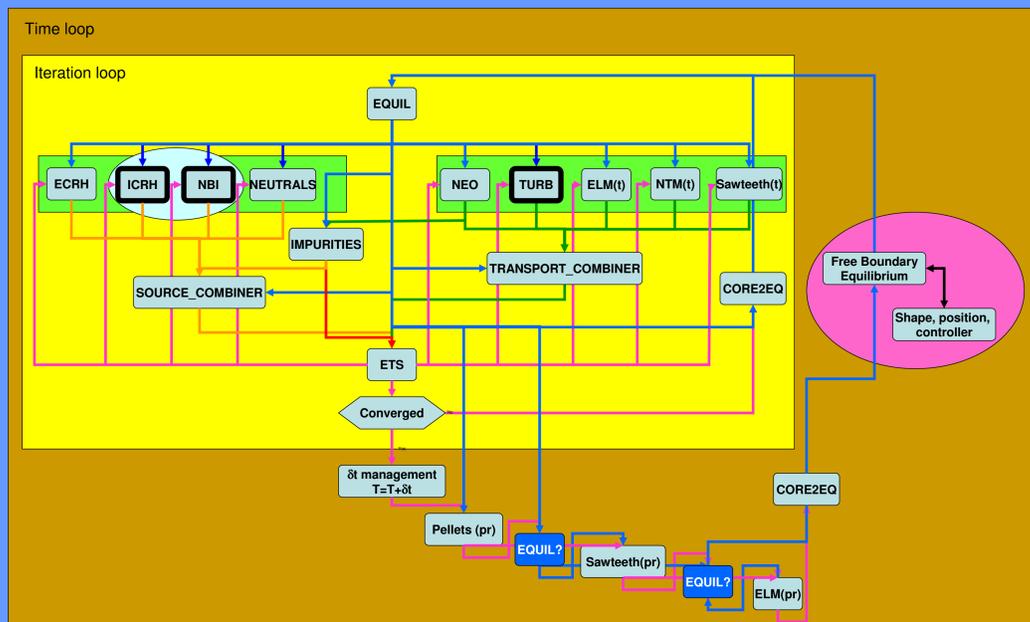


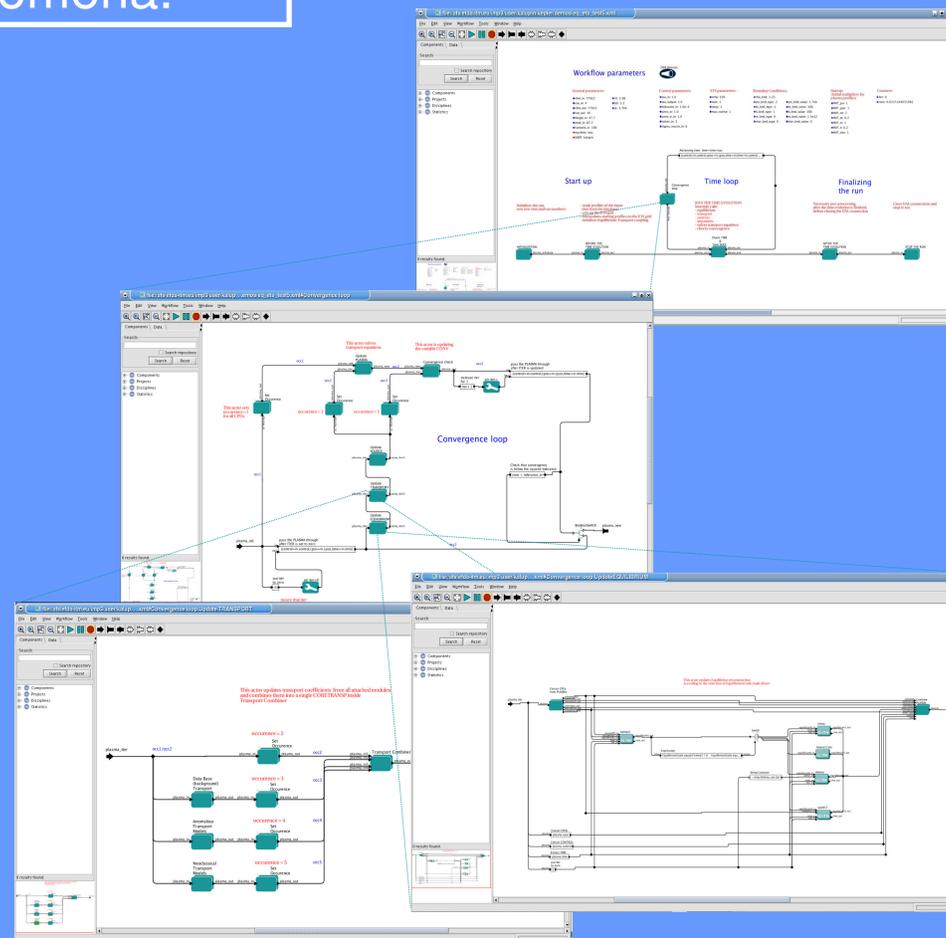
Discharge Evolution: Core Transport Modelling

Goal: Development, verification and validation of a core transport workflow treating all relevant phenomena.

Conceptual model of the core workflow



Implementation as a Kepler Workflow



Multiple layers of a core transport workflow in Kepler

Modules used in the workflow:

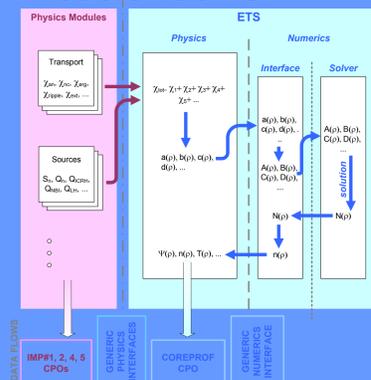
equilibrium	transport	sources	impurity
☺interpretative	☺interpretative	☺interpretative	☺Solver for Nimp
☺EMEQ	☺Bohm-gyroBohm	☺Gaussian	
☺HELENA	☺CoppiTang	☺pellet	
☺HELENA21	☺ETAIGB	☺ETAIGB	
☺SPIDER	☺NEOWES	☺HCD Contains:	
	☺GEM	- Waves codes for IC, LH and EC	
	☺ATTEMPT	- NBI deposition codes and nuclear reaction source codes	
		- Fokker-Planck solvers for ions and electrons	
		- Data joiner accounting for possible synergies	

For more information, see Kalupin et al., this conference P4.111 "Verification and Validation of the European Transport Solver"

In the Kepler workflow

- All modules communicate via CPOs
- Can run on
 - The same node as Kepler
 - In the batch queue of the ITM Gateway
 - Remotely on the HPC-FF
- Any physics module can be easily replaced by an equivalent module
 - Allowing for easy benchmarking between codes
 - Allows for the trade-off of accuracy and speed
 - Versions that run faster than real-time
 - Versions that might require huge computing resources to try to understand every detail

Core is a new, highly modular solver



Verification and Validation

Comparison with existing transport codes: ASTRA & CRONOS (case based on JET hybrid scenario with current overshoot, high triangularity)

In the future: validation against experiment

