_MASS_Ir_176	175.963649 * ITM_AMU	isotope mass
ITM_MASS_Ir_177	176.961302 * ITM_AMU	isotope mass
ITM_MASS_Ir_178	177.961082 * ITM_AMU	isotope mass
ITM_MASS_Ir_179	178.959122 * ITM_AMU	isotope mass
ITM_MASS_Ir_180	179.959229 * ITM_AMU	isotope mass
ITM_MASS_Ir_181	180.957625 * ITM_AMU	isotope mass
ITM_MASS_Ir_182	181.958076 * ITM_AMU	isotope mass
ITM_MASS_Ir_183	182.956846 * ITM_AMU	isotope mass
ITM_MASS_Ir_184	183.957480 * ITM_AMU	isotope mass
ITM_MASS_Ir_185	184.956700 * ITM_AMU	isotope mass
ITM_MASS_Ir_186	185.957946 * ITM_AMU	isotope mass
ITM_MASS_Ir_187	186.957363 * ITM_AMU	isotope mass
ITM_MASS_Ir_188	187.958853 * ITM_AMU	isotope mass
ITM_MASS_Ir_189	188.958719 * ITM_AMU	isotope mass
ITM_MASS_Ir_190	189.9605460 * ITM_AMU	isotope mass
ITM_MASS_Ir_191	190.9605940 * ITM_AMU	isotope mass
ITM_MASS_Ir_192	191.9626050 * ITM_AMU	isotope mass
ITM_MASS_Ir_193	192.9629264 * ITM_AMU	isotope mass
ITM_MASS_Ir_194	193.9650784 * ITM_AMU	isotope mass
ITM_MASS_Ir_195	194.9659796 * ITM_AMU	isotope mass
ITM_MASS_Ir_196	195.968400 * ITM_AMU	isotope mass
ITM_MASS_Ir_197	196.969653 * ITM_AMU	isotope mass
ITM_MASS_Ir_198	197.97228 * ITM_AMU	isotope mass
ITM_MASS_Ir_199	198.973800 * ITM_AMU	isotope mass
ITM_MASS_Pt_166	165.99486 * ITM_AMU	isotope mass
ITM_MASS_Pt_167	166.99298 * ITM_AMU	isotope mass
ITM_MASS_Pt_168	167.98815 * ITM_AMU	isotope mass
ITM_MASS_Pt_169	168.98672 * ITM_AMU	isotope mass
ITM_MASS_Pt_170	169.982495 * ITM_AMU	isotope mass
ITM_MASS_Pt_171	170.981240 * ITM_AMU	isotope mass
ITM_MASS_Pt_172	171.977347 * ITM_AMU	isotope mass
ITM_MASS_Pt_173	172.976440 * ITM_AMU	isotope mass
ITM_MASS_Pt_174	173.972819 * ITM_AMU	isotope mass
ITM_MASS_Pt_175	174.972421 * ITM_AMU	isotope mass
ITM_MASS_Pt_176	175.968945 * ITM_AMU	isotope mass
ITM_MASS_Pt_177	176.968469 * ITM_AMU	isotope mass
ITM_MASS_Pt_178	177.965649 * ITM_AMU	isotope mass
ITM_MASS_Pt_179	178.965363 * ITM_AMU	isotope mass
ITM_MASS_Pt_180	179.963031 * ITM_AMU	isotope mass
ITM_MASS_Pt_181	180.963097 * ITM_AMU	isotope mass
ITM_MASS_Pt_182	181.961171 * ITM_AMU	isotope mass
ITM_MASS_Pt_183	182.961597 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Pt_184	183.959922 * ITM_AMU	isotope mass
ITM_MASS_Pt_185	184.960620 * ITM_AMU	isotope mass
ITM_MASS_Pt_186	185.959351 * ITM_AMU	isotope mass
ITM_MASS_Pt_187	186.960590 * ITM_AMU	isotope mass
ITM_MASS_Pt_188	187.959395 * ITM_AMU	isotope mass
ITM_MASS_Pt_189	188.960834 * ITM_AMU	isotope mass
ITM_MASS_Pt_190	189.959932 * ITM_AMU	isotope mass
ITM_MASS_Pt_191	190.961677 * ITM_AMU	isotope mass
ITM_MASS_Pt_192	191.9610380 * ITM_AMU	isotope mass
ITM_MASS_Pt_193	192.9629874 * ITM_AMU	isotope mass
ITM_MASS_Pt_194	193.9626803 * ITM_AMU	isotope mass
ITM_MASS_Pt_195	194.9647911 * ITM_AMU	isotope mass
ITM_MASS_Pt_196	195.9649515 * ITM_AMU	isotope mass
ITM_MASS_Pt_197	196.9673402 * ITM_AMU	isotope mass
ITM_MASS_Pt_198	197.967893 * ITM_AMU	isotope mass
ITM_MASS_Pt_199	198.970593 * ITM_AMU	isotope mass
ITM_MASS_Pt_200	199.971441 * ITM_AMU	isotope mass
ITM_MASS_Pt_201	200.974510 * ITM_AMU	isotope mass
ITM_MASS_Pt_202	201.97574 * ITM_AMU	isotope mass
ITM_MASS_Au_169	168.99808 * ITM_AMU	isotope mass
ITM_MASS_Au_170	169.99612 * ITM_AMU	isotope mass
ITM_MASS_Au_171	170.991879 * ITM_AMU	isotope mass
ITM_MASS_Au_172	171.99004 * ITM_AMU	isotope mass
ITM_MASS_Au_173	172.986237 * ITM_AMU	isotope mass
ITM_MASS_Au_174	173.98476 * ITM_AMU	isotope mass
ITM_MASS_Au_175	174.981270 * ITM_AMU	isotope mass
ITM_MASS_Au_176	175.98010 * ITM_AMU	isotope mass
ITM_MASS_Au_177	176.976865 * ITM_AMU	isotope mass
ITM_MASS_Au_178	177.976030 * ITM_AMU	isotope mass
ITM_MASS_Au_179	178.973213 * ITM_AMU	isotope mass
ITM_MASS_Au_180	179.972521 * ITM_AMU	isotope mass
ITM_MASS_Au_181	180.970079 * ITM_AMU	isotope mass
ITM_MASS_Au_182	181.969618 * ITM_AMU	isotope mass
ITM_MASS_Au_183	182.967593 * ITM_AMU	isotope mass
ITM_MASS_Au_184	183.967452 * ITM_AMU	isotope mass
ITM_MASS_Au_185	184.965789 * ITM_AMU	isotope mass
ITM_MASS_Au_186	185.965953 * ITM_AMU	isotope mass
ITM_MASS_Au_187	186.964568 * ITM_AMU	isotope mass
ITM_MASS_Au_188	187.965324 * ITM_AMU	isotope mass
ITM_MASS_Au_189	188.963948 * ITM_AMU	isotope mass
ITM_MASS_Au_190	189.964700 * ITM_AMU	isotope mass
ITM_MASS_Au_191	190.963700 * ITM_AMU	isotope mass
ITM_MASS_Au_192	191.964813 * ITM_AMU	isotope mass
ITM_MASS_Au_193	192.964150 * ITM_AMU	isotope mass
ITM_MASS_Au_194	193.965365 * ITM_AMU	isotope mass
ITM_MASS_Au_195	194.9650346 * ITM_AMU	isotope mass
ITM_MASS_Au_196	195.966570 * ITM_AMU	isotope mass
ITM_MASS_Au_197	196.9665687 * ITM_AMU	isotope mass
ITM_MASS_Au_198	197.9682423 * ITM_AMU	isotope mass
ITM_MASS_Au_199	198.9687652 * ITM_AMU	isotope mass
ITM_MASS_Au_200	199.970730 * ITM_AMU	isotope mass
ITM_MASS_Au_201	200.971657 * ITM_AMU	isotope mass
ITM_MASS_Au_202	201.97381 * ITM_AMU	isotope mass
ITM_MASS_Au_203	202.975155 * ITM_AMU	isotope mass
ITM_MASS_Au_204	203.97772 * ITM_AMU	isotope mass
ITM_MASS_Au_205	204.97987 * ITM_AMU	isotope mass
ITM_MASS_Hg_171	171.00376 * ITM_AMU	isotope mass
ITM_MASS_Hg_172	171.99883 * ITM_AMU	isotope mass
ITM_MASS_Hg_173	172.99724 * ITM_AMU	isotope mass
ITM_MASS_Hg_174	173.992864 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Hg_175	174.99142 * ITM_AMU	isotope mass
ITM_MASS_Hg_176	175.987355 * ITM_AMU	isotope mass
ITM_MASS_Hg_177	176.986280 * ITM_AMU	isotope mass
ITM_MASS_Hg_178	177.982483 * ITM_AMU	isotope mass
ITM_MASS_Hg_179	178.981834 * ITM_AMU	isotope mass
ITM_MASS_Hg_180	179.978266 * ITM_AMU	isotope mass
ITM_MASS_Hg_181	180.977819 * ITM_AMU	isotope mass
ITM_MASS_Hg_182	181.974690 * ITM_AMU	isotope mass
ITM_MASS_Hg_183	182.974450 * ITM_AMU	isotope mass
ITM_MASS_Hg_184	183.971713 * ITM_AMU	isotope mass
ITM_MASS_Hg_185	184.971899 * ITM_AMU	isotope mass
ITM_MASS_Hg_186	185.969362 * ITM_AMU	isotope mass
ITM_MASS_Hg_187	186.969814 * ITM_AMU	isotope mass
ITM_MASS_Hg_188	187.967577 * ITM_AMU	isotope mass
ITM_MASS_Hg_189	188.968190 * ITM_AMU	isotope mass
ITM_MASS_Hg_190	189.966322 * ITM_AMU	isotope mass
ITM_MASS_Hg_191	190.967157 * ITM_AMU	isotope mass
ITM_MASS_Hg_192	191.965634 * ITM_AMU	isotope mass
ITM_MASS_Hg_193	192.966665 * ITM_AMU	isotope mass
ITM_MASS_Hg_194	193.965439 * ITM_AMU	isotope mass
ITM_MASS_Hg_195	194.966720 * ITM_AMU	isotope mass
ITM_MASS_Hg_196	195.965833 * ITM_AMU	isotope mass
ITM_MASS_Hg_197	196.967213 * ITM_AMU	isotope mass
ITM_MASS_Hg_198	197.9667690 * ITM_AMU	isotope mass
ITM_MASS_Hg_199	198.9682799 * ITM_AMU	isotope mass
ITM_MASS_Hg_200	199.9683260 * ITM_AMU	isotope mass
ITM_MASS_Hg_201	200.9703023 * ITM_AMU	isotope mass
ITM_MASS_Hg_202	201.9706430 * ITM_AMU	isotope mass
ITM_MASS_Hg_203	202.9728725 * ITM_AMU	isotope mass
ITM_MASS_Hg_204	203.9734939 * ITM_AMU	isotope mass
ITM_MASS_Hg_205	204.976073 * ITM_AMU	isotope mass
ITM_MASS_Hg_206	205.977514 * ITM_AMU	isotope mass
ITM_MASS_Hg_207	206.98259 * ITM_AMU	isotope mass
ITM_MASS_Hg_208	207.98594 * ITM_AMU	isotope mass
ITM_MASS_Hg_209	208.99104 * ITM_AMU	isotope mass
ITM_MASS_Hg_210	209.99451 * ITM_AMU	isotope mass
ITM_MASS_Tl_176	176.00059 * ITM_AMU	isotope mass
ITM_MASS_Tl_177	176.996427 * ITM_AMU	isotope mass
ITM_MASS_Tl_178	177.99490 * ITM_AMU	isotope mass
ITM_MASS_Tl_179	178.991090 * ITM_AMU	isotope mass
ITM_MASS_Tl_180	179.98991 * ITM_AMU	isotope mass
ITM_MASS_Tl_181	180.986257 * ITM_AMU	isotope mass
ITM_MASS_Tl_182	181.985670 * ITM_AMU	isotope mass
ITM_MASS_Tl_183	182.982193 * ITM_AMU	isotope mass
ITM_MASS_Tl_184	183.981870 * ITM_AMU	isotope mass
ITM_MASS_Tl_185	184.978790 * ITM_AMU	isotope mass
ITM_MASS_Tl_186	185.97833 * ITM_AMU	isotope mass
ITM_MASS_Tl_187	186.975906 * ITM_AMU	isotope mass
ITM_MASS_Tl_188	187.976010 * ITM_AMU	isotope mass
ITM_MASS_Tl_189	188.973588 * ITM_AMU	isotope mass
ITM_MASS_Tl_190	189.973880 * ITM_AMU	isotope mass
ITM_MASS_Tl_191	190.971786 * ITM_AMU	isotope mass
ITM_MASS_Tl_192	191.972230 * ITM_AMU	isotope mass
ITM_MASS_Tl_193	192.97067 * ITM_AMU	isotope mass
ITM_MASS_Tl_194	193.97120 * ITM_AMU	isotope mass
ITM_MASS_Tl_195	194.969774 * ITM_AMU	isotope mass
ITM_MASS_Tl_196	195.970481 * ITM_AMU	isotope mass
ITM_MASS_Tl_197	196.969575 * ITM_AMU	isotope mass
ITM_MASS_Tl_198	197.970480 * ITM_AMU	isotope mass
ITM_MASS_Tl_199	198.969880 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Tl_200	199.970963 * ITM_AMU	isotope mass
ITM_MASS_Tl_201	200.970819 * ITM_AMU	isotope mass
ITM_MASS_Tl_202	201.972106 * ITM_AMU	isotope mass
ITM_MASS_Tl_203	202.9723442 * ITM_AMU	isotope mass
ITM_MASS_Tl_204	203.9738635 * ITM_AMU	isotope mass
ITM_MASS_Tl_205	204.9744275 * ITM_AMU	isotope mass
ITM_MASS_Tl_206	205.9761103 * ITM_AMU	isotope mass
ITM_MASS_Tl_207	206.977419 * ITM_AMU	isotope mass
ITM_MASS_Tl_208	207.9820187 * ITM_AMU	isotope mass
ITM_MASS_Tl_209	208.985359 * ITM_AMU	isotope mass
ITM_MASS_Tl_210	209.990074 * ITM_AMU	isotope mass
ITM_MASS_Tl_211	210.99348 * ITM_AMU	isotope mass
ITM_MASS_Tl_212	211.99823 * ITM_AMU	isotope mass
ITM_MASS_Pb_178	178.003830 * ITM_AMU	isotope mass
ITM_MASS_Pb_179	179.00215 * ITM_AMU	isotope mass
ITM_MASS_Pb_180	179.997918 * ITM_AMU	isotope mass
ITM_MASS_Pb_181	180.99662 * ITM_AMU	isotope mass
ITM_MASS_Pb_182	181.992672 * ITM_AMU	isotope mass
ITM_MASS_Pb_183	182.991870 * ITM_AMU	isotope mass
ITM_MASS_Pb_184	183.988142 * ITM_AMU	isotope mass
ITM_MASS_Pb_185	184.987610 * ITM_AMU	isotope mass
ITM_MASS_Pb_186	185.984239 * ITM_AMU	isotope mass
ITM_MASS_Pb_187	186.983918 * ITM_AMU	isotope mass
ITM_MASS_Pb_188	187.980874 * ITM_AMU	isotope mass
ITM_MASS_Pb_189	188.980810 * ITM_AMU	isotope mass
ITM_MASS_Pb_190	189.978082 * ITM_AMU	isotope mass
ITM_MASS_Pb_191	190.978270 * ITM_AMU	isotope mass
ITM_MASS_Pb_192	191.975785 * ITM_AMU	isotope mass
ITM_MASS_Pb_193	192.976170 * ITM_AMU	isotope mass
ITM_MASS_Pb_194	193.974012 * ITM_AMU	isotope mass
ITM_MASS_Pb_195	194.974542 * ITM_AMU	isotope mass
ITM_MASS_Pb_196	195.972774 * ITM_AMU	isotope mass
ITM_MASS_Pb_197	196.973431 * ITM_AMU	isotope mass
ITM_MASS_Pb_198	197.972034 * ITM_AMU	isotope mass
ITM_MASS_Pb_199	198.972917 * ITM_AMU	isotope mass
ITM_MASS_Pb_200	199.971827 * ITM_AMU	isotope mass
ITM_MASS_Pb_201	200.972885 * ITM_AMU	isotope mass
ITM_MASS_Pb_202	201.972159 * ITM_AMU	isotope mass
ITM_MASS_Pb_203	202.973391 * ITM_AMU	isotope mass
ITM_MASS_Pb_204	203.9730436 * ITM_AMU	isotope mass
ITM_MASS_Pb_205	204.9744818 * ITM_AMU	isotope mass
ITM_MASS_Pb_206	205.9744653 * ITM_AMU	isotope mass
ITM_MASS_Pb_207	206.9758969 * ITM_AMU	isotope mass
ITM_MASS_Pb_208	207.9766521 * ITM_AMU	isotope mass
ITM_MASS_Pb_209	208.9810901 * ITM_AMU	isotope mass
ITM_MASS_Pb_210	209.9841885 * ITM_AMU	isotope mass
ITM_MASS_Pb_211	210.9887370 * ITM_AMU	isotope mass
ITM_MASS_Pb_212	211.9918975 * ITM_AMU	isotope mass
ITM_MASS_Pb_213	212.996581 * ITM_AMU	isotope mass
ITM_MASS_Pb_214	213.9998054 * ITM_AMU	isotope mass
ITM_MASS_Pb_215	215.00481 * ITM_AMU	isotope mass
ITM_MASS_Bi_184	184.00112 * ITM_AMU	isotope mass
ITM_MASS_Bi_185	184.997630 * ITM_AMU	isotope mass
ITM_MASS_Bi_186	185.996600 * ITM_AMU	isotope mass
ITM_MASS_Bi_187	186.993158 * ITM_AMU	isotope mass
ITM_MASS_Bi_188	187.992270 * ITM_AMU	isotope mass
ITM_MASS_Bi_189	188.989200 * ITM_AMU	isotope mass
ITM_MASS_Bi_190	189.98830 * ITM_AMU	isotope mass
ITM_MASS_Bi_191	190.985786 * ITM_AMU	isotope mass
ITM_MASS_Bi_192	191.985460 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Bi_193	192.982960 * ITM_AMU	isotope mass
ITM_MASS_Bi_194	193.982830 * ITM_AMU	isotope mass
ITM_MASS_Bi_195	194.980651 * ITM_AMU	isotope mass
ITM_MASS_Bi_196	195.980667 * ITM_AMU	isotope mass
ITM_MASS_Bi_197	196.978864 * ITM_AMU	isotope mass
ITM_MASS_Bi_198	197.979210 * ITM_AMU	isotope mass
ITM_MASS_Bi_199	198.977672 * ITM_AMU	isotope mass
ITM_MASS_Bi_200	199.978132 * ITM_AMU	isotope mass
ITM_MASS_Bi_201	200.977009 * ITM_AMU	isotope mass
ITM_MASS_Bi_202	201.977742 * ITM_AMU	isotope mass
ITM_MASS_Bi_203	202.976876 * ITM_AMU	isotope mass
ITM_MASS_Bi_204	203.977813 * ITM_AMU	isotope mass
ITM_MASS_Bi_205	204.977389 * ITM_AMU	isotope mass
ITM_MASS_Bi_206	205.978499 * ITM_AMU	isotope mass
ITM_MASS_Bi_207	206.9784707 * ITM_AMU	isotope mass
ITM_MASS_Bi_208	207.9797422 * ITM_AMU	isotope mass
ITM_MASS_Bi_209	208.9803987 * ITM_AMU	isotope mass
ITM_MASS_Bi_210	209.9841204 * ITM_AMU	isotope mass
ITM_MASS_Bi_211	210.987269 * ITM_AMU	isotope mass
ITM_MASS_Bi_212	211.9912857 * ITM_AMU	isotope mass
ITM_MASS_Bi_213	212.994385 * ITM_AMU	isotope mass
ITM_MASS_Bi_214	213.998712 * ITM_AMU	isotope mass
ITM_MASS_Bi_215	215.001770 * ITM_AMU	isotope mass
ITM_MASS_Bi_216	216.006306 * ITM_AMU	isotope mass
ITM_MASS_Bi_217	217.00947 * ITM_AMU	isotope mass
ITM_MASS_Bi_218	218.01432 * ITM_AMU	isotope mass
ITM_MASS_Po_188	187.999422 * ITM_AMU	isotope mass
ITM_MASS_Po_189	188.998481 * ITM_AMU	isotope mass
ITM_MASS_Po_190	189.995101 * ITM_AMU	isotope mass
ITM_MASS_Po_191	190.994574 * ITM_AMU	isotope mass
ITM_MASS_Po_192	191.991335 * ITM_AMU	isotope mass
ITM_MASS_Po_193	192.991030 * ITM_AMU	isotope mass
ITM_MASS_Po_194	193.988186 * ITM_AMU	isotope mass
ITM_MASS_Po_195	194.988110 * ITM_AMU	isotope mass
ITM_MASS_Po_196	195.985535 * ITM_AMU	isotope mass
ITM_MASS_Po_197	196.985660 * ITM_AMU	isotope mass
ITM_MASS_Po_198	197.983389 * ITM_AMU	isotope mass
ITM_MASS_Po_199	198.983666 * ITM_AMU	isotope mass
ITM_MASS_Po_200	199.981799 * ITM_AMU	isotope mass
ITM_MASS_Po_201	200.982260 * ITM_AMU	isotope mass
ITM_MASS_Po_202	201.980758 * ITM_AMU	isotope mass
ITM_MASS_Po_203	202.981420 * ITM_AMU	isotope mass
ITM_MASS_Po_204	203.980318 * ITM_AMU	isotope mass
ITM_MASS_Po_205	204.981203 * ITM_AMU	isotope mass
ITM_MASS_Po_206	205.980481 * ITM_AMU	isotope mass
ITM_MASS_Po_207	206.981593 * ITM_AMU	isotope mass
ITM_MASS_Po_208	207.9812457 * ITM_AMU	isotope mass
ITM_MASS_Po_209	208.9824304 * ITM_AMU	isotope mass
ITM_MASS_Po_210	209.9828737 * ITM_AMU	isotope mass
ITM_MASS_Po_211	210.9866532 * ITM_AMU	isotope mass
ITM_MASS_Po_212	211.9888680 * ITM_AMU	isotope mass
ITM_MASS_Po_213	212.992857 * ITM_AMU	isotope mass
ITM_MASS_Po_214	213.9952014 * ITM_AMU	isotope mass
ITM_MASS_Po_215	214.9994200 * ITM_AMU	isotope mass
ITM_MASS_Po_216	216.0019150 * ITM_AMU	isotope mass
ITM_MASS_Po_217	217.006335 * ITM_AMU	isotope mass
ITM_MASS_Po_218	218.0089730 * ITM_AMU	isotope mass
ITM_MASS_Po_219	219.01374 * ITM_AMU	isotope mass
ITM_MASS_Po_220	220.01660 * ITM_AMU	isotope mass
ITM_MASS_At_193	192.999840 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_At_194	193.99873 * ITM_AMU	isotope mass
ITM_MASS_At_195	194.996268 * ITM_AMU	isotope mass
ITM_MASS_At_196	195.995790 * ITM_AMU	isotope mass
ITM_MASS_At_197	196.993190 * ITM_AMU	isotope mass
ITM_MASS_At_198	197.992840 * ITM_AMU	isotope mass
ITM_MASS_At_199	198.990530 * ITM_AMU	isotope mass
ITM_MASS_At_200	199.990351 * ITM_AMU	isotope mass
ITM_MASS_At_201	200.988417 * ITM_AMU	isotope mass
ITM_MASS_At_202	201.988630 * ITM_AMU	isotope mass
ITM_MASS_At_203	202.986942 * ITM_AMU	isotope mass
ITM_MASS_At_204	203.987251 * ITM_AMU	isotope mass
ITM_MASS_At_205	204.986074 * ITM_AMU	isotope mass
ITM_MASS_At_206	205.986667 * ITM_AMU	isotope mass
ITM_MASS_At_207	206.985784 * ITM_AMU	isotope mass
ITM_MASS_At_208	207.986590 * ITM_AMU	isotope mass
ITM_MASS_At_209	208.986173 * ITM_AMU	isotope mass
ITM_MASS_At_210	209.987148 * ITM_AMU	isotope mass
ITM_MASS_At_211	210.9874963 * ITM_AMU	isotope mass
ITM_MASS_At_212	211.990745 * ITM_AMU	isotope mass
ITM_MASS_At_213	212.992937 * ITM_AMU	isotope mass
ITM_MASS_At_214	213.996372 * ITM_AMU	isotope mass
ITM_MASS_At_215	214.998653 * ITM_AMU	isotope mass
ITM_MASS_At_216	216.002423 * ITM_AMU	isotope mass
ITM_MASS_At_217	217.004719 * ITM_AMU	isotope mass
ITM_MASS_At_218	218.008694 * ITM_AMU	isotope mass
ITM_MASS_At_219	219.011162 * ITM_AMU	isotope mass
ITM_MASS_At_220	220.015410 * ITM_AMU	isotope mass
ITM_MASS_At_221	221.01805 * ITM_AMU	isotope mass
ITM_MASS_At_222	222.02233 * ITM_AMU	isotope mass
ITM_MASS_At_223	223.02519 * ITM_AMU	isotope mass
ITM_MASS_Rn_195	195.005440 * ITM_AMU	isotope mass
ITM_MASS_Rn_196	196.002115 * ITM_AMU	isotope mass
ITM_MASS_Rn_197	197.001580 * ITM_AMU	isotope mass
ITM_MASS_Rn_198	197.998679 * ITM_AMU	isotope mass
ITM_MASS_Rn_199	198.998370 * ITM_AMU	isotope mass
ITM_MASS_Rn_200	199.995699 * ITM_AMU	isotope mass
ITM_MASS_Rn_201	200.995630 * ITM_AMU	isotope mass
ITM_MASS_Rn_202	201.993263 * ITM_AMU	isotope mass
ITM_MASS_Rn_203	202.993387 * ITM_AMU	isotope mass
ITM_MASS_Rn_204	203.991429 * ITM_AMU	isotope mass
ITM_MASS_Rn_205	204.991720 * ITM_AMU	isotope mass
ITM_MASS_Rn_206	205.990214 * ITM_AMU	isotope mass
ITM_MASS_Rn_207	206.990734 * ITM_AMU	isotope mass
ITM_MASS_Rn_208	207.989642 * ITM_AMU	isotope mass
ITM_MASS_Rn_209	208.990415 * ITM_AMU	isotope mass
ITM_MASS_Rn_210	209.989696 * ITM_AMU	isotope mass
ITM_MASS_Rn_211	210.990601 * ITM_AMU	isotope mass
ITM_MASS_Rn_212	211.990704 * ITM_AMU	isotope mass
ITM_MASS_Rn_213	212.993883 * ITM_AMU	isotope mass
ITM_MASS_Rn_214	213.995363 * ITM_AMU	isotope mass
ITM_MASS_Rn_215	214.998745 * ITM_AMU	isotope mass
ITM_MASS_Rn_216	216.000274 * ITM_AMU	isotope mass
ITM_MASS_Rn_217	217.003928 * ITM_AMU	isotope mass
ITM_MASS_Rn_218	218.0056013 * ITM_AMU	isotope mass
ITM_MASS_Rn_219	219.0094802 * ITM_AMU	isotope mass
ITM_MASS_Rn_220	220.0113940 * ITM_AMU	isotope mass
ITM_MASS_Rn_221	221.015537 * ITM_AMU	isotope mass
ITM_MASS_Rn_222	222.0175777 * ITM_AMU	isotope mass
ITM_MASS_Rn_223	223.02179 * ITM_AMU	isotope mass
ITM_MASS_Rn_224	224.02409 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Rn_225	225.02844 * ITM_AMU	isotope mass
ITM_MASS_Rn_226	226.03089 * ITM_AMU	isotope mass
ITM_MASS_Rn_227	227.03541 * ITM_AMU	isotope mass
ITM_MASS_Rn_228	228.03799 * ITM_AMU	isotope mass
ITM_MASS_Fr_199	199.007260 * ITM_AMU	isotope mass
ITM_MASS_Fr_200	200.006570 * ITM_AMU	isotope mass
ITM_MASS_Fr_201	201.003860 * ITM_AMU	isotope mass
ITM_MASS_Fr_202	202.003370 * ITM_AMU	isotope mass
ITM_MASS_Fr_203	203.000925 * ITM_AMU	isotope mass
ITM_MASS_Fr_204	204.000653 * ITM_AMU	isotope mass
ITM_MASS_Fr_205	204.998594 * ITM_AMU	isotope mass
ITM_MASS_Fr_206	205.998670 * ITM_AMU	isotope mass
ITM_MASS_Fr_207	206.996950 * ITM_AMU	isotope mass
ITM_MASS_Fr_208	207.997140 * ITM_AMU	isotope mass
ITM_MASS_Fr_209	208.995954 * ITM_AMU	isotope mass
ITM_MASS_Fr_210	209.996408 * ITM_AMU	isotope mass
ITM_MASS_Fr_211	210.995537 * ITM_AMU	isotope mass
ITM_MASS_Fr_212	211.996202 * ITM_AMU	isotope mass
ITM_MASS_Fr_213	212.996189 * ITM_AMU	isotope mass
ITM_MASS_Fr_214	213.998971 * ITM_AMU	isotope mass
ITM_MASS_Fr_215	215.000341 * ITM_AMU	isotope mass
ITM_MASS_Fr_216	216.003198 * ITM_AMU	isotope mass
ITM_MASS_Fr_217	217.004632 * ITM_AMU	isotope mass
ITM_MASS_Fr_218	218.007578 * ITM_AMU	isotope mass
ITM_MASS_Fr_219	219.009252 * ITM_AMU	isotope mass
ITM_MASS_Fr_220	220.012327 * ITM_AMU	isotope mass
ITM_MASS_Fr_221	221.014255 * ITM_AMU	isotope mass
ITM_MASS_Fr_222	222.017552 * ITM_AMU	isotope mass
ITM_MASS_Fr_223	223.0197359 * ITM_AMU	isotope mass
ITM_MASS_Fr_224	224.023250 * ITM_AMU	isotope mass
ITM_MASS_Fr_225	225.025570 * ITM_AMU	isotope mass
ITM_MASS_Fr_226	226.02939 * ITM_AMU	isotope mass
ITM_MASS_Fr_227	227.03184 * ITM_AMU	isotope mass
ITM_MASS_Fr_228	228.03573 * ITM_AMU	isotope mass
ITM_MASS_Fr_229	229.038450 * ITM_AMU	isotope mass
ITM_MASS_Fr_230	230.04251 * ITM_AMU	isotope mass
ITM_MASS_Fr_231	231.04544 * ITM_AMU	isotope mass
ITM_MASS_Fr_232	232.04977 * ITM_AMU	isotope mass
ITM_MASS_Ra_202	202.009890 * ITM_AMU	isotope mass
ITM_MASS_Ra_203	203.009270 * ITM_AMU	isotope mass
ITM_MASS_Ra_204	204.006500 * ITM_AMU	isotope mass
ITM_MASS_Ra_205	205.006270 * ITM_AMU	isotope mass
ITM_MASS_Ra_206	206.003827 * ITM_AMU	isotope mass
ITM_MASS_Ra_207	207.003800 * ITM_AMU	isotope mass
ITM_MASS_Ra_208	208.001840 * ITM_AMU	isotope mass
ITM_MASS_Ra_209	209.001990 * ITM_AMU	isotope mass
ITM_MASS_Ra_210	210.000495 * ITM_AMU	isotope mass
ITM_MASS_Ra_211	211.000898 * ITM_AMU	isotope mass
ITM_MASS_Ra_212	211.999794 * ITM_AMU	isotope mass
ITM_MASS_Ra_213	213.000384 * ITM_AMU	isotope mass
ITM_MASS_Ra_214	214.000108 * ITM_AMU	isotope mass
ITM_MASS_Ra_215	215.002720 * ITM_AMU	isotope mass
ITM_MASS_Ra_216	216.003533 * ITM_AMU	isotope mass
ITM_MASS_Ra_217	217.006320 * ITM_AMU	isotope mass
ITM_MASS_Ra_218	218.007140 * ITM_AMU	isotope mass
ITM_MASS_Ra_219	219.010085 * ITM_AMU	isotope mass
ITM_MASS_Ra_220	220.011028 * ITM_AMU	isotope mass
ITM_MASS_Ra_221	221.013917 * ITM_AMU	isotope mass
ITM_MASS_Ra_222	222.015375 * ITM_AMU	isotope mass
ITM_MASS_Ra_223	223.0185022 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Ra_224	224.0202118 * ITM_AMU	isotope mass
ITM_MASS_Ra_225	225.023612 * ITM_AMU	isotope mass
ITM_MASS_Ra_226	226.0254098 * ITM_AMU	isotope mass
ITM_MASS_Ra_227	227.0291778 * ITM_AMU	isotope mass
ITM_MASS_Ra_228	228.0310703 * ITM_AMU	isotope mass
ITM_MASS_Ra_229	229.034958 * ITM_AMU	isotope mass
ITM_MASS_Ra_230	230.037056 * ITM_AMU	isotope mass
ITM_MASS_Ra_231	231.04122 * ITM_AMU	isotope mass
ITM_MASS_Ra_232	232.04364 * ITM_AMU	isotope mass
ITM_MASS_Ra_233	233.04806 * ITM_AMU	isotope mass
ITM_MASS_Ra_234	234.05070 * ITM_AMU	isotope mass
ITM_MASS_Ac_206	206.014500 * ITM_AMU	isotope mass
ITM_MASS_Ac_207	207.011950 * ITM_AMU	isotope mass
ITM_MASS_Ac_208	208.011550 * ITM_AMU	isotope mass
ITM_MASS_Ac_209	209.009490 * ITM_AMU	isotope mass
ITM_MASS_Ac_210	210.009440 * ITM_AMU	isotope mass
ITM_MASS_Ac_211	211.007730 * ITM_AMU	isotope mass
ITM_MASS_Ac_212	212.007810 * ITM_AMU	isotope mass
ITM_MASS_Ac_213	213.006610 * ITM_AMU	isotope mass
ITM_MASS_Ac_214	214.006902 * ITM_AMU	isotope mass
ITM_MASS_Ac_215	215.006454 * ITM_AMU	isotope mass
ITM_MASS_Ac_216	216.008720 * ITM_AMU	isotope mass
ITM_MASS_Ac_217	217.009347 * ITM_AMU	isotope mass
ITM_MASS_Ac_218	218.011640 * ITM_AMU	isotope mass
ITM_MASS_Ac_219	219.012420 * ITM_AMU	isotope mass
ITM_MASS_Ac_220	220.014763 * ITM_AMU	isotope mass
ITM_MASS_Ac_221	221.015590 * ITM_AMU	isotope mass
ITM_MASS_Ac_222	222.017844 * ITM_AMU	isotope mass
ITM_MASS_Ac_223	223.019137 * ITM_AMU	isotope mass
ITM_MASS_Ac_224	224.021723 * ITM_AMU	isotope mass
ITM_MASS_Ac_225	225.023230 * ITM_AMU	isotope mass
ITM_MASS_Ac_226	226.026098 * ITM_AMU	isotope mass
ITM_MASS_Ac_227	227.0277521 * ITM_AMU	isotope mass
ITM_MASS_Ac_228	228.0310211 * ITM_AMU	isotope mass
ITM_MASS_Ac_229	229.033020 * ITM_AMU	isotope mass
ITM_MASS_Ac_230	230.03629 * ITM_AMU	isotope mass
ITM_MASS_Ac_231	231.03856 * ITM_AMU	isotope mass
ITM_MASS_Ac_232	232.04203 * ITM_AMU	isotope mass
ITM_MASS_Ac_233	233.04455 * ITM_AMU	isotope mass
ITM_MASS_Ac_234	234.04842 * ITM_AMU	isotope mass
ITM_MASS_Ac_235	235.05123 * ITM_AMU	isotope mass
ITM_MASS_Ac_236	236.05530 * ITM_AMU	isotope mass
ITM_MASS_Th_209	209.01772 * ITM_AMU	isotope mass
ITM_MASS_Th_210	210.015075 * ITM_AMU	isotope mass
ITM_MASS_Th_211	211.014930 * ITM_AMU	isotope mass
ITM_MASS_Th_212	212.012980 * ITM_AMU	isotope mass
ITM_MASS_Th_213	213.013010 * ITM_AMU	isotope mass
ITM_MASS_Th_214	214.011500 * ITM_AMU	isotope mass
ITM_MASS_Th_215	215.011730 * ITM_AMU	isotope mass
ITM_MASS_Th_216	216.011062 * ITM_AMU	isotope mass
ITM_MASS_Th_217	217.013114 * ITM_AMU	isotope mass
ITM_MASS_Th_218	218.013284 * ITM_AMU	isotope mass
ITM_MASS_Th_219	219.015540 * ITM_AMU	isotope mass
ITM_MASS_Th_220	220.015748 * ITM_AMU	isotope mass
ITM_MASS_Th_221	221.018184 * ITM_AMU	isotope mass
ITM_MASS_Th_222	222.018468 * ITM_AMU	isotope mass
ITM_MASS_Th_223	223.020811 * ITM_AMU	isotope mass
ITM_MASS_Th_224	224.021467 * ITM_AMU	isotope mass
ITM_MASS_Th_225	225.023951 * ITM_AMU	isotope mass
ITM_MASS_Th_226	226.024903 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Th_227	227.0277041 * ITM_AMU	isotope mass
ITM_MASS_Th_228	228.0287411 * ITM_AMU	isotope mass
ITM_MASS_Th_229	229.031762 * ITM_AMU	isotope mass
ITM_MASS_Th_230	230.0331338 * ITM_AMU	isotope mass
ITM_MASS_Th_231	231.0363043 * ITM_AMU	isotope mass
ITM_MASS_Th_232	232.0380553 * ITM_AMU	isotope mass
ITM_MASS_Th_233	233.0415818 * ITM_AMU	isotope mass
ITM_MASS_Th_234	234.043601 * ITM_AMU	isotope mass
ITM_MASS_Th_235	235.047510 * ITM_AMU	isotope mass
ITM_MASS_Th_236	236.04987 * ITM_AMU	isotope mass
ITM_MASS_Th_237	237.05389 * ITM_AMU	isotope mass
ITM_MASS_Th_238	238.05650 * ITM_AMU	isotope mass
ITM_MASS_Pa_212	212.023200 * ITM_AMU	isotope mass
ITM_MASS_Pa_213	213.021110 * ITM_AMU	isotope mass
ITM_MASS_Pa_214	214.020920 * ITM_AMU	isotope mass
ITM_MASS_Pa_215	215.019190 * ITM_AMU	isotope mass
ITM_MASS_Pa_216	216.019110 * ITM_AMU	isotope mass
ITM_MASS_Pa_217	217.018320 * ITM_AMU	isotope mass
ITM_MASS_Pa_218	218.020042 * ITM_AMU	isotope mass
ITM_MASS_Pa_219	219.019880 * ITM_AMU	isotope mass
ITM_MASS_Pa_220	220.021880 * ITM_AMU	isotope mass
ITM_MASS_Pa_221	221.021880 * ITM_AMU	isotope mass
ITM_MASS_Pa_222	222.023740 * ITM_AMU	isotope mass
ITM_MASS_Pa_223	223.023960 * ITM_AMU	isotope mass
ITM_MASS_Pa_224	224.025626 * ITM_AMU	isotope mass
ITM_MASS_Pa_225	225.026130 * ITM_AMU	isotope mass
ITM_MASS_Pa_226	226.027948 * ITM_AMU	isotope mass
ITM_MASS_Pa_227	227.028805 * ITM_AMU	isotope mass
ITM_MASS_Pa_228	228.031051 * ITM_AMU	isotope mass
ITM_MASS_Pa_229	229.0320968 * ITM_AMU	isotope mass
ITM_MASS_Pa_230	230.034541 * ITM_AMU	isotope mass
ITM_MASS_Pa_231	231.0358840 * ITM_AMU	isotope mass
ITM_MASS_Pa_232	232.038592 * ITM_AMU	isotope mass
ITM_MASS_Pa_233	233.0402473 * ITM_AMU	isotope mass
ITM_MASS_Pa_234	234.043308 * ITM_AMU	isotope mass
ITM_MASS_Pa_235	235.045440 * ITM_AMU	isotope mass
ITM_MASS_Pa_236	236.04868 * ITM_AMU	isotope mass
ITM_MASS_Pa_237	237.05115 * ITM_AMU	isotope mass
ITM_MASS_Pa_238	238.054500 * ITM_AMU	isotope mass
ITM_MASS_Pa_239	239.05726 * ITM_AMU	isotope mass
ITM_MASS_Pa_240	240.06098 * ITM_AMU	isotope mass
ITM_MASS_U_217	217.024370 * ITM_AMU	isotope mass
ITM_MASS_U_218	218.023540 * ITM_AMU	isotope mass
ITM_MASS_U_219	219.024920 * ITM_AMU	isotope mass
ITM_MASS_U_220	220.02472 * ITM_AMU	isotope mass
ITM_MASS_U_221	221.02640 * ITM_AMU	isotope mass
ITM_MASS_U_222	222.02609 * ITM_AMU	isotope mass
ITM_MASS_U_223	223.027740 * ITM_AMU	isotope mass
ITM_MASS_U_224	224.027605 * ITM_AMU	isotope mass
ITM_MASS_U_225	225.029391 * ITM_AMU	isotope mass
ITM_MASS_U_226	226.029339 * ITM_AMU	isotope mass
ITM_MASS_U_227	227.031156 * ITM_AMU	isotope mass
ITM_MASS_U_228	228.031374 * ITM_AMU	isotope mass
ITM_MASS_U_229	229.033506 * ITM_AMU	isotope mass
ITM_MASS_U_230	230.033940 * ITM_AMU	isotope mass
ITM_MASS_U_231	231.036294 * ITM_AMU	isotope mass
ITM_MASS_U_232	232.0371562 * ITM_AMU	isotope mass
ITM_MASS_U_233	233.0396352 * ITM_AMU	isotope mass
ITM_MASS_U_234	234.0409521 * ITM_AMU	isotope mass
ITM_MASS_U_235	235.0439299 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_U_236	236.0455680 * ITM_AMU	isotope mass
ITM_MASS_U_237	237.0487302 * ITM_AMU	isotope mass
ITM_MASS_U_238	238.0507882 * ITM_AMU	isotope mass
ITM_MASS_U_239	239.0542933 * ITM_AMU	isotope mass
ITM_MASS_U_240	240.056592 * ITM_AMU	isotope mass
ITM_MASS_U_241	241.06033 * ITM_AMU	isotope mass
ITM_MASS_U_242	242.06293 * ITM_AMU	isotope mass
ITM_MASS_Np_225	225.033910 * ITM_AMU	isotope mass
ITM_MASS_Np_226	226.03515 * ITM_AMU	isotope mass
ITM_MASS_Np_227	227.034960 * ITM_AMU	isotope mass
ITM_MASS_Np_228	228.03618 * ITM_AMU	isotope mass
ITM_MASS_Np_229	229.036260 * ITM_AMU	isotope mass
ITM_MASS_Np_230	230.037830 * ITM_AMU	isotope mass
ITM_MASS_Np_231	231.038250 * ITM_AMU	isotope mass
ITM_MASS_Np_232	232.04011 * ITM_AMU	isotope mass
ITM_MASS_Np_233	233.040740 * ITM_AMU	isotope mass
ITM_MASS_Np_234	234.042895 * ITM_AMU	isotope mass
ITM_MASS_Np_235	235.0440633 * ITM_AMU	isotope mass
ITM_MASS_Np_236	236.046570 * ITM_AMU	isotope mass
ITM_MASS_Np_237	237.0481734 * ITM_AMU	isotope mass
ITM_MASS_Np_238	238.0509464 * ITM_AMU	isotope mass
ITM_MASS_Np_239	239.0529390 * ITM_AMU	isotope mass
ITM_MASS_Np_240	240.056162 * ITM_AMU	isotope mass
ITM_MASS_Np_241	241.058250 * ITM_AMU	isotope mass
ITM_MASS_Np_242	242.06164 * ITM_AMU	isotope mass
ITM_MASS_Np_243	243.064280 * ITM_AMU	isotope mass
ITM_MASS_Np_244	244.06785 * ITM_AMU	isotope mass
ITM_MASS_Pu_228	228.038740 * ITM_AMU	isotope mass
ITM_MASS_Pu_229	229.040150 * ITM_AMU	isotope mass
ITM_MASS_Pu_230	230.039650 * ITM_AMU	isotope mass
ITM_MASS_Pu_231	231.041101 * ITM_AMU	isotope mass
ITM_MASS_Pu_232	232.041187 * ITM_AMU	isotope mass
ITM_MASS_Pu_233	233.043000 * ITM_AMU	isotope mass
ITM_MASS_Pu_234	234.043317 * ITM_AMU	isotope mass
ITM_MASS_Pu_235	235.045286 * ITM_AMU	isotope mass
ITM_MASS_Pu_236	236.0460580 * ITM_AMU	isotope mass
ITM_MASS_Pu_237	237.0484097 * ITM_AMU	isotope mass
ITM_MASS_Pu_238	238.0495599 * ITM_AMU	isotope mass
ITM_MASS_Pu_239	239.0521634 * ITM_AMU	isotope mass
ITM_MASS_Pu_240	240.0538135 * ITM_AMU	isotope mass
ITM_MASS_Pu_241	241.0568515 * ITM_AMU	isotope mass
ITM_MASS_Pu_242	242.0587426 * ITM_AMU	isotope mass
ITM_MASS_Pu_243	243.062003 * ITM_AMU	isotope mass
ITM_MASS_Pu_244	244.064204 * ITM_AMU	isotope mass
ITM_MASS_Pu_245	245.067747 * ITM_AMU	isotope mass
ITM_MASS_Pu_246	246.070205 * ITM_AMU	isotope mass
ITM_MASS_Pu_247	247.07407 * ITM_AMU	isotope mass
ITM_MASS_Am_231	231.04556 * ITM_AMU	isotope mass
ITM_MASS_Am_232	232.04659 * ITM_AMU	isotope mass
ITM_MASS_Am_233	233.04635 * ITM_AMU	isotope mass
ITM_MASS_Am_234	234.04781 * ITM_AMU	isotope mass
ITM_MASS_Am_235	235.04795 * ITM_AMU	isotope mass
ITM_MASS_Am_236	236.04958 * ITM_AMU	isotope mass
ITM_MASS_Am_237	237.050000 * ITM_AMU	isotope mass
ITM_MASS_Am_238	238.051980 * ITM_AMU	isotope mass
ITM_MASS_Am_239	239.0530245 * ITM_AMU	isotope mass
ITM_MASS_Am_240	240.055300 * ITM_AMU	isotope mass
ITM_MASS_Am_241	241.0568291 * ITM_AMU	isotope mass
ITM_MASS_Am_242	242.0595492 * ITM_AMU	isotope mass
ITM_MASS_Am_243	243.0613811 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Am_244	244.0642848 * ITM_AMU	isotope mass
ITM_MASS_Am_245	245.066452 * ITM_AMU	isotope mass
ITM_MASS_Am_246	246.069775 * ITM_AMU	isotope mass
ITM_MASS_Am_247	247.07209 * ITM_AMU	isotope mass
ITM_MASS_Am_248	248.07575 * ITM_AMU	isotope mass
ITM_MASS_Am_249	249.07848 * ITM_AMU	isotope mass
ITM_MASS_Cm_233	233.050770 * ITM_AMU	isotope mass
ITM_MASS_Cm_234	234.050160 * ITM_AMU	isotope mass
ITM_MASS_Cm_235	235.05143 * ITM_AMU	isotope mass
ITM_MASS_Cm_236	236.05141 * ITM_AMU	isotope mass
ITM_MASS_Cm_237	237.05290 * ITM_AMU	isotope mass
ITM_MASS_Cm_238	238.053030 * ITM_AMU	isotope mass
ITM_MASS_Cm_239	239.05496 * ITM_AMU	isotope mass
ITM_MASS_Cm_240	240.0555295 * ITM_AMU	isotope mass
ITM_MASS_Cm_241	241.0576530 * ITM_AMU	isotope mass
ITM_MASS_Cm_242	242.0588358 * ITM_AMU	isotope mass
ITM_MASS_Cm_243	243.0613891 * ITM_AMU	isotope mass
ITM_MASS_Cm_244	244.0627526 * ITM_AMU	isotope mass
ITM_MASS_Cm_245	245.0654912 * ITM_AMU	isotope mass
ITM_MASS_Cm_246	246.0672237 * ITM_AMU	isotope mass
ITM_MASS_Cm_247	247.070354 * ITM_AMU	isotope mass
ITM_MASS_Cm_248	248.072349 * ITM_AMU	isotope mass
ITM_MASS_Cm_249	249.075953 * ITM_AMU	isotope mass
ITM_MASS_Cm_250	250.078357 * ITM_AMU	isotope mass
ITM_MASS_Cm_251	251.082285 * ITM_AMU	isotope mass
ITM_MASS_Cm_252	252.08487 * ITM_AMU	isotope mass
ITM_MASS_Bk_235	235.05658 * ITM_AMU	isotope mass
ITM_MASS_Bk_236	236.05733 * ITM_AMU	isotope mass
ITM_MASS_Bk_237	237.05700 * ITM_AMU	isotope mass
ITM_MASS_Bk_238	238.05828 * ITM_AMU	isotope mass
ITM_MASS_Bk_239	239.05828 * ITM_AMU	isotope mass
ITM_MASS_Bk_240	240.05976 * ITM_AMU	isotope mass
ITM_MASS_Bk_241	241.06023 * ITM_AMU	isotope mass
ITM_MASS_Bk_242	242.06198 * ITM_AMU	isotope mass
ITM_MASS_Bk_243	243.063008 * ITM_AMU	isotope mass
ITM_MASS_Bk_244	244.065181 * ITM_AMU	isotope mass
ITM_MASS_Bk_245	245.0663616 * ITM_AMU	isotope mass
ITM_MASS_Bk_246	246.068670 * ITM_AMU	isotope mass
ITM_MASS_Bk_247	247.070307 * ITM_AMU	isotope mass
ITM_MASS_Bk_248	248.073090 * ITM_AMU	isotope mass
ITM_MASS_Bk_249	249.0749867 * ITM_AMU	isotope mass
ITM_MASS_Bk_250	250.078317 * ITM_AMU	isotope mass
ITM_MASS_Bk_251	251.080760 * ITM_AMU	isotope mass
ITM_MASS_Bk_252	252.08431 * ITM_AMU	isotope mass
ITM_MASS_Bk_253	253.08688 * ITM_AMU	isotope mass
ITM_MASS_Bk_254	254.09060 * ITM_AMU	isotope mass
ITM_MASS_Cf_237	237.06207 * ITM_AMU	isotope mass
ITM_MASS_Cf_238	238.06141 * ITM_AMU	isotope mass
ITM_MASS_Cf_239	239.06242 * ITM_AMU	isotope mass
ITM_MASS_Cf_240	240.06230 * ITM_AMU	isotope mass
ITM_MASS_Cf_241	241.06373 * ITM_AMU	isotope mass
ITM_MASS_Cf_242	242.063700 * ITM_AMU	isotope mass
ITM_MASS_Cf_243	243.06543 * ITM_AMU	isotope mass
ITM_MASS_Cf_244	244.066001 * ITM_AMU	isotope mass
ITM_MASS_Cf_245	245.068049 * ITM_AMU	isotope mass
ITM_MASS_Cf_246	246.0688053 * ITM_AMU	isotope mass
ITM_MASS_Cf_247	247.071001 * ITM_AMU	isotope mass
ITM_MASS_Cf_248	248.072185 * ITM_AMU	isotope mass
ITM_MASS_Cf_249	249.0748535 * ITM_AMU	isotope mass
ITM_MASS_Cf_250	250.0764061 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Cf_251	251.079587 * ITM_AMU	isotope mass
ITM_MASS_Cf_252	252.081626 * ITM_AMU	isotope mass
ITM_MASS_Cf_253	253.085133 * ITM_AMU	isotope mass
ITM_MASS_Cf_254	254.087323 * ITM_AMU	isotope mass
ITM_MASS_Cf_255	255.09105 * ITM_AMU	isotope mass
ITM_MASS_Cf_256	256.09344 * ITM_AMU	isotope mass
ITM_MASS_Es_240	240.06892 * ITM_AMU	isotope mass
ITM_MASS_Es_241	241.06854 * ITM_AMU	isotope mass
ITM_MASS_Es_242	242.06975 * ITM_AMU	isotope mass
ITM_MASS_Es_243	243.06955 * ITM_AMU	isotope mass
ITM_MASS_Es_244	244.07088 * ITM_AMU	isotope mass
ITM_MASS_Es_245	245.07132 * ITM_AMU	isotope mass
ITM_MASS_Es_246	246.07290 * ITM_AMU	isotope mass
ITM_MASS_Es_247	247.073660 * ITM_AMU	isotope mass
ITM_MASS_Es_248	248.075470 * ITM_AMU	isotope mass
ITM_MASS_Es_249	249.076410 * ITM_AMU	isotope mass
ITM_MASS_Es_250	250.07861 * ITM_AMU	isotope mass
ITM_MASS_Es_251	251.079992 * ITM_AMU	isotope mass
ITM_MASS_Es_252	252.082980 * ITM_AMU	isotope mass
ITM_MASS_Es_253	253.0848247 * ITM_AMU	isotope mass
ITM_MASS_Es_254	254.088022 * ITM_AMU	isotope mass
ITM_MASS_Es_255	255.090273 * ITM_AMU	isotope mass
ITM_MASS_Es_256	256.09360 * ITM_AMU	isotope mass
ITM_MASS_Es_257	257.09598 * ITM_AMU	isotope mass
ITM_MASS_Es_258	258.09952 * ITM_AMU	isotope mass
ITM_MASS_Fm_242	242.07343 * ITM_AMU	isotope mass
ITM_MASS_Fm_243	243.07435 * ITM_AMU	isotope mass
ITM_MASS_Fm_244	244.07408 * ITM_AMU	isotope mass
ITM_MASS_Fm_245	245.07539 * ITM_AMU	isotope mass
ITM_MASS_Fm_246	246.075300 * ITM_AMU	isotope mass
ITM_MASS_Fm_247	247.07685 * ITM_AMU	isotope mass
ITM_MASS_Fm_248	248.077195 * ITM_AMU	isotope mass
ITM_MASS_Fm_249	249.07903 * ITM_AMU	isotope mass
ITM_MASS_Fm_250	250.079521 * ITM_AMU	isotope mass
ITM_MASS_Fm_251	251.081575 * ITM_AMU	isotope mass
ITM_MASS_Fm_252	252.082467 * ITM_AMU	isotope mass
ITM_MASS_Fm_253	253.085185 * ITM_AMU	isotope mass
ITM_MASS_Fm_254	254.0868542 * ITM_AMU	isotope mass
ITM_MASS_Fm_255	255.089962 * ITM_AMU	isotope mass
ITM_MASS_Fm_256	256.091773 * ITM_AMU	isotope mass
ITM_MASS_Fm_257	257.095105 * ITM_AMU	isotope mass
ITM_MASS_Fm_258	258.09708 * ITM_AMU	isotope mass
ITM_MASS_Fm_259	259.10060 * ITM_AMU	isotope mass
ITM_MASS_Fm_260	260.10268 * ITM_AMU	isotope mass
ITM_MASS_Md_245	245.08083 * ITM_AMU	isotope mass
ITM_MASS_Md_246	246.08189 * ITM_AMU	isotope mass
ITM_MASS_Md_247	247.08164 * ITM_AMU	isotope mass
ITM_MASS_Md_248	248.08282 * ITM_AMU	isotope mass
ITM_MASS_Md_249	249.08301 * ITM_AMU	isotope mass
ITM_MASS_Md_250	250.08442 * ITM_AMU	isotope mass
ITM_MASS_Md_251	251.08484 * ITM_AMU	isotope mass
ITM_MASS_Md_252	252.08656 * ITM_AMU	isotope mass
ITM_MASS_Md_253	253.08728 * ITM_AMU	isotope mass
ITM_MASS_Md_254	254.08966 * ITM_AMU	isotope mass
ITM_MASS_Md_255	255.091083 * ITM_AMU	isotope mass
ITM_MASS_Md_256	256.094060 * ITM_AMU	isotope mass
ITM_MASS_Md_257	257.095541 * ITM_AMU	isotope mass
ITM_MASS_Md_258	258.098431 * ITM_AMU	isotope mass
ITM_MASS_Md_259	259.10051 * ITM_AMU	isotope mass
ITM_MASS_Md_260	260.10365 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Md_261	261.10572 * ITM_AMU	isotope mass
ITM_MASS_Md_262	262.10887 * ITM_AMU	isotope mass
ITM_MASS_No_248	248.08660 * ITM_AMU	isotope mass
ITM_MASS_No_249	249.08783 * ITM_AMU	isotope mass
ITM_MASS_No_250	250.08751 * ITM_AMU	isotope mass
ITM_MASS_No_251	251.08901 * ITM_AMU	isotope mass
ITM_MASS_No_252	252.088977 * ITM_AMU	isotope mass
ITM_MASS_No_253	253.09068 * ITM_AMU	isotope mass
ITM_MASS_No_254	254.090955 * ITM_AMU	isotope mass
ITM_MASS_No_255	255.093241 * ITM_AMU	isotope mass
ITM_MASS_No_256	256.094283 * ITM_AMU	isotope mass
ITM_MASS_No_257	257.096877 * ITM_AMU	isotope mass
ITM_MASS_No_258	258.09821 * ITM_AMU	isotope mass
ITM_MASS_No_259	259.10103 * ITM_AMU	isotope mass
ITM_MASS_No_260	260.10264 * ITM_AMU	isotope mass
ITM_MASS_No_261	261.10575 * ITM_AMU	isotope mass
ITM_MASS_No_262	262.10730 * ITM_AMU	isotope mass
ITM_MASS_No_263	263.11055 * ITM_AMU	isotope mass
ITM_MASS_No_264	264.11235 * ITM_AMU	isotope mass
ITM_MASS_Lr_251	251.09436 * ITM_AMU	isotope mass
ITM_MASS_Lr_252	252.09537 * ITM_AMU	isotope mass
ITM_MASS_Lr_253	253.09521 * ITM_AMU	isotope mass
ITM_MASS_Lr_254	254.09645 * ITM_AMU	isotope mass
ITM_MASS_Lr_255	255.09668 * ITM_AMU	isotope mass
ITM_MASS_Lr_256	256.09863 * ITM_AMU	isotope mass
ITM_MASS_Lr_257	257.09956 * ITM_AMU	isotope mass
ITM_MASS_Lr_258	258.10181 * ITM_AMU	isotope mass
ITM_MASS_Lr_259	259.102900 * ITM_AMU	isotope mass
ITM_MASS_Lr_260	260.10550 * ITM_AMU	isotope mass
ITM_MASS_Lr_261	261.10688 * ITM_AMU	isotope mass
ITM_MASS_Lr_262	262.10963 * ITM_AMU	isotope mass
ITM_MASS_Lr_263	263.11129 * ITM_AMU	isotope mass
ITM_MASS_Lr_264	264.11404 * ITM_AMU	isotope mass
ITM_MASS_Lr_265	265.11584 * ITM_AMU	isotope mass
ITM_MASS_Lr_266	266.11931 * ITM_AMU	isotope mass
ITM_MASS_Rf_253	253.10069 * ITM_AMU	isotope mass
ITM_MASS_Rf_254	254.10018 * ITM_AMU	isotope mass
ITM_MASS_Rf_255	255.10134 * ITM_AMU	isotope mass
ITM_MASS_Rf_256	256.101166 * ITM_AMU	isotope mass
ITM_MASS_Rf_257	257.10299 * ITM_AMU	isotope mass
ITM_MASS_Rf_258	258.10349 * ITM_AMU	isotope mass
ITM_MASS_Rf_259	259.105640 * ITM_AMU	isotope mass
ITM_MASS_Rf_260	260.10644 * ITM_AMU	isotope mass
ITM_MASS_Rf_261	261.108770 * ITM_AMU	isotope mass
ITM_MASS_Rf_262	262.10993 * ITM_AMU	isotope mass
ITM_MASS_Rf_263	263.11255 * ITM_AMU	isotope mass
ITM_MASS_Rf_264	264.11399 * ITM_AMU	isotope mass
ITM_MASS_Rf_265	265.11670 * ITM_AMU	isotope mass
ITM_MASS_Rf_266	266.11796 * ITM_AMU	isotope mass
ITM_MASS_Rf_267	267.12153 * ITM_AMU	isotope mass
ITM_MASS_Rf_268	268.12364 * ITM_AMU	isotope mass
ITM_MASS_Db_255	255.10740 * ITM_AMU	isotope mass
ITM_MASS_Db_256	256.10813 * ITM_AMU	isotope mass
ITM_MASS_Db_257	257.10772 * ITM_AMU	isotope mass
ITM_MASS_Db_258	258.10923 * ITM_AMU	isotope mass
ITM_MASS_Db_259	259.10961 * ITM_AMU	isotope mass
ITM_MASS_Db_260	260.11130 * ITM_AMU	isotope mass
ITM_MASS_Db_261	261.11206 * ITM_AMU	isotope mass
ITM_MASS_Db_262	262.11408 * ITM_AMU	isotope mass
ITM_MASS_Db_263	263.11499 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Db_264	264.11740 * ITM_AMU	isotope mass
ITM_MASS_Db_265	265.11860 * ITM_AMU	isotope mass
ITM_MASS_Db_266	266.12103 * ITM_AMU	isotope mass
ITM_MASS_Db_267	267.12238 * ITM_AMU	isotope mass
ITM_MASS_Db_268	268.12545 * ITM_AMU	isotope mass
ITM_MASS_Db_269	269.12746 * ITM_AMU	isotope mass
ITM_MASS_Db_270	270.13071 * ITM_AMU	isotope mass
ITM_MASS_Sg_258	258.11317 * ITM_AMU	isotope mass
ITM_MASS_Sg_259	259.11450 * ITM_AMU	isotope mass
ITM_MASS_Sg_260	260.114420 * ITM_AMU	isotope mass
ITM_MASS_Sg_261	261.11612 * ITM_AMU	isotope mass
ITM_MASS_Sg_262	262.11640 * ITM_AMU	isotope mass
ITM_MASS_Sg_263	263.11832 * ITM_AMU	isotope mass
ITM_MASS_Sg_264	264.11893 * ITM_AMU	isotope mass
ITM_MASS_Sg_265	265.121110 * ITM_AMU	isotope mass
ITM_MASS_Sg_266	266.12207 * ITM_AMU	isotope mass
ITM_MASS_Sg_267	267.12443 * ITM_AMU	isotope mass
ITM_MASS_Sg_268	268.12561 * ITM_AMU	isotope mass
ITM_MASS_Sg_269	269.12876 * ITM_AMU	isotope mass
ITM_MASS_Sg_270	270.13033 * ITM_AMU	isotope mass
ITM_MASS_Sg_271	271.13347 * ITM_AMU	isotope mass
ITM_MASS_Sg_272	272.13516 * ITM_AMU	isotope mass
ITM_MASS_Sg_273	273.13822 * ITM_AMU	isotope mass
ITM_MASS_Bh_260	260.12197 * ITM_AMU	isotope mass
ITM_MASS_Bh_261	261.12166 * ITM_AMU	isotope mass
ITM_MASS_Bh_262	262.12289 * ITM_AMU	isotope mass
ITM_MASS_Bh_263	263.12304 * ITM_AMU	isotope mass
ITM_MASS_Bh_264	264.12460 * ITM_AMU	isotope mass
ITM_MASS_Bh_265	265.12515 * ITM_AMU	isotope mass
ITM_MASS_Bh_266	266.12694 * ITM_AMU	isotope mass
ITM_MASS_Bh_267	267.12765 * ITM_AMU	isotope mass
ITM_MASS_Bh_268	268.12976 * ITM_AMU	isotope mass
ITM_MASS_Bh_269	269.13069 * ITM_AMU	isotope mass
ITM_MASS_Bh_270	270.13362 * ITM_AMU	isotope mass
ITM_MASS_Bh_271	271.13518 * ITM_AMU	isotope mass
ITM_MASS_Bh_272	272.13803 * ITM_AMU	isotope mass
ITM_MASS_Bh_273	273.13962 * ITM_AMU	isotope mass
ITM_MASS_Bh_274	274.14244 * ITM_AMU	isotope mass
ITM_MASS_Bh_275	275.14425 * ITM_AMU	isotope mass
ITM_MASS_Hs_263	263.12856 * ITM_AMU	isotope mass
ITM_MASS_Hs_264	264.128390 * ITM_AMU	isotope mass
ITM_MASS_Hs_265	265.13009 * ITM_AMU	isotope mass
ITM_MASS_Hs_266	266.13010 * ITM_AMU	isotope mass
ITM_MASS_Hs_267	267.13179 * ITM_AMU	isotope mass
ITM_MASS_Hs_268	268.13216 * ITM_AMU	isotope mass
ITM_MASS_Hs_269	269.13406 * ITM_AMU	isotope mass
ITM_MASS_Hs_270	270.13465 * ITM_AMU	isotope mass
ITM_MASS_Hs_271	271.13766 * ITM_AMU	isotope mass
ITM_MASS_Hs_272	272.13905 * ITM_AMU	isotope mass
ITM_MASS_Hs_273	273.14199 * ITM_AMU	isotope mass
ITM_MASS_Hs_274	274.14313 * ITM_AMU	isotope mass
ITM_MASS_Hs_275	275.14595 * ITM_AMU	isotope mass
ITM_MASS_Hs_276	276.14721 * ITM_AMU	isotope mass
ITM_MASS_Hs_277	277.14984 * ITM_AMU	isotope mass
ITM_MASS_Mt_265	265.13615 * ITM_AMU	isotope mass
ITM_MASS_Mt_266	266.13730 * ITM_AMU	isotope mass
ITM_MASS_Mt_267	267.13731 * ITM_AMU	isotope mass
ITM_MASS_Mt_268	268.13873 * ITM_AMU	isotope mass
ITM_MASS_Mt_269	269.13906 * ITM_AMU	isotope mass
ITM_MASS_Mt_270	270.14066 * ITM_AMU	isotope mass

Name	Value	Description
ITM_MASS_Mt_271	`271.14114 * ITM_AMU`	isotope mass
ITM_MASS_Mt_272	`272.14374 * ITM_AMU`	isotope mass
ITM_MASS_Mt_273	`273.14491 * ITM_AMU`	isotope mass
ITM_MASS_Mt_274	`274.14749 * ITM_AMU`	isotope mass
ITM_MASS_Mt_275	`275.14865 * ITM_AMU`	isotope mass
ITM_MASS_Mt_276	`276.15116 * ITM_AMU`	isotope mass
ITM_MASS_Mt_277	`277.15242 * ITM_AMU`	isotope mass
ITM_MASS_Mt_278	`278.15481 * ITM_AMU`	isotope mass
ITM_MASS_Mt_279	`279.15619 * ITM_AMU`	isotope mass
ITM_MASS_Ds_267	`267.14434 * ITM_AMU`	isotope mass
ITM_MASS_Ds_268	`268.14380 * ITM_AMU`	isotope mass
ITM_MASS_Ds_269	`269.14512 * ITM_AMU`	isotope mass
ITM_MASS_Ds_270	`270.14472 * ITM_AMU`	isotope mass
ITM_MASS_Ds_271	`271.14606 * ITM_AMU`	isotope mass
ITM_MASS_Ds_272	`272.14632 * ITM_AMU`	isotope mass
ITM_MASS_Ds_273	`273.14886 * ITM_AMU`	isotope mass
ITM_MASS_Ds_274	`274.14949 * ITM_AMU`	isotope mass
ITM_MASS_Ds_275	`275.15218 * ITM_AMU`	isotope mass
ITM_MASS_Ds_276	`276.15303 * ITM_AMU`	isotope mass
ITM_MASS_Ds_277	`277.15565 * ITM_AMU`	isotope mass
ITM_MASS_Ds_278	`278.15647 * ITM_AMU`	isotope mass
ITM_MASS_Ds_279	`279.15886 * ITM_AMU`	isotope mass
ITM_MASS_Ds_280	`280.15980 * ITM_AMU`	isotope mass
ITM_MASS_Ds_281	`281.16206 * ITM_AMU`	isotope mass
ITM_MASS_Rg_272	`272.15362 * ITM_AMU`	isotope mass
ITM_MASS_Rg_273	`273.15368 * ITM_AMU`	isotope mass
ITM_MASS_Rg_274	`274.15571 * ITM_AMU`	isotope mass
ITM_MASS_Rg_275	`275.15614 * ITM_AMU`	isotope mass
ITM_MASS_Rg_276	`276.15849 * ITM_AMU`	isotope mass
ITM_MASS_Rg_277	`277.15952 * ITM_AMU`	isotope mass
ITM_MASS_Rg_278	`278.16160 * ITM_AMU`	isotope mass
ITM_MASS_Rg_279	`279.16247 * ITM_AMU`	isotope mass
ITM_MASS_Rg_280	`280.16447 * ITM_AMU`	isotope mass
ITM_MASS_Rg_281	`281.16537 * ITM_AMU`	isotope mass
ITM_MASS_Rg_282	`282.16749 * ITM_AMU`	isotope mass
ITM_MASS_Rg_283	`283.16842 * ITM_AMU`	isotope mass
ITM_MASS_Cn_277	`277.16394 * ITM_AMU`	isotope mass
ITM_MASS_Cn_278	`278.16431 * ITM_AMU`	isotope mass
ITM_MASS_Cn_279	`279.16655 * ITM_AMU`	isotope mass
ITM_MASS_Cn_280	`280.16704 * ITM_AMU`	isotope mass
ITM_MASS_Cn_281	`281.16929 * ITM_AMU`	isotope mass
ITM_MASS_Cn_282	`282.16977 * ITM_AMU`	isotope mass
ITM_MASS_Cn_283	`283.17179 * ITM_AMU`	isotope mass
ITM_MASS_Cn_284	`284.17238 * ITM_AMU`	isotope mass
ITM_MASS_Cn_285	`285.17411 * ITM_AMU`	isotope mass
ITM_MASS_Uut_283	`283.17645 * ITM_AMU`	isotope mass
ITM_MASS_Uut_284	`284.17808 * ITM_AMU`	isotope mass
ITM_MASS_Uut_285	`285.17873 * ITM_AMU`	isotope mass
ITM_MASS_Uut_286	`286.18048 * ITM_AMU`	isotope mass
ITM_MASS_Uut_287	`287.18105 * ITM_AMU`	isotope mass
ITM_MASS_Uuq_285	`285.18370 * ITM_AMU`	isotope mass
ITM_MASS_Uuq_286	`286.18386 * ITM_AMU`	isotope mass
ITM_MASS_Uuq_287	`287.18560 * ITM_AMU`	isotope mass
ITM_MASS_Uuq_288	`288.18569 * ITM_AMU`	isotope mass
ITM_MASS_Uuq_289	`289.18728 * ITM_AMU`	isotope mass
ITM_MASS_Uup_287	`287.19119 * ITM_AMU`	isotope mass
ITM_MASS_Uup_288	`288.19249 * ITM_AMU`	isotope mass
ITM_MASS_Uup_289	`289.19272 * ITM_AMU`	isotope mass
ITM_MASS_Uup_290	`290.19414 * ITM_AMU`	isotope mass
ITM_MASS_Uup_291	`291.19438 * ITM_AMU`	isotope mass

Name	Value	Description
ITM_MASS_Uuh_289	`289.19886 * ITM_AMU`	isotope mass
ITM_MASS_Uuh_290	`290.19859 * ITM_AMU`	isotope mass
ITM_MASS_Uuh_291	`291.20001 * ITM_AMU`	isotope mass
ITM_MASS_Uuh_292	`292.19979 * ITM_AMU`	isotope mass
ITM_MASS_Uus_291	`291.20656 * ITM_AMU`	isotope mass
ITM_MASS_Uus_292	`292.20755 * ITM_AMU`	isotope mass
ITM_MASS_Uuo_293	`293.21467 * ITM_AMU`	isotope mass
UAL_CLOSEST_SAMPLE	`1`	Closest time slice
UAL_PREVIOUS_SAMPLE	`2`	Previous time slice
UAL_INTERPOLATION	`3`	Interpolation in time
ITM_INVALID_INT	`-999999999`	Value for invalid/uninitialized integer field
ITM_INVALID_FLOAT	`-9.0e40`	Value for invalid/uninitialized float field
ITM_CONSTANTS_VERSION	`$Id: itm_constants.xml 2024 2015-03-24 15:22:07Z tjohnson $`	

itm_constants.xml (3.2.1)
All constants are double precision floats (`R8`).

3.3 Invalid Data Base Entries

The ITM data base does not allow for setting data base entries directly to invalid in case they should not be set. Since the Universal Access Layer (UAL) [9] always pulls out complete CPOs, i.e. complete data structures, of which not all fields may be filled, the problem arose of how to identify those fields which have not been filled. In the case of arrays, this is simply done by not associating the corresponding pointer.
In the case of scalars, however, unique values for floats and integers had to be defined to identify empty fields. These values identify invalid data base entries and can be tested through comparison.
The values for invalid data base entries in Fortran90 are defined below:

```
INTEGER,  PARAMETER :: itm_int_invalid = -999999999
REAL(R8), PARAMETER :: itm_r8_invalid = -9.0D40
```

They have been found to be safely out of any physical range for the affected fields such that no accidental confusion with real values may occur.

The Fortran90 module defining these values `itm_types.f90` is hosted by the project **itmshared** .
To check out the relevant files please do

```
svn checkout https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_types target_dir
```

The module also includes three functions of type boolean `itm_is_valid_int4` , `itm_is_valid_int8` , and `itm_is_valid_real8` which are overloaded under the interface `itm_is_valid` to check whether a data base entry has been filled.

Example:

```
if (itm_is_valid(equilibrium%global_param%i_plasma)) then
  write(*, *) 'Plasma current Ip = ', equilibrium%global_param%i_plasma
end if
```

3.4 Enumerated datatypes/Identifiers

This section concerns how to specify the origin of data in certain types of CPOs. The specification is performed using the datatype `identifier` . The following specifies the conventions of the allowed enumerated datatypes.

[9] https://www.efda-itm.eu/ITM/html/itm_glossary.html#g_ual

- **3.4.1 cocos_identifier**

```
Translation table for coordinate conventions for toroidal geometry, COCOS.

For a detailed description about the COCOS see [O. Sauter and S. Yu. Medvedev, Computer Physics C

\version "$Id: cocos_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

Fortran interface example:

```
 use cocos_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
1	COCOS_1	Coordinate specifications: (R,phi,Z) ; (rho,theta,phi); Bp = + 1/2pi grad(phi) x grad(psi) Used in e.g. psitbx, Toray-GA
2	COCOS_2	Coordinate specifications: (R,Z,phi) ; (rho,theta,phi); Bp = + 1/2pi grad(phi) x grad(psi) Used by e.g. Chease, ONETWO, Hinton-Hazeltine, LION, XTOR, MEUDAS, MARS, MARS-F
3	COCOS_3	Coordinate specifications: (R,phi,Z) ; (rho,phi,theta); Bp = - 1/2pi grad(phi) x grad(psi) Used by e.g. Freiberg, CAXE, KINX, GRAY, CQL3D, CarMa, EFIT, ORB5, GBS, GT5D
4	COCOS_4	Coordinate specifications: (R,Z,phi) ; (rho,phi,theta); Bp = - 1/2pi grad(phi) x grad(psi)
5	COCOS_5	Coordinate specifications: (R,phi,Z) ; (rho,phi,theta); Bp = + 1/2pi grad(phi) x grad(psi) Used by e.g. TORBEAM, GENRAY
6	COCOS_6	Coordinate specifications: (R,Z,phi) ; (rho,phi,theta); Bp = + 1/2pi grad(phi) x grad(psi)
7	COCOS_7	Coordinate specifications: (R,phi,Z) ; (rho,theta,phi); Bp = - 1/2pi grad(phi) x grad(psi)
8	COCOS_8	Coordinate specifications: (R,Z,phi) ; (rho,theta,phi); Bp = - 1/2pi grad(phi) x grad(psi)
11	COCOS_11	Coordinate specifications: (R,phi,Z) ; (rho,theta,phi); Bp = + grad(phi) x grad(psi). Used by e.g. ITER, Boozer
12	COCOS_12	Coordinate specifications: (R,Z,phi) ; (rho,theta,phi); Bp = + grad(phi) x grad(psi) Used by e.g. GENE
13	COCOS_13	Coordinate specifications: (R,phi,Z) ; (rho,phi,theta); Bp = - grad(phi) x grad(psi). Used by e.g. CLISTE, EQUAL, GEC, HELENA, EFDA-ITM
14	COCOS_14	Coordinate specifications: (R,Z,phi) ; (rho,phi,theta); Bp = - grad(phi) x grad(psi)
15	COCOS_15	Coordinate specifications: (R,phi,Z) ; (rho,phi,theta); Bp = + grad(phi) x grad(psi) Used by e.g. TORBEAM, GENRAY
16	COCOS_16	Coordinate specifications: (R,Z,phi) ; (rho,phi,theta); Bp = + grad(phi) x grad(psi)
17	COCOS_17	Coordinate specifications: (R,phi,Z) ; (rho,theta,phi); Bp = - grad(phi) x grad(psi). Used by e.g. LIUQE, psitbx
18	COCOS_18	Coordinate specifications: (R,Z,phi) ; (rho,theta,phi); Bp = - grad(phi) x grad(psi)

cocos_identifier.xml (3.4.1)

- **3.4.2 coordinate_identifier**

```
Translation table for coordinate_identifier_definitions.
Implemented in: utilities.xsd, complexType::weighted_markers/variable_ids

Used in:
- distribution/distri_vec/dist_func/markers/variable_ids
- distsource/source/markers/variable_ids

\version "$Id: coordinate_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/distribution/distri_vec/dist_func/markers/variable_ids
```

```
/distsource/source/markers/variable_ids
```

Fortran interface example:

```
use coordinate_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	X	First cartesian coordinate in the horizontal plane [m]
2	Y	Second cartesian coordinate in the horizontal plane (grad(X) x grad(Y) = grad(Z)) [m]
4	R	Major radius [m]
5	Z	Vertical position Z [m]
6	phi	Toroidal angle [rad]
7	psi	Poloidal magnetic flux [T*m^2]
8	theta	Geometrical poloidal angle
107	rho_tor	The square root of the toroidal flux, sqrt((Phi-Phi_axis)/pi/B0) [m]
109	theta_b	Straight field line poloidal angle [rad]
110	vx	Velocity component in the x-direction [m/s]
111	vy	Velocity component in the z-direction [m/s]
112	vz	Velocity component in the z-direction [m/s]
113	vel	Magnitude of the velocity [m/s]
114	vphi	Velocity component in the toroidal direction [m/s]
115	vpar	Velocity component parallel to the magnetic field [m/s]
116	vperp	Velocity perpendicular to the magnetic field [m/s]
117	E	Hamiltonian energy [eV]
118	pphi	Canonical toroidal angular momentum [kg m**2/s]
119	mu	magnetic moment [J/T]
120	Lambda	mu/E [1/T]
121	pitch	vpar/v [1]
122	vel_thermal	Velocity normalised to the local thermal velocity of the thermal ions (of the relevant species)
123	momentum	Modulus of the relativistic momentum vector
124	parallel_momentum	Component of the relativistic momentum vector parallel to the magnetic field
125	perpendicular_momentum	Component of the relativistic momentum vector perpendicular to the magnetic field
126	xi_at_min_B	Pitch, i.e. ratio between the parallel over the perpendicular velocity, at the minimum value of the magnetic field strength along the guiding centre orbit

coordinate_identifier.xml (3.4.2)

- **3.4.3 coredelta_identifier**

```
Translation table for coredelta
Used in the cpo:
  coredelta%values(:)%deltaid

\version "$Id: coredelta_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/coredelta/values/deltaid
```

Fortran interface example:

```
use coredelta_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	Unspecified coredelta
1	pellet	Coredelta from a pellet

Flag	Id	Description
2	sawtooth	Coredelta from a sawtooth
3	elm	Coredelta from an ELM
4	combined	Combined coredelta from multiple types of events
5	not_provided	No data provided
1000	derived	Derived from another source; duplicating data

coredelta_identifier.xml (3.4.3)

- **3.4.4 coreneutral_identifier**

```
Translation table for identifying different types of neutral.
The neutrals are characterised by their energy and source of the neutrals.

\version "$Id: coreneutral_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/coredelta/compositions/neutralscomp/type
```

```
/coreimpur/compositions/neutralscomp/type
```

```
/coreneutrals/compositions/neutralscomp/type
```

```
/coreneutrals/neutcompo/neutral/type
```

```
/coreprof/compositions/neutralscomp/type
```

```
/coresource/compositions/neutralscomp/type
```

```
/coretransp/compositions/neutralscomp/type
```

```
/distribution/compositions/neutralscomp/type
```

```
/distsource/compositions/neutralscomp/type
```

```
/edge/compositions/neutralscomp/type
```

```
/neoclassic/compositions/neutralscomp/type
```

```
/waves/coherentwave/compositions/neutralscomp/type
```

Fortran interface example:

```
 use coreneutral_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	cold	Cold neutrals
1	thermal	Thermal neutrals
2	fast	Fast neutrals
3	nbi	NBI neutrals

coreneutral_identifier.xml (3.4.4)

- **3.4.5 coresource_identifier**

```
Translation table for sources of particles, momentum and heat.
Used in the cpo: coresource

\version "$Id: coresource_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/coresource/values/sourceid
```

Fortran interface example:

```
use coresource_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	Unspecified source type
1	nbi	Source from Neutral Beam Injection
2	ec	Sources from electron cyclotron heating heating and current drive
3	lh	Sources from lower hybrid heating and current drive
4	ic	Sources from heating at the ion cyclotron range of frequencies
5	fusion	Sources from fusion reactions, e.g. alpha particle heating
6	pellet	Sources from injection
7	ic_nbi	A combination of the ic and nbi sources
8	ic_fusion	A combination of the ic and fusion sources
9	ic_nbi_fusion	A combination of the ic and fusion sources
10	ec_lh	A combination of the ec and lh sources
11	ec_ic	A combination of the ec and ic sources
12	lh_ic	A combination of the lh and ic sources
13	ec_lh_ic	A combination of the ec, lh and ic sources
14	ohmic	Source from ohmic heating
15	brehmstrahlung	Source from bremstrahlung
16	cyclotronradiation	Source from cyclotron radiation
17	syncrotronradiation	Source from syncrotron radiation
18	cyclotron_syncrotronradiation	Source from syncrotron radiation
19	lineradiation	Source from line radiation
20	equipartition	Collisional equipartition
21	gaspuff	Gas puff
22	killergaspuff	Killer gas puff
23	ionizationlosses	Losses due to ionization
24	coldneutralcooling	Cold neutrals from the edge that enters the plasma
25	particles2wall	Particle pumping by the wall
26	particles2pump	Particle pumping by external pumps
27	database	Source from database entry
28	background	Background source
29	impurity	Impurity source
30	combined	Combined source
31	not_provided	No data provided
32	neoclassical	Neoclassical

Flag	Id	Description
33	gaussian	Gaussian
34	runaways	Source run-away processes; includes both electron and ion run-away
1000	unspecified_DERIVED	Derived from another source; duplicating data. Unspecified source type
1001	nbi_DERIVED	Derived from another source; duplicating data. Source from Neutral Beam Injection
1002	ec_DERIVED	Derived from another source; duplicating data. Sources from electron cyclotron heating heating and current drive
1003	lh_DERIVED	Derived from another source; duplicating data. Sources from lower hybrid heating and current drive
1004	ic_DERIVED	Derived from another source; duplicating data. Sources from heating at the ion cyclotron range of frequencies
1005	fusion_DERIVED	Derived from another source; duplicating data. Sources from fusion reactions, e.g. alpha particle heating
1006	pellet_DERIVED	Derived from another source; duplicating data. Sources from injection
1007	ic_nbi_DERIVED	Derived from another source; duplicating data. A combination of the ic and nbi sources
1008	ic_fusion_DERIVED	Derived from another source; duplicating data. A combination of the ic and fusion sources
1009	ic_nbi_fusion_DERIVED	Derived from another source; duplicating data. A combination of the ic and fusion sources
1010	ec_lh_DERIVED	Derived from another source; duplicating data. A combination of the ec and lh sources
1011	ec_ic_DERIVED	Derived from another source; duplicating data. A combination of the ec and ic sources
1012	lh_ic_DERIVED	Derived from another source; duplicating data. A combination of the lh and ic sources
1013	ec_lh_ic_DERIVED	Derived from another source; duplicating data. A combination of the ec, lh and ic sources
1014	ohmic_DERIVED	Derived from another source; duplicating data. Source from ohmic heating
1015	brehmstrahlung_DERIVED	Derived from another source; duplicating data. Source from bremstrahlung
1016	cyclotronradiation_DERIVED	Derived from another source; duplicating data. Source from cyclotron radiation
1017	syncrotronradiation_DERIVED	Derived from another source; duplicating data. Source from syncrotron radiation
1018	cyclotron_syncrotronradiation_DERIVED	Derived from another source; duplicating data. Source from syncrotron radiation
1019	lineradiation_DERIVED	Derived from another source; duplicating data. Source from line radiation
1020	equipartition_DERIVED	Derived from another source; duplicating data. Collisional equipartition
1021	gaspuff_DERIVED	Derived from another source; duplicating data. Gas puff
1022	killergaspuff_DERIVED	Derived from another source; duplicating data. Killer gas puff
1023	ionizationlosses_DERIVED	Derived from another source; duplicating data. Losses due to ionization
1024	coldneutralcooling_DERIVED	Derived from another source; duplicating data. Cold neutrals from the edge that enters the plasma
1025	particles2wall_DERIVED	Derived from another source; duplicating data. Particle pumping by the wall
1026	particles2pump_DERIVED	Derived from another source; duplicating data. Particle pumping by external pumps
1027	database_DERIVED	Derived from another source; duplicating data. Source from database entry
1028	background_DERIVED	Derived from another source; duplicating data. Background source
1029	impurity_DERIVED	Derived from another source; duplicating data. Impurity source
1030	combined_DERIVED	Derived from another source; duplicating data. Combined source
1031	not_provided_DERIVED	Derived from another source; duplicating data. No data provided
1032	neoclassical_DERIVED	Derived from another source; duplicating data. Neoclassical
1033	gaussian_DERIVED	Derived from another source; duplicating data. Gaussian

coresource_identifier.xml (3.4.5)

- **3.4.6 coretransp_identifier**

```
Translation table for different types of transport coefficients.

\version "$Id: coretransp_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
coretransp%values(:)%transportid
```

Fortran interface example:

```
use coretransp_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	Unspecified transport type
1	modtransp	Derived from MODTRANSP
2	neoclassical	Neoclassical
3	turbulence_fluxtube	Turbulence / fluxtube code
4	turbulence_global	Turbulence / global code
5	elm_continuous	Continuous ELM model — gives the ELM averaged profile
6	elm_resolved	Time resolved ELM model
7	ntm	Transport arising from the presence of NTMs
8	sawteeth	Transport arising from the presence of sawteeth
9	pedestal	Transport level to give edge pedestal
10	database	Transport specified by a database entry
11	background	Background transport level
12	combined	Derived from a number of contributions
13	not_provided	No data provided
1000	unspecified_DERIVED	Derived from another source; duplicating data. Unspecified transport type
1001	modtransp_DERIVED	Derived from another source; duplicating data. Derived from MODTRANSP
1002	neoclassical_DERIVED	Derived from another source; duplicating data. Neoclassical
1003	turbulence_fluxtube_DERIVED	Derived from another source; duplicating data. Turbulence / fluxtube code
1004	turbulence_global_DERIVED	Derived from another source; duplicating data. Turbulence / global code
1005	elm_continuous_DERIVED	Derived from another source; duplicating data. Continuous ELM model — gives the ELM averaged profile
1006	elm_resolved_DERIVED	Derived from another source; duplicating data. Time resolved ELM model
1007	ntm_DERIVED	Derived from another source; duplicating data. Transport arising from the presence of NTMs
1008	sawteeth_DERIVED	Derived from another source; duplicating data. Transport arising from the presence of sawteeth
1009	pedestal_DERIVED	Derived from another source; duplicating data. Transport level to give edge pedestal
1010	database_DERIVED	Derived from another source; duplicating data. Transport specified by a database entry
1011	background_DERIVED	Derived from another source; duplicating data. Background transport level
1012	combined_DERIVED	Derived from another source; duplicating data. Derived from a number of contributions
1013	not_provided_DERIVED	Derived from another source; duplicating data. No data provided

coretransp_identifier.xml (3.4.6)

- **3.4.7 distsource_identifier**

```
Translation table for Heating and Current Drive (HCD) distsource types, i.e. types particles sour

Used in:
- distribution()/distri_vec()/source_id/id
- distsource()/source()/source_id/id

\version "$Id: distsource_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/distsource/source/source_id
```

```
/distribution/distri_vec/source_id
```

Fortran interface example:

```
 use distsource_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	NBI	Source from neutral beam injection
2	nuclear	Source from nuclear reaction (reaction type unspecified)
3	DT_N4He	Source from nuclear reaction: T(d,n)4He [D+T-¿He4+n]
4	D3He_P4He	Source from nuclear reaction: He3(d,p)4He [He3+D-¿He4+p]
5	DD_PT	Source from nuclear reaction: D(d,p)T [D+D-¿T+p]
6	DD_N3He	Source from nuclear reaction: D(d,n)3He [D+D-¿He3+n]
7	runaway	Source from runaway processes

distsource_identifier.xml (3.4.7)

- **3.4.8 fast_particle_origin_identifier**

```
Translation table for fast_particle_origin_identifier.
Used in:
- corefast/

\version "$Id: fast_particle_origin_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/corefast/values/fastid
```

Fortran interface example:

```
 use fast_particle_origin_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	NBI	From NBI heating
2	IC	Accelerated by IC waves
3	EC	Accelerated by EC waves
4	LC	Accelerated by LH waves
5	alpha	Fusion product alpha particle
6	fusion	Fusion product
7	run_away	Run-away acceleration
8	knock_on	Generated by a knock-on collision with a fast particle
9	combined	Combination of fast particles from several sources

fast_particle_origin_identifier.xml (3.4.8)

- **3.4.9 fast_thermal_filter_identifier**

```
Translation table for fast_thermal_separation_filter_identifier_definition.
Implemented in: utilities.xsd, complexType::fast_thermal_separation_filter/method

\version "$Id: fast_thermal_filter_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/corefast/values/filter/method
```

```
/distribution/distri_vec/fast_filter/method
```

Fortran interface example:

```
use fast_thermal_filter_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	EnergyCutOff	The fast-thermal separation is performed at an given value of particle kinetic energy.
2	EnergyTiCutOff	The fast-thermal separation is performed at an given ratio between the particle kinetic energy and the local thermal ion energy.
3	EnergyTeCutOff	The fast-thermal separation is performed at an given ratio between the particle kinetic energy and the local thermal electron energy.
4	delta_f	The fast particle population is the different between the full population and a thermal Maxwellian.

fast_thermal_filter_identifier.xml (3.4.9)

- **3.4.10 fokker_planck_source_identifier**

```
Translation table for fokker_planck_source_identifier.
Implemented in: distribution.xsd, complexType::dist_sources_reference/type

Note that the type definitions are not necessarily disjoints sets.
For example wall-firstorbit and wall-coulomb are both subsets of wall.
When describing a wall loss one should always aim to use the most detailed
type available. While when finding all wall losses one has to sum over all
three types: wall, wall-firstorbit and wall-coulomb.

\version "$Id: fokker_planck_source_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/distribution/distri_vec/global_param/sources/source_ref/type
```

```
/distribution/distri_vec/profiles_1d/sources/source_ref/type
```

Fortran interface example:

```
use fokker_planck_source_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	wave	Source/sink from a waves CPO
2	distsource	Source/sink from a distsource CPO
3	wave_and_source	Source/sink from both the waves and the distsource CPOs
4	thermal	Artificial source/sink used to represent transport processes
5	wall	Source/sink from the wall
6	wall_firstorbit	Collisionless wall losses during first orbit from birth
7	wall_coulomb	Wall losses caused by Coloumb collisions
8	atomic	Source/sink due to atomic processes, e.g. CX reactions
9	nuclear	Source/sink due to nuclear reactions

fokker_planck_source_identifier.xml (3.4.10)

- **3.4.11 pellet_shape_identifier**

```
Translation table for pellet_shape_identifier_definition.
Used in:
- pellet/

\version "$Id: pellet_shape_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/pellet/shape/type
```

Fortran interface example:

```
 use pellet_shape_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	`unspecified`	unspecified
1	`rectangular`	Rectangular pellet. Here dimensions(1) is the height [m], dimensions(2) is the width [m] and dimensions(3) is the length [m] of the rectangle.
2	`cylindrical`	Cylindrical pellet Here dimensions(1) is the radius [m] and dimensions(2) is the height [m] of the cylinder.
3	`spherical`	Spherical pellet. Here dimensions(1) is the radius [m] of the sphere.

pellet_shape_identifier.xml (3.4.11)

- **3.4.12 species_reference_identifier**

```
Translation table for species_reference_identifier_definition.
Implemented in:
- utilities.xsd: complexType species_reference

\version "$Id: species_reference_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/distribution/distri_vec/species/type
```

```
/distsource/source/species/type
```

Fortran interface example:

```
 use species_reference_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	`unspecified`	unspecified
1	`electron`	Electron
2	`ion`	Ion from compositions/ions
3	`impurity`	Impurity from compositions/impur

Flag	Id	Description
4	neutron	Neutron
5	photon	Photon
6	neutral	Neutral particle, e.g. atom or molecule from charge exchange reactions

species_reference_identifier.xml (3.4.12)

- **3.4.13 wall_identifier**

```
Translation table for wall_identifier_defintions.

Used in:
- wall cpo

\version "$Id: wall_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/wall/wall2d/wall_id
```

```
/wall/wall3d/wall_id
```

Fortran interface example:

```
 use wall_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	equilibrium	Equilibrium wall
2	gas_tight	Gas tight wall
3	FBE	Free boundary equilibrium wall
4	RWM	3D RWM wall (with holes)

wall_identifier.xml (3.4.13)

- **3.4.14 wave_identifier**

```
Translation table for wave field types.
Used in:
- distribution()/distri_vec()/waves_id/id
- waves()/coherentwave()/waves_id/id

\version "$Id: wave_identifier.xml 2153 2019-01-31 09:23:43Z g2dpc $"
URL: https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants
```

This identifier is used in the following places in the EU-IM CPOs:

```
/waves/coherentwave/wave_id
```

```
/distribution/distri_vec/wave_id
```

Fortran interface example:

```
use wave_identifier, only: get_type_value, get_type_name, get_type_description
```

.

Flag	Id	Description
0	unspecified	unspecified
1	EC	Wave field for electron cyclotron heating and current drive
2	LH	Wave field for lower hybrid heating and current drive
3	IC	Wave field for ion cyclotron frequency heating and current drive

wave_identifier.xml (3.4.14)

Compiled versions of the modules can be found in

```
$ITMLIBDIR/itmconstants/lib/$OBJECTCODE
```

where the following values of OBJECTCODE are supported

```
amd64_g95_0.92
amd64_gfortran_4.7
amd64_intel_12
amd64_pgi_10
```

The C equivalent can be found in

```
$ITMLIBDIR/itmconstants/include/
```

and the Python in

```
$ITMLIBDIR/itmconstants/lib/python2.6/
```

A Java version is available but has not yet been released — contact the CPT if you are interested.
(More information about the ITM libraries [10].)

3.4.15 Example: How to fill coresource/values/sourceid

When filling in an enumerated datatype, like `coresource/values/sourceid` , it is recomended to use the parameters and functions built into the fortran modules associated with each such datatype. These modules are available as part of the UAL package. As an examples we may include the `coresource_identifier` :

```
use coresource_identifier, only: fusion, get_type_name, get_type_description__ind
```

Here the value of the integer-parameter `fusion` is the `Flag` for fusion reactions in the `coresource_identifier` (3.4.5) structure (i.e. fusion=5). Once we know the `Flag` we may get the `Id` using the function `Id=get_type_name(Flag)` and the `Description` using the function `Description=get_type_description__ind(Flag)` . These function are available for every datatype.

Below you have an example of how to use these functions:

```
program coresource_example
  use euitm_schemas, only: type_coresource
  use coresource_identifier, only: fusion, get_type_name, get_type_description__ind
  use write_structures, only: open_write_file, write_cpo, close_write_file
```

[10] https://www.efda-itm.eu/ITM/html/itm_libraries.html#itm_libraries

```
  use deallocate_structures, only: deallocate_cpo
  implicit none

  type (type_coresource) :: coresource
  integer :: idx, i

  character*128 :: filename
  integer :: shot, run

  data filename / &
       & 'coresource.cpo' &
       & /

  allocate(coresource%values(1))
  allocate(coresource%values(1)%sourceid%id(1))
  allocate(coresource%values(1)%sourceid%description(1))
  coresource%values(1)%sourceid%flag = fusion
  coresource%values(1)%sourceid%id = get_type_name(fusion)
  coresource%values(1)%sourceid%description = get_type_description__ind(fusion)

  call open_write_file(1, filename)
  call write_cpo(coresource, 'coresource')
  call close_write_file

  call deallocate_cpo(coresource)

end program coresource_example
```

This example program, and similar examples for other enumerated datatypes, are available in:

```
https://gforge6.eufus.eu/svn/itmshared/trunk/src/itm_constants/examples
```

3.5 Grid Types in Equilibrium CPO

Equilibria may be represented in a variety of different ways depending on which ITM module has calculated them and which module shall use them. To avoid ambiguity and to allow modules to check which type of equilibrium is stored in the equilibrium CPO, a unique grid identifier is stored in profiles_2d%grid_type.
The grid identified currently consists of 4 strings (at 132 chars) with the following structure (array indices in Fortran notation):

Position	Content
grid_type(1)	integer identifier for grid type
grid_type(2)	string identifier for grid type
grid_type(3)	integer identifier for poloidal angle
grid_type(4)	string identifier for poloidal angle

3.5.1 Grid Type Identifier

The currently allowed values (integer and string) for the identifier of the grid type are listed below:

Integer Values	String Value	Description
1	rectangular	Regular grid in (R, Z) .'EFIT-like grid'.
2	inverse	Regular grid in (Ψ, θ) .'flux surface grid'.
3	irregular	Irregular grid. All fields in profiles_2d are given as (ndim1, 1) degenerate 2D matrices, i.e. as lists of vertices (for triangles or quadrilaterals).

3.5.2 Poloidal Angle Identifier

The currently allowed values (integer and string) for the identifier of the poloidal angle are listed below:

Integer Values	String Value	Description
1	straight field line	straight field line angle θ as defined in Straight Field Line Coordinates [11]
2	equal arc	Poloidal angle θ defined by equal arc lengths along flux surfaces
3	polar	Poloidal angle θ in toroidal coordinates as defined in Coordinate System (2.1)

3.6 Standardized EU-ITM Plasma Bundle

The ITM has agreed on a standardized way to bundle CPOs and control parameters inside KEPLER.

Field names			Type	Description
time			`real`	The synthetic time of the simulation, or for time-dependent workflows; the end of the present time step. For example, consider a time dependent workflows, where physics quantities are update one after the other. Thus, while the physics quantities are updated the various fields below (e.g. the CPOs) may be describe at different time points. In such workflows the this "time"-field describe the time at the end of the present time step. Units: (s)
CONTROL	tau		`real`	time-step (s)
	tau_out		`real`	time interval for saving output (s)
	ETS	amix	`real`	mixing factor
		amix_tr	`real`	mixing factor for profiles
		sigma_source	`integer`	option for origin of plasma electrical conductivity: 0: plasma collisions; 1: transport module; 2: source module
		solver_type	`integer`	choice of numerical solver
		conv_rec	`real`	required fractional convergence
CPOS	MHD	equilibrium	`cpo`	see type [12] and fortran [13] descriptions
		toroidfield	`cpo`	see type [14] and fortran [15] descriptions
		mhd	`cpo`	see type [16] and fortran [17] descriptions
		sawteeth	`cpo`	see type [18] and fortran [19] descriptions
	CORE	coreprof	`cpo`	see type [20] and fortran [21] descriptions
		coretransp	`cpo`	see type [22] and fortran [23] descriptions
		coresource	`cpo`	see type [24] and fortran [25] descriptions
		coreimpur	`cpo`	see type [26] and fortran [27] descriptions
		coreneutral	`cpo`	see type [28] and fortran [29] descriptions
		corefast	`cpo`	see type [30] and fortran [31] descriptions
		coredelta	`cpo`	see type [32] and fortran [33] descriptions

[11] https://www.efda-itm.eu/ITM/html/.html#itm_straight_field_line
[12] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#equilibrium
[13] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#equilibrium_Fortran
[14] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#toroidfield
[15] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#toroidfield_Fortran
[16] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#mhd
[17] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#mhd_Fortran
[18] https://www.efda-itm.eu/ITM/html/.html#sawtooth
[19] https://www.efda-itm.eu/ITM/html/.html#sawtooth_Fortran
[20] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#coreprof
[21] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#coreprof_Fortran
[22] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#coretransp
[23] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#coretransp_Fortran
[24] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#coresource
[25] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#coresource_Fortran
[26] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#coreimpur
[27] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#coreimpur_Fortran
[28] https://www.efda-itm.eu/ITM/html/.html#coreneutral
[29] https://www.efda-itm.eu/ITM/html/.html#coreneutral_Fortran
[30] https://www.efda-itm.eu/ITM/html/.html#corefast
[31] https://www.efda-itm.eu/ITM/html/.html#corefast_Fortran
[32] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#coredelta
[33] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#coredelta_Fortran

Field names			Type	Description
		compositionc	cpo	see type [34] and fortran [35] descriptions
		neoclassic	cpo	see type [36] and fortran [37] descriptions
	EDGE	edge	cpo	see type [38] and fortran [39] descriptions
	HCD	waves	cpo	see type [40] and fortran [41] descriptions
		distsource	cpo	see type [42] and fortran [43] descriptions
		distribution	cpo	see type [44] and fortran [45] descriptions
	MACH	vessel	cpo	see type [46] and fortran [47] descriptions
		wall	cpo	see type [48] and fortran [49] descriptions
		nbi	cpo	see type [50] and fortran [51] descriptions
		antennas	cpo	see type [52] and fortran [53] descriptions
		ironmodel	cpo	see type [54] and fortran [55] descriptions
		pfsystems	cpo	see type [56] and fortran [57] descriptions
	DIAG	fusiondiag	cpo	see type [58] and fortran [59] descriptions
		scenario	cpo	see type [60] and fortran [61] descriptions
	EVENT	Spellets	cpo	see type [62] and fortran [63] descriptions
PCS	input		pcs_in	Diagnostics input signals to the plasma control system (see comple-type definition below)
	reference		pcs_ref	Reference signals for the plasma control system (see comple-type definition below)
	output		pcs_out	Output signals from plasma control system (see comple-type definition below)

The complex-types used in the PCS.

Field names	Type	Description
pcs_in (under development)		**Diagnostics for plasma control**
`pcs.inputs.plasma_variables`	`type_plasma_ variables`	Plasma variables
`pcs.inputs.plant_variables`	`type_plant_ variables`	Plant variables
pcs_ref (under development)		**Reference signals for plasma control**
`pcs.reference.plant_variables`	`type_plant _variables`	Plant variables
`pcs.reference.plant_configuration`	`type_plant _configuration`	Plant configuration
pcs_out (under development)		**Output signal for plasma control**

[34] https://www.efda-itm.eu/ITM/html/.html#compositionc
[35] https://www.efda-itm.eu/ITM/html/.html#compositionc_Fortran
[36] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#neoclassic
[37] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#neoclassic_Fortran
[38] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#edge
[39] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#edge_Fortran
[40] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#waves
[41] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#waves_Fortran
[42] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#distsource
[43] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#distsource_Fortran
[44] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#distribution
[45] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#distribution_Fortran
[46] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#vessel
[47] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#vessel_Fortran
[48] https://www.efda-itm.eu/ITM/html/.html#wall
[49] https://www.efda-itm.eu/ITM/html/.html#wall_Fortran
[50] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#nbi
[51] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#nbi_Fortran
[52] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#antennas
[53] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#antennas_Fortran
[54] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#ironmodel
[55] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#ironmodel_Fortran
[56] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#pfsystems
[57] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#pfsystems_Fortran
[58] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#fusiondiag
[59] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#fusiondiag_Fortran
[60] https://www.efda-itm.eu/ITM/html/itmtypes__4.09a.html#scenario
[61] https://www.efda-itm.eu/ITM/html/cpoinstances__4.09a.html#scenario_Fortran
[62] https://www.efda-itm.eu/ITM/html/.html#pellets
[63] https://www.efda-itm.eu/ITM/html/.html#pellets_Fortran

Field names	Type	Description
pcs.output.plasma_variables	type_plasma _variables	Plasma variables
pcs.output.plant_variables	type_plant _variables	Plant variables. NOTE: only for artificial control.
type_plasma_variables (under development)		**Plasma properties relevant for plasma control**
plasma.shape.ZIP	float	Z_centre*Ip (used for vertical control; definition of Z_centre can vary) [Am]
plasma.shape.gaps(:)	float	Distance between the plasma and the wall components [m]
plasma.magnetics.b_toroidal	real	Toroidal magnetic field at the magnetic axis [T]
plasma.magnetics.Ip	real	Current (A) CPO element: equilibrium().global_param.current_tot
plasma.magnetics.v_loop	real	Loop voltage (V) CPO element: coreprof().profiles1d.vloop.value
plasma.confinement.ne_line_integrated	real	Line integrated electron density (m^{-2})
plasma.confinement.beta_toroidal	real	Toroidal beta CPO element: equilibrium().global_param.beta_tor
plant_variables (under development)		**Plant variabels**
pf_system...	-	-
plant_variables.fuelling.pellet.trigger	integer	TRUE if pellet is being launched, othervise FALSE
plant_variables.fuelling.gas.puff_rate	real	Gas puffing rate (1/s)
plant_variables.hcd.nbi.power	real	NBI power (W) CPO element: nbi().nbi_unit().pow_unit.value
plant_variables.hcd.nbi.injection_angle	real	NBI launching angle (rad) CPO element: nbi().nbi_unit().pow_unit.value
plant_variables.hcd.ec.power	real	EC power (W) CPO element: antennas().antenna_unit().antenna_ec.power.value
plant_variables.hcd.ec.angle	real	EC launch angle (definition depend on the machine) [rad]
plant_variables.hcd.lh.power	real	LH power (W) CPO element: antennas().antenna_unit().antenna_lh.power.value
plant_variables.hcd.lh.n_parallel	real	Parallel refractive index [1]
plant_variables.hcd.ic.power	real	IC power (W) CPO element: antennas().antenna_unit().antenna_ic.power.value
plant_variables.hcd.ic.frequency	real	RF wave frequency (Hz) CPO element: antennas().antenna_unit().antenna_ic.freq

last update: 2019-01-31 by g2dpc