Part. & Energy conservation
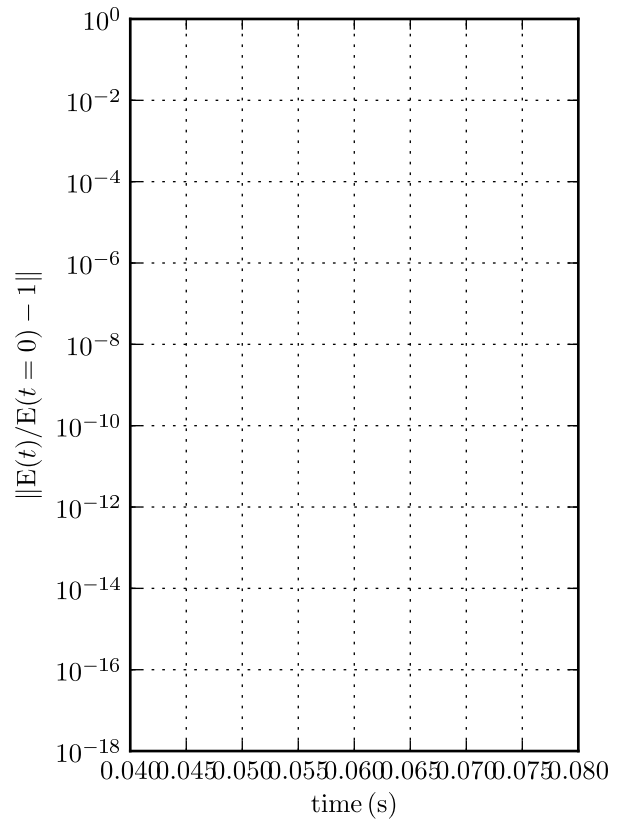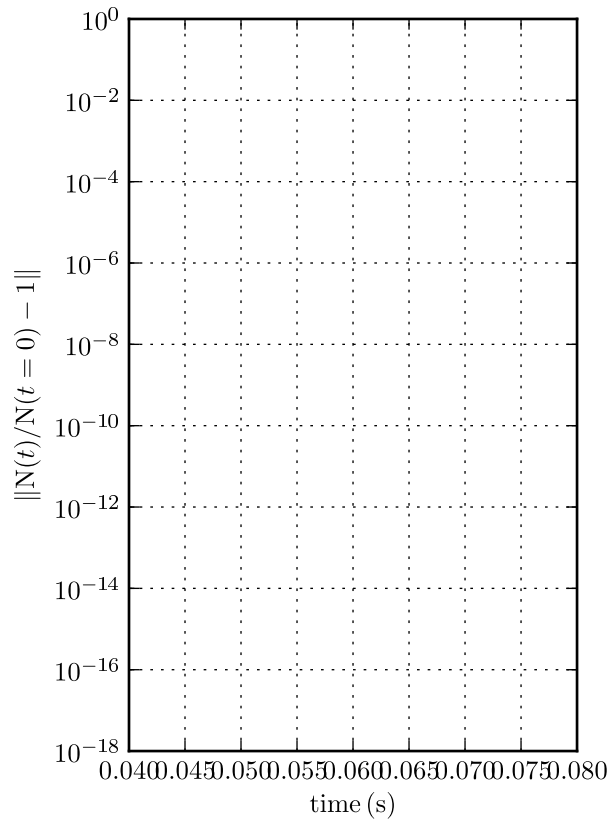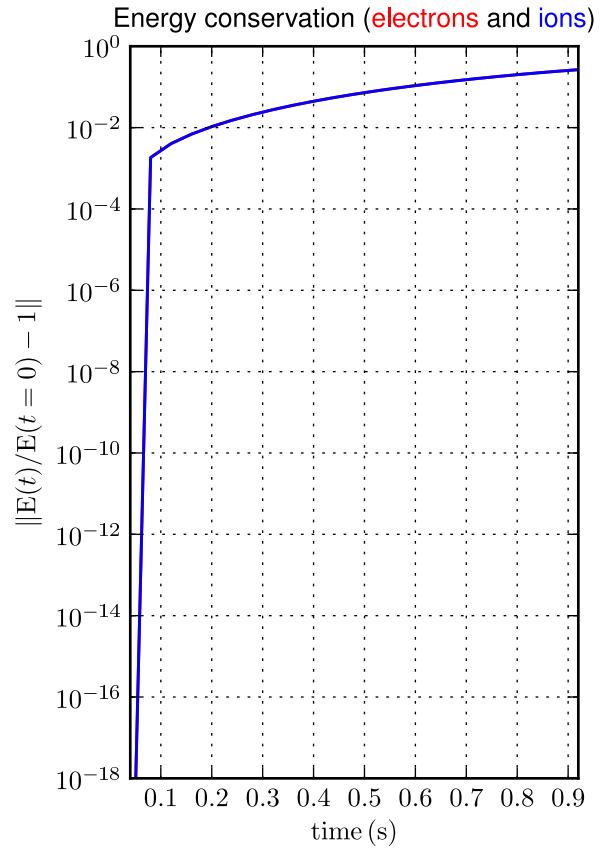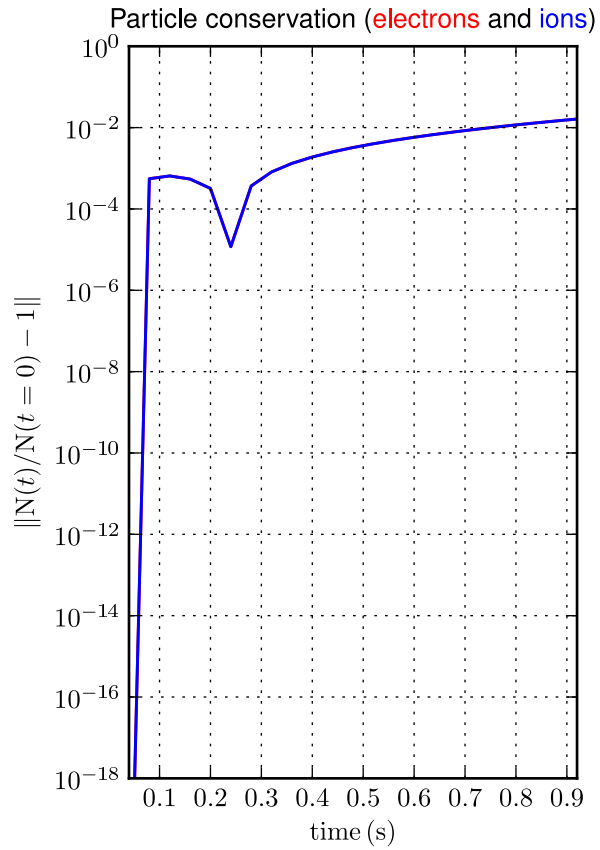[Case: I.1.5.j, Solver: 3, $D = 0.1 \, \mathrm{m^2/s}$, $v = -1.00 \, \mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2} \, \mathrm{s}$, $N_\rho = 101$]
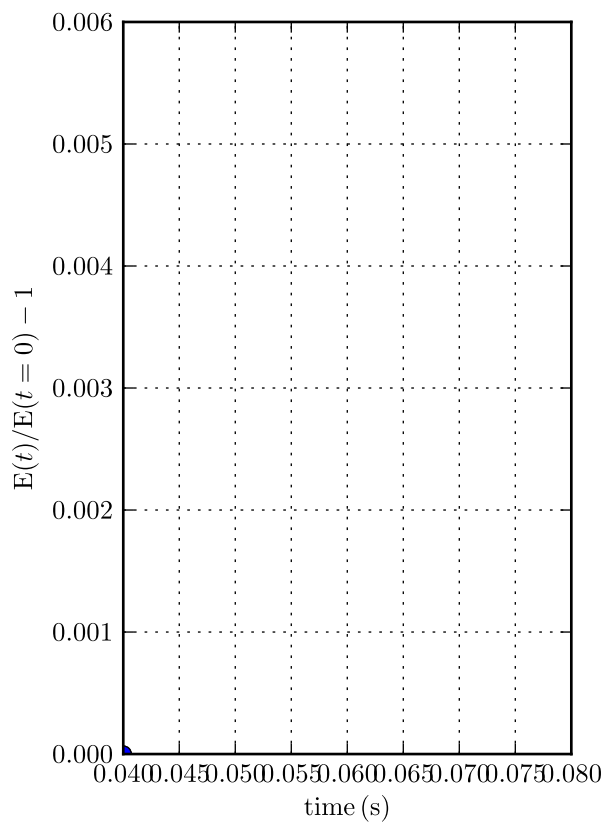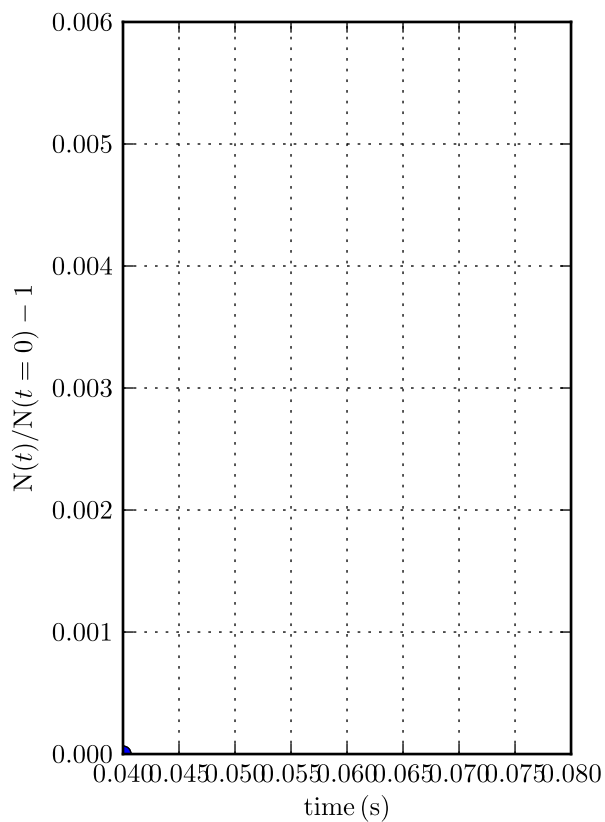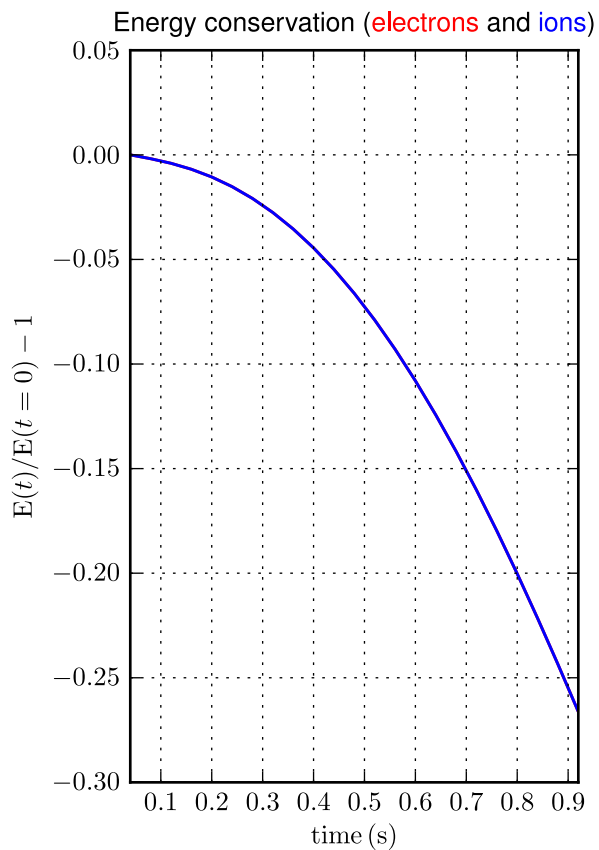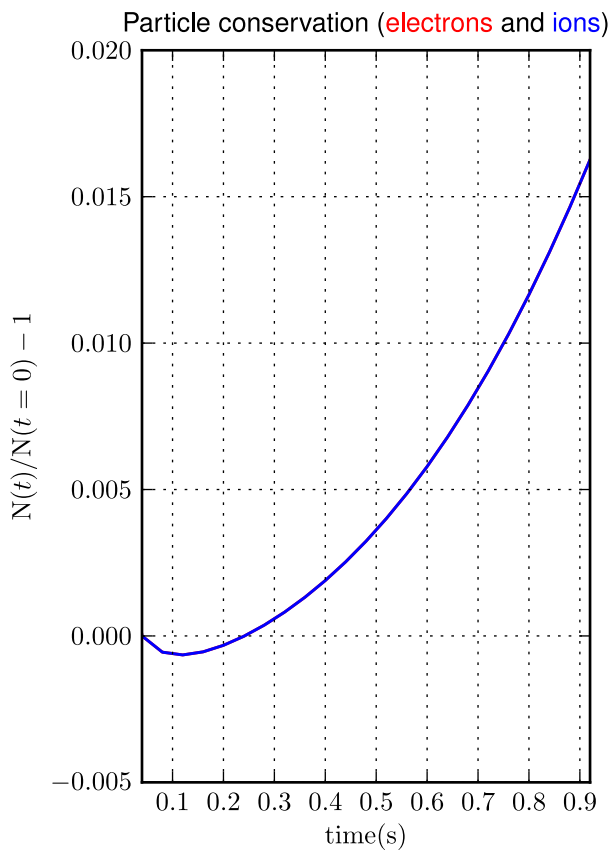Comparison with initial solution - log scale; total time and zoom over time

Part. & Energy conservation
[Case: **I.1.5.j**, Solver: **3**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
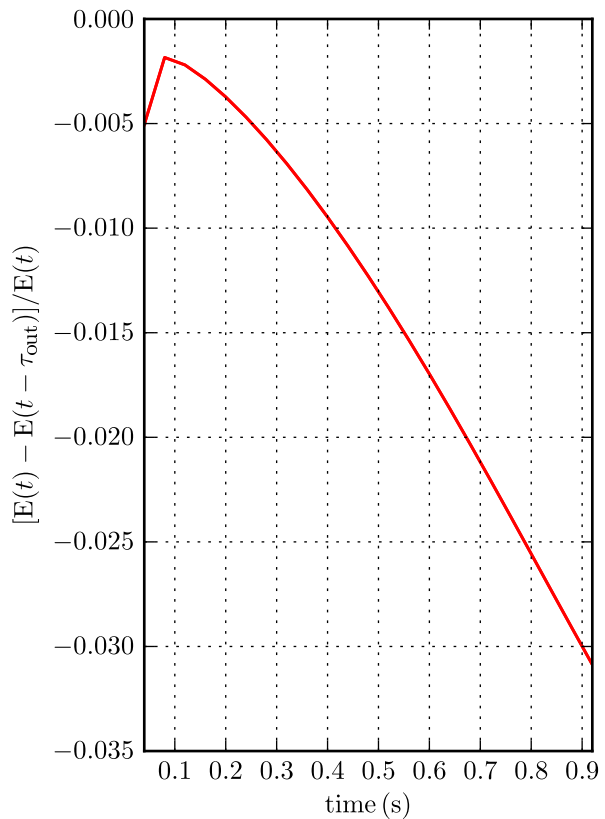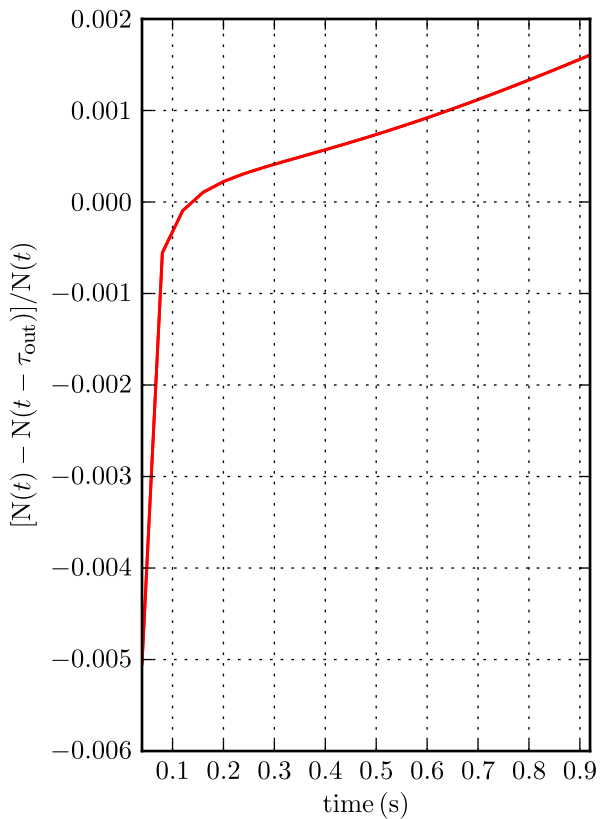Comparison with initial solution - linear scale; total time and zoom over time

Particle conservation (electrons and ions)

Energy conservation (electrons and ions)

Part. & Energy conservation
[Case: I.1.5.j, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
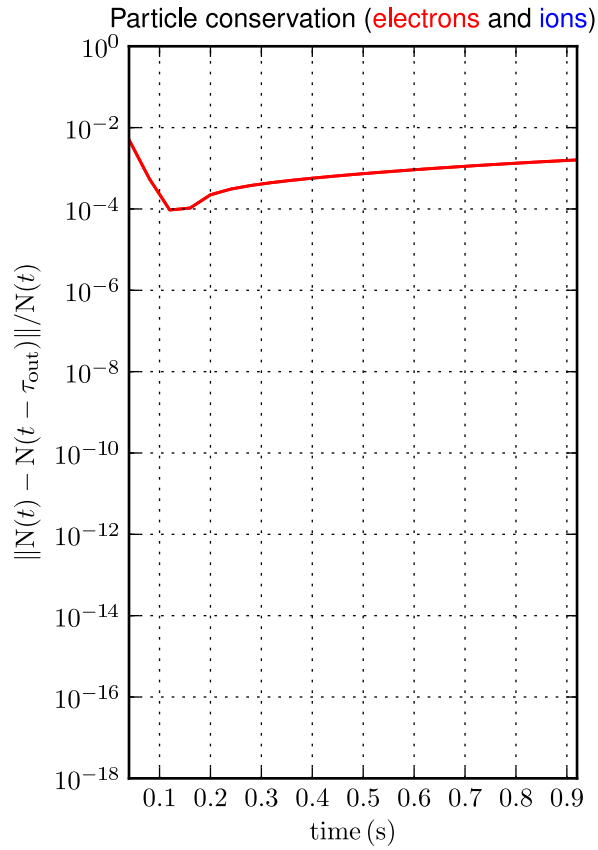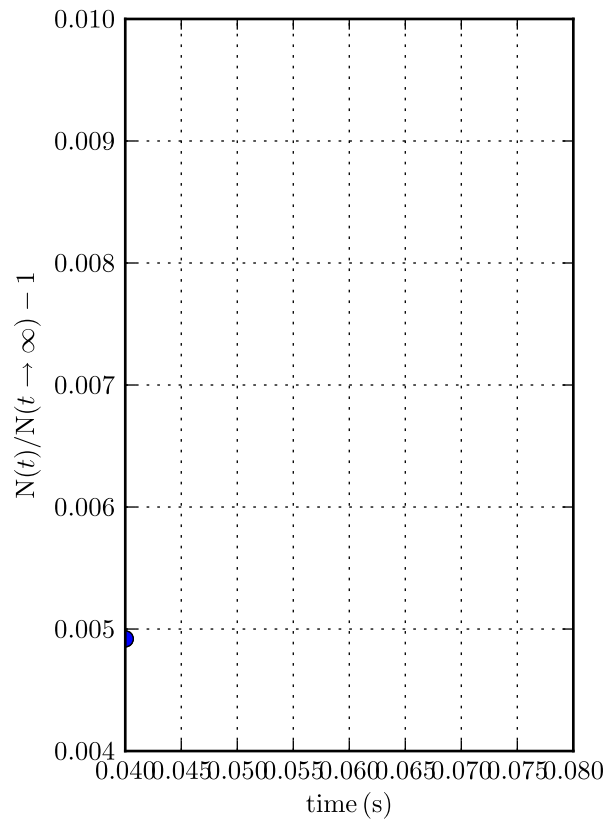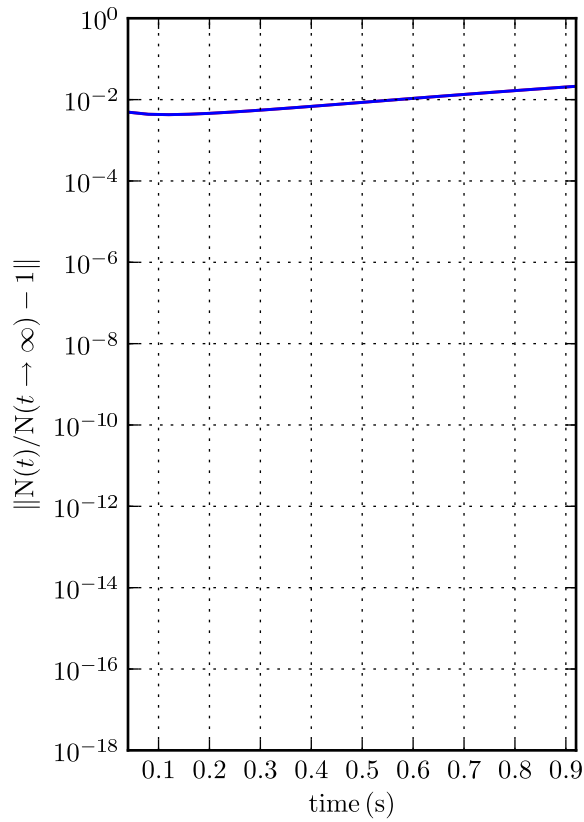Comparison with previous time-sampled (τ_{out}) solution - log and linear scales

Particle conservation (electrons and ions)

Energy conservation (electrons and ions)

Particle conservation

[Case: **I.1.5.j**, Solver: **3**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
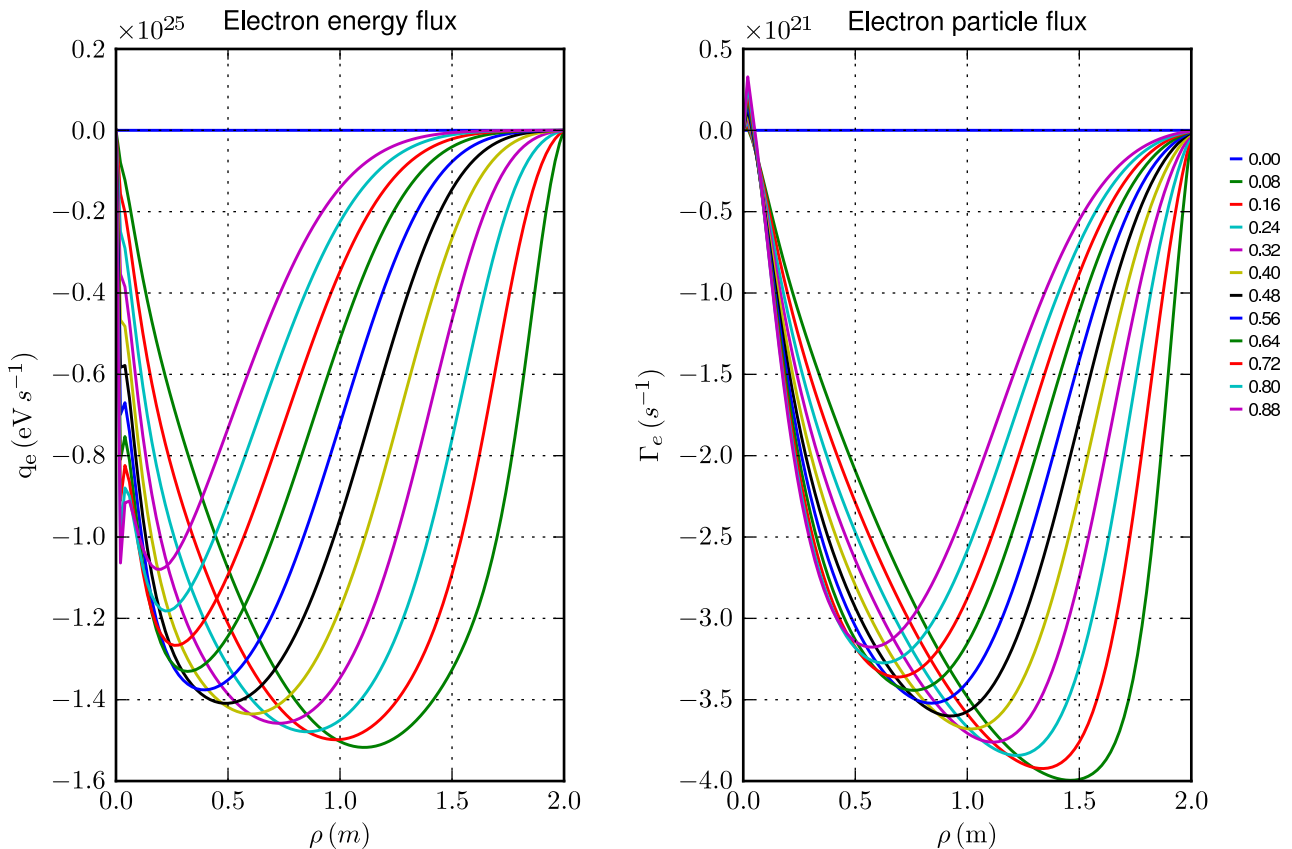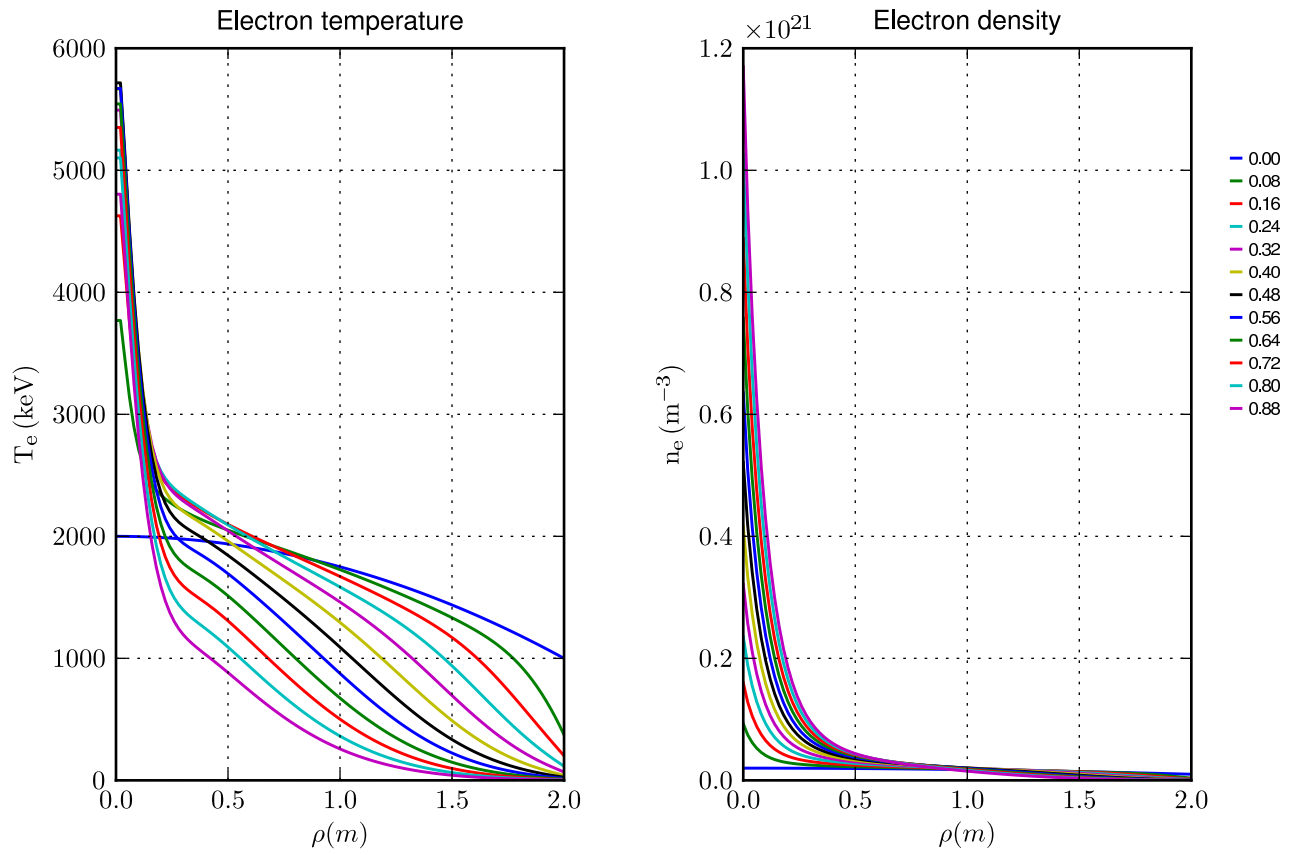
Comparison with asymptotic solution (electrons and ions); total time and zoom over time

Profiles
[Case: **I.1.5.j**, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
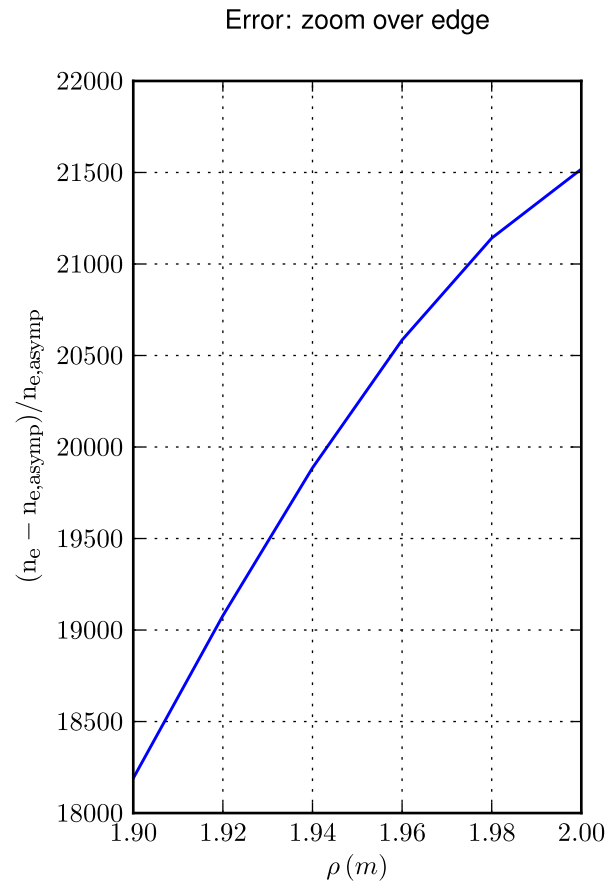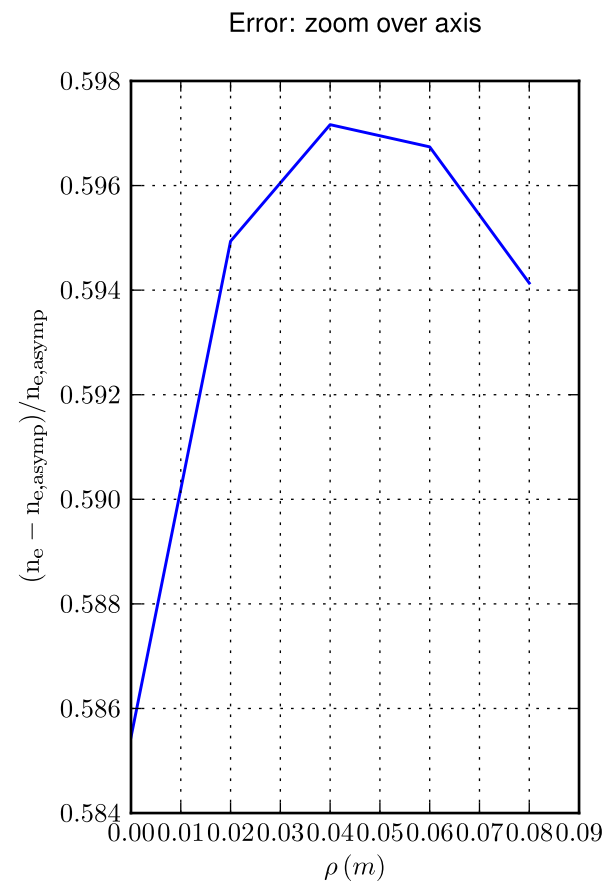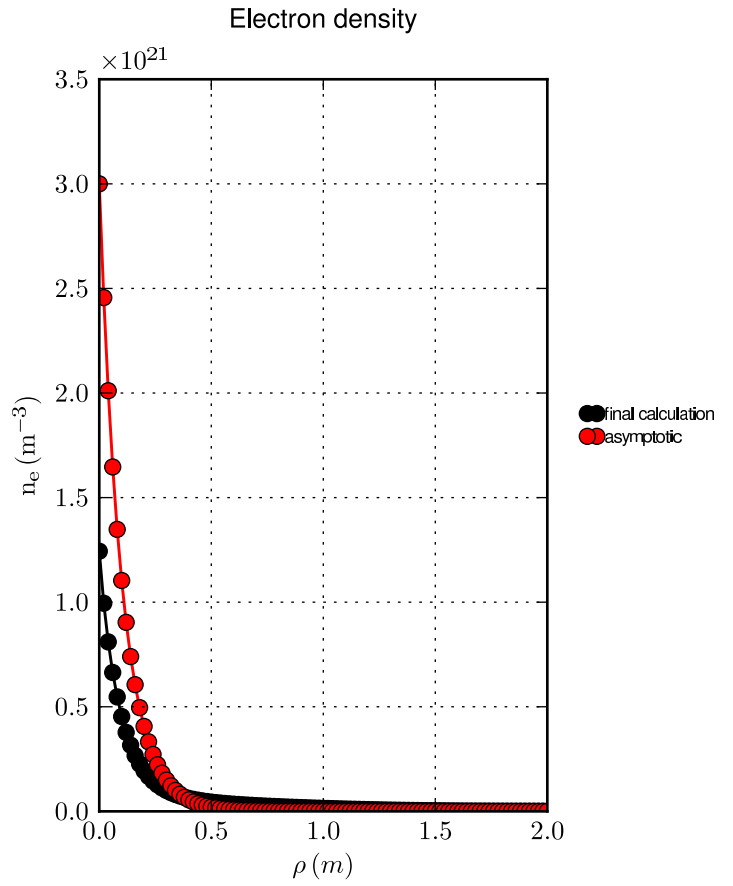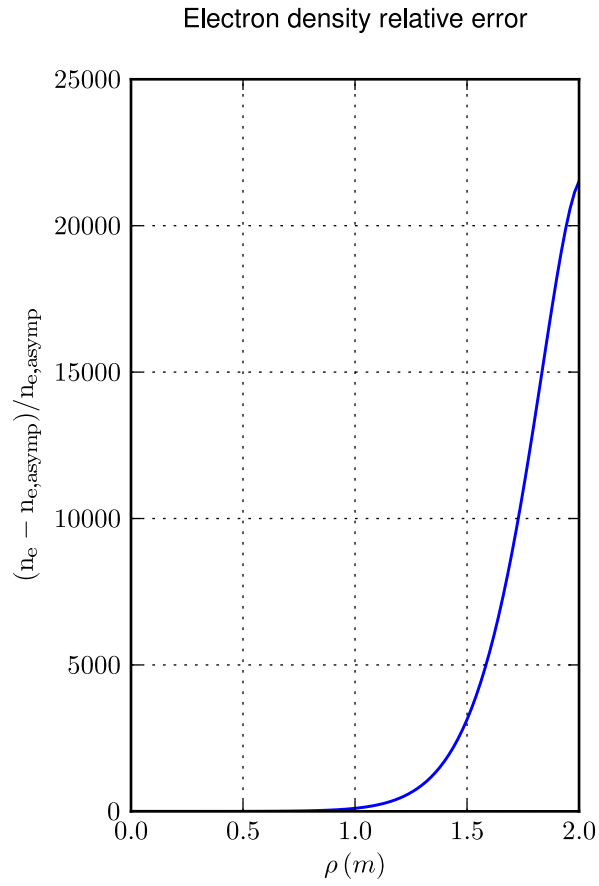Time sampling: total simulation time/10

Profiles
[Case: **I.1.5.j**, Solver: **3**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
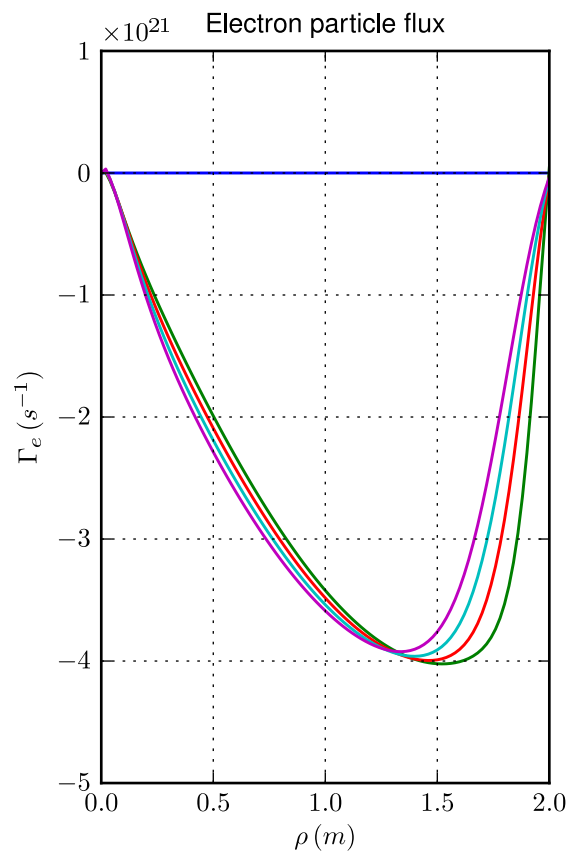## Comparison with asymptotic solution

Profiles
[Case: **I.1.5.j**, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = $**0.19** s

Profiles

[Case: **I.1.5.j**, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
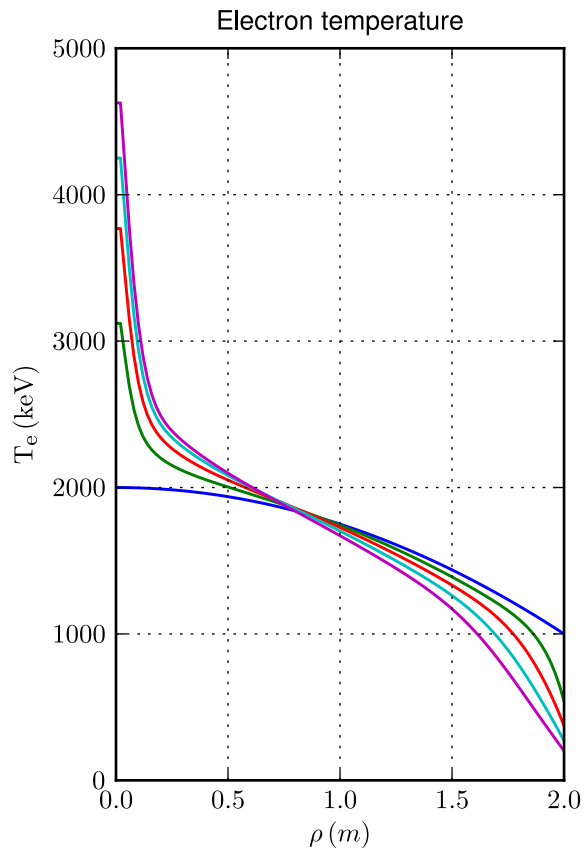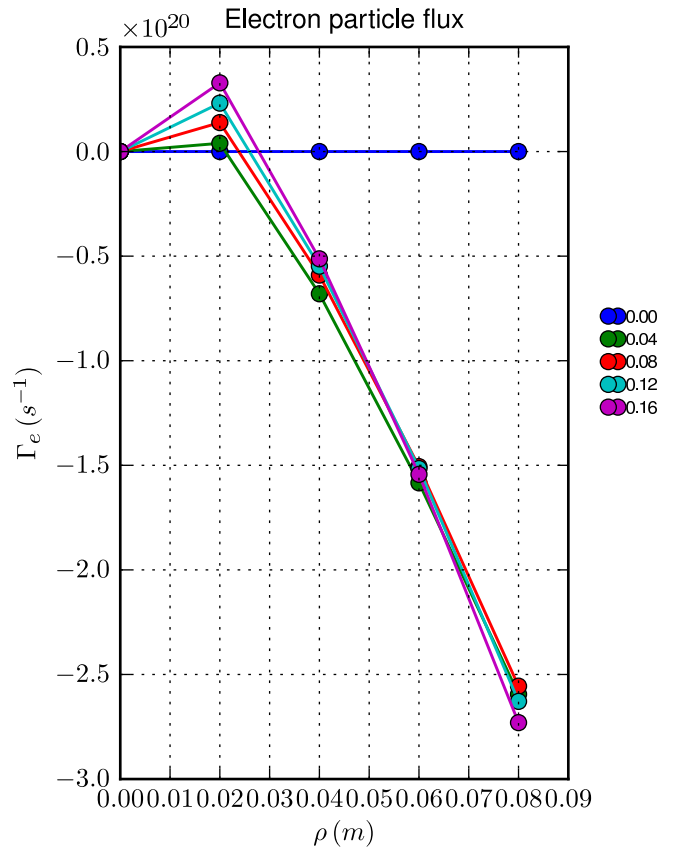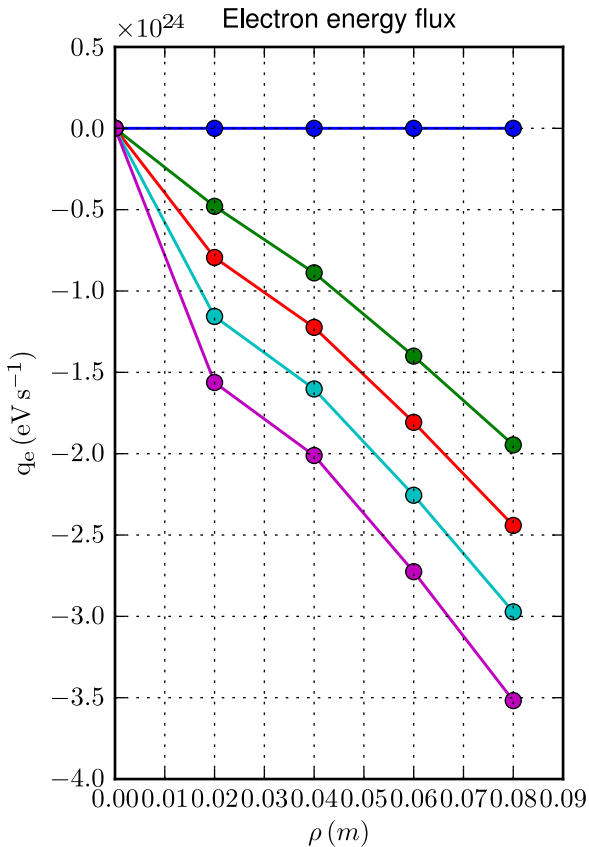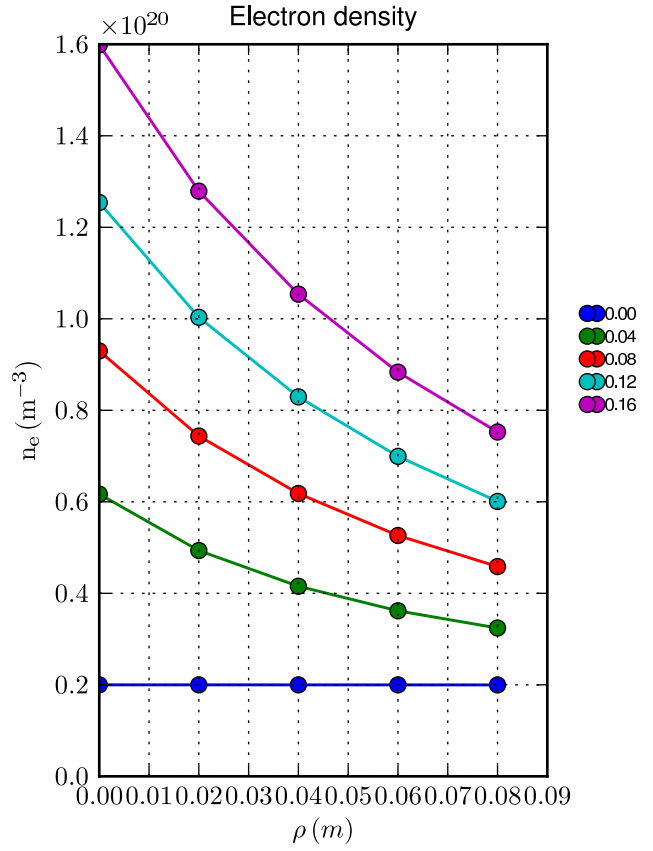
Spatial zoom over magnetic axis

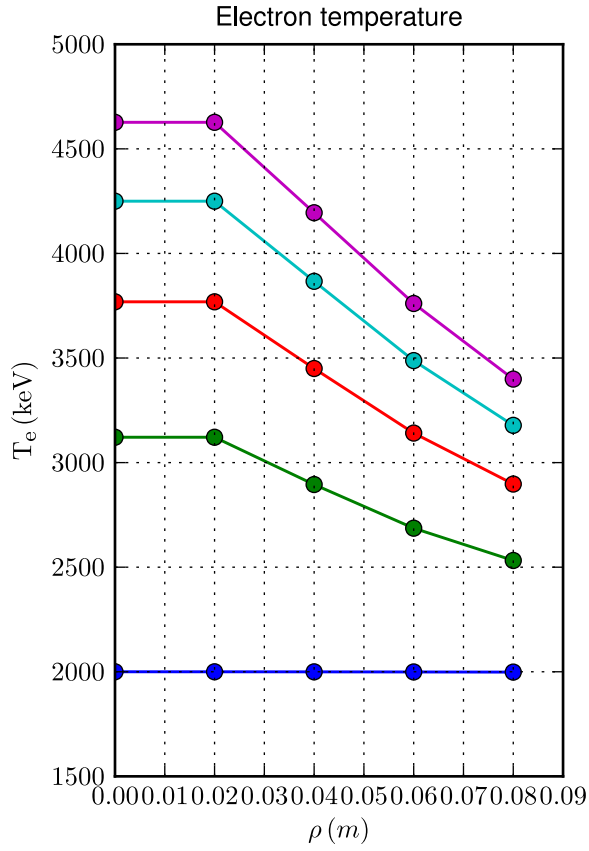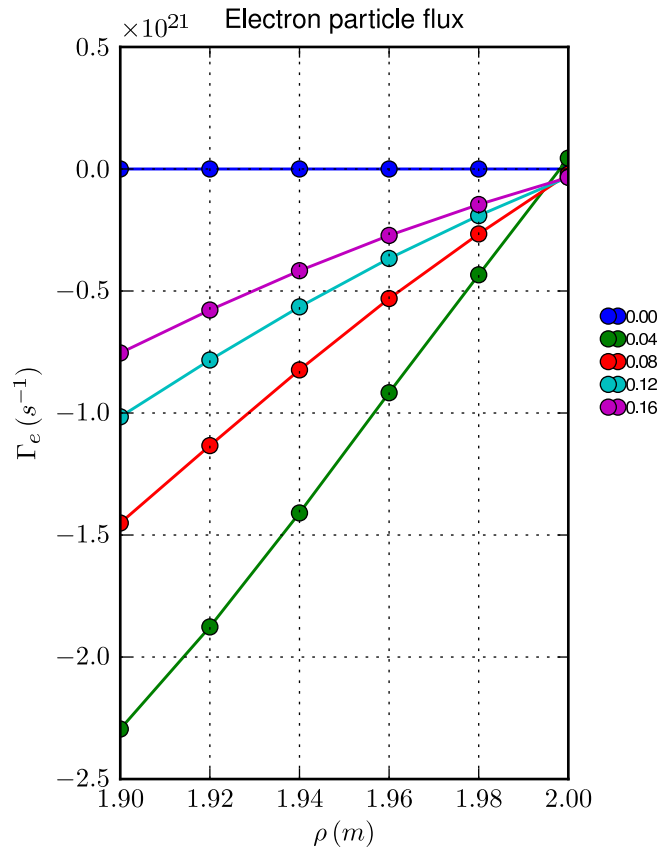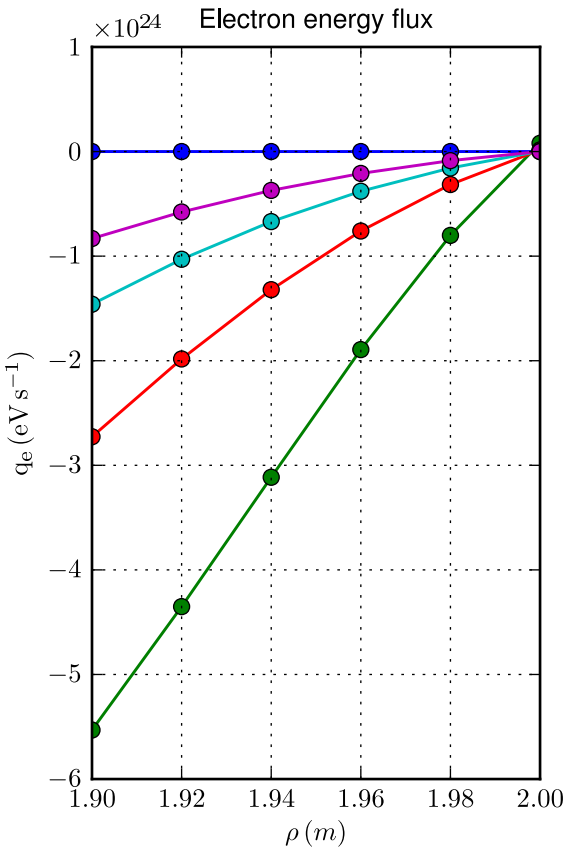Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
[Case: **I.1.5.j**, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Spatial zoom over edge
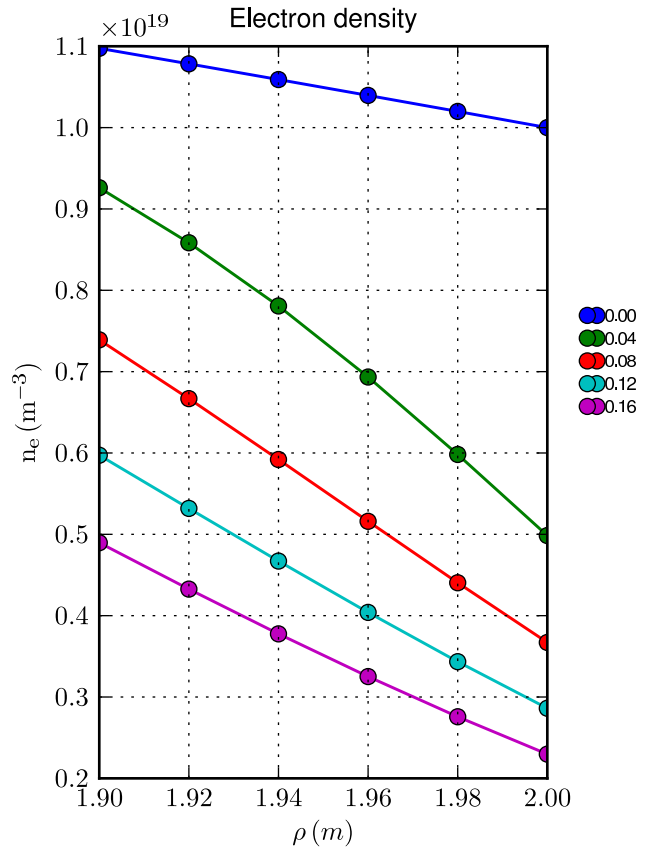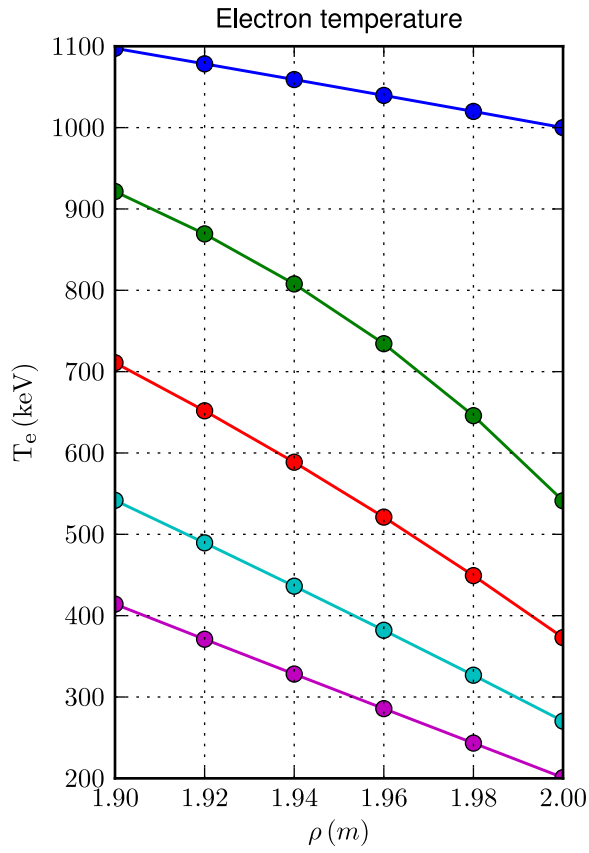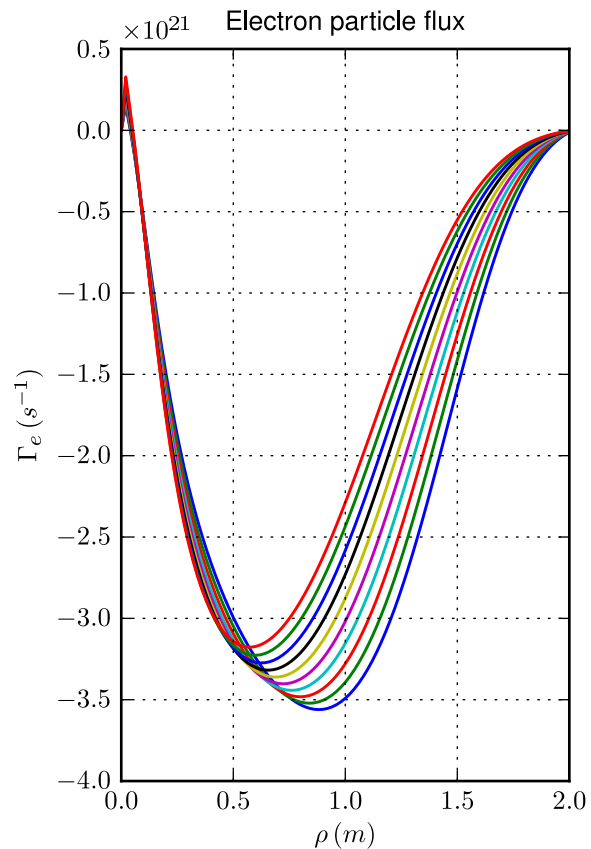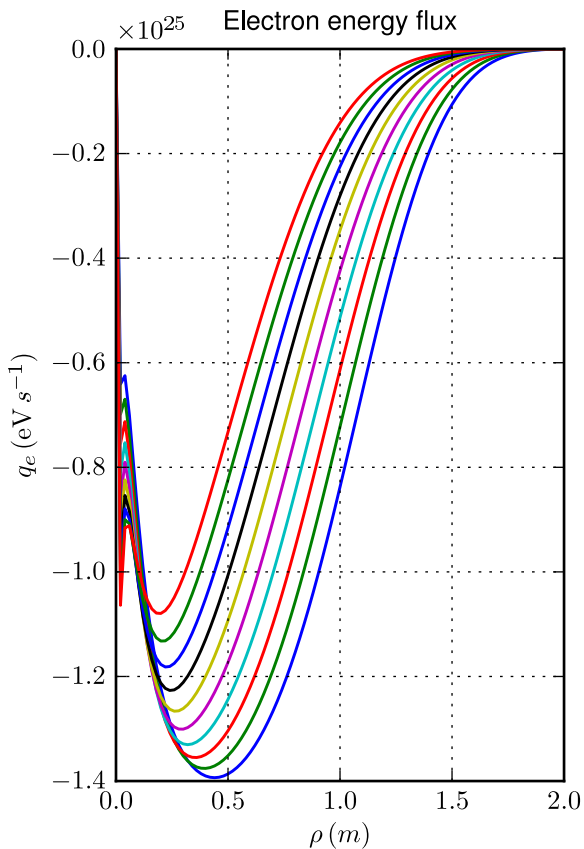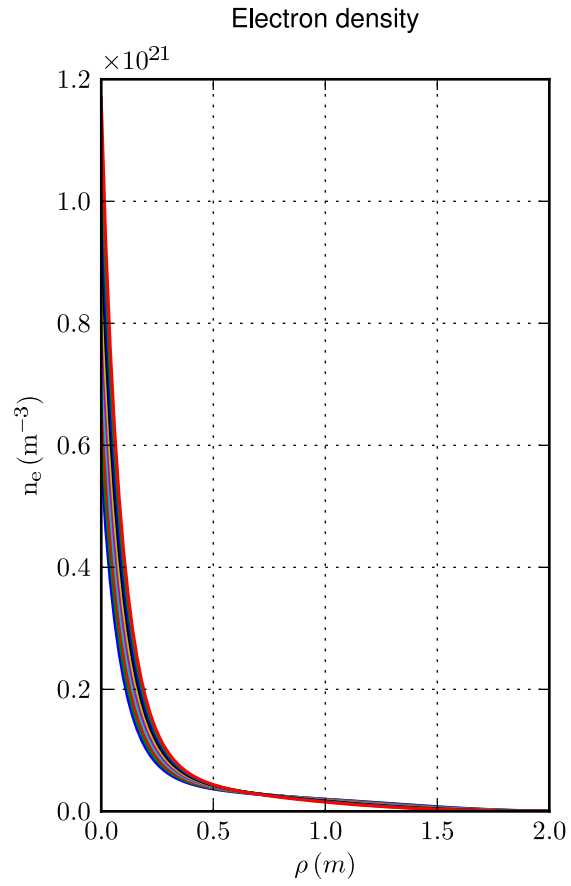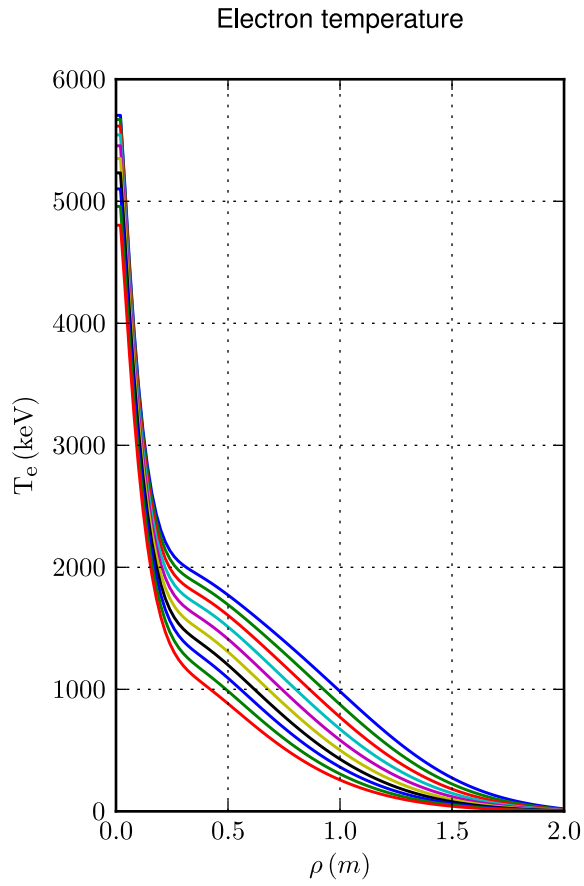Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
[Case: I.1.5.j, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
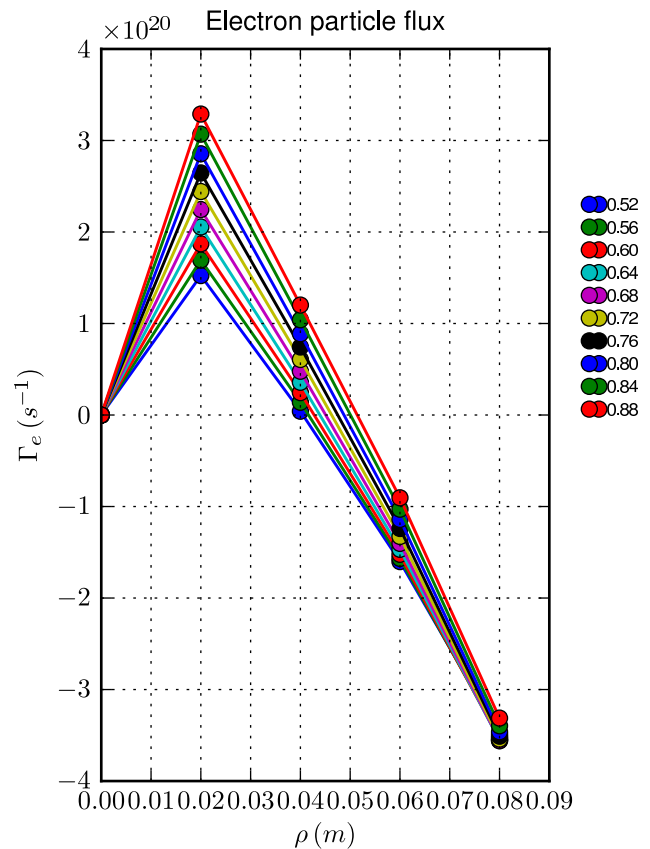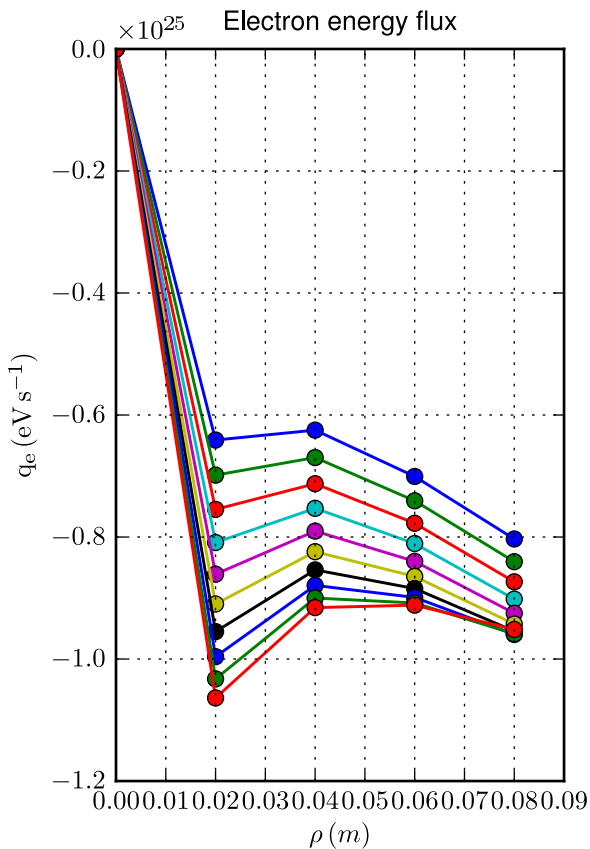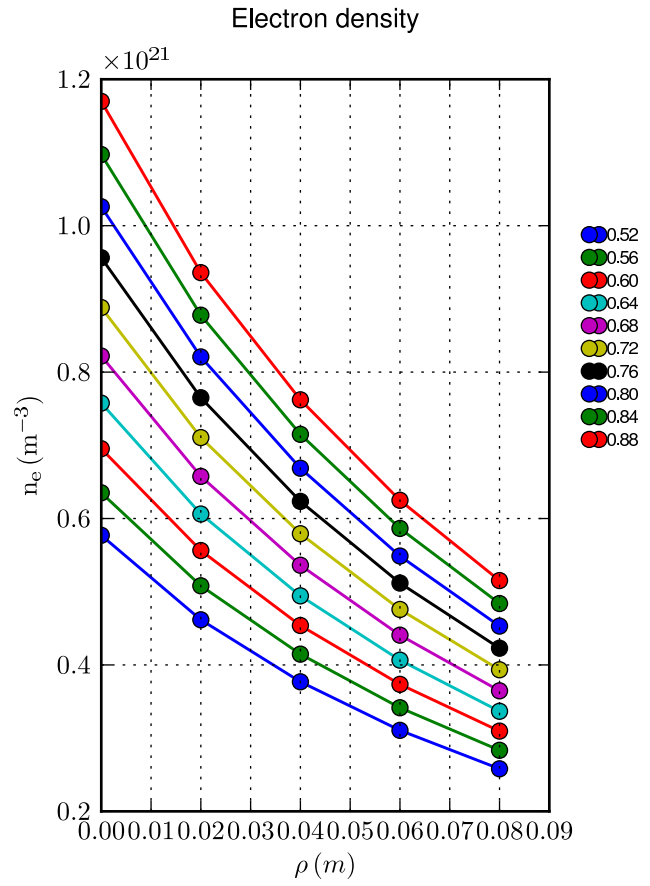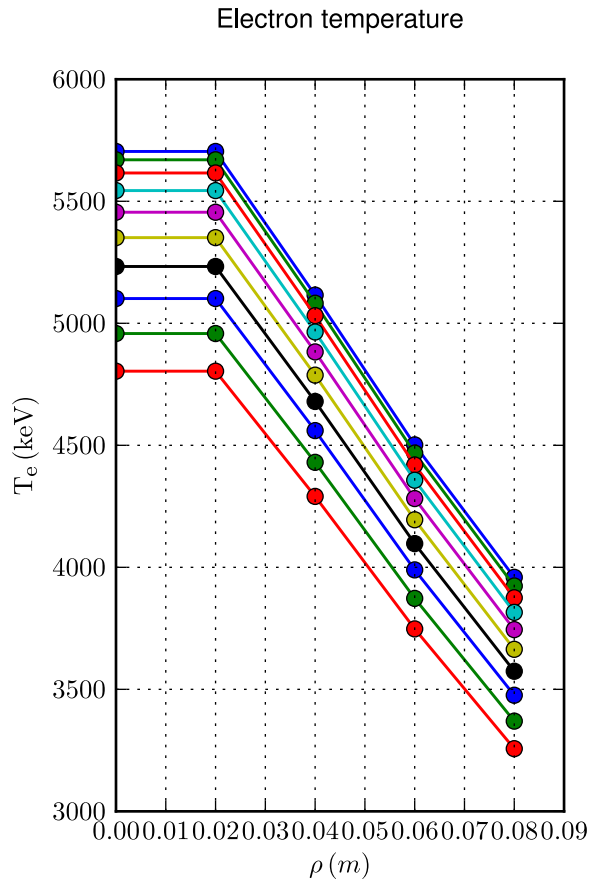Time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
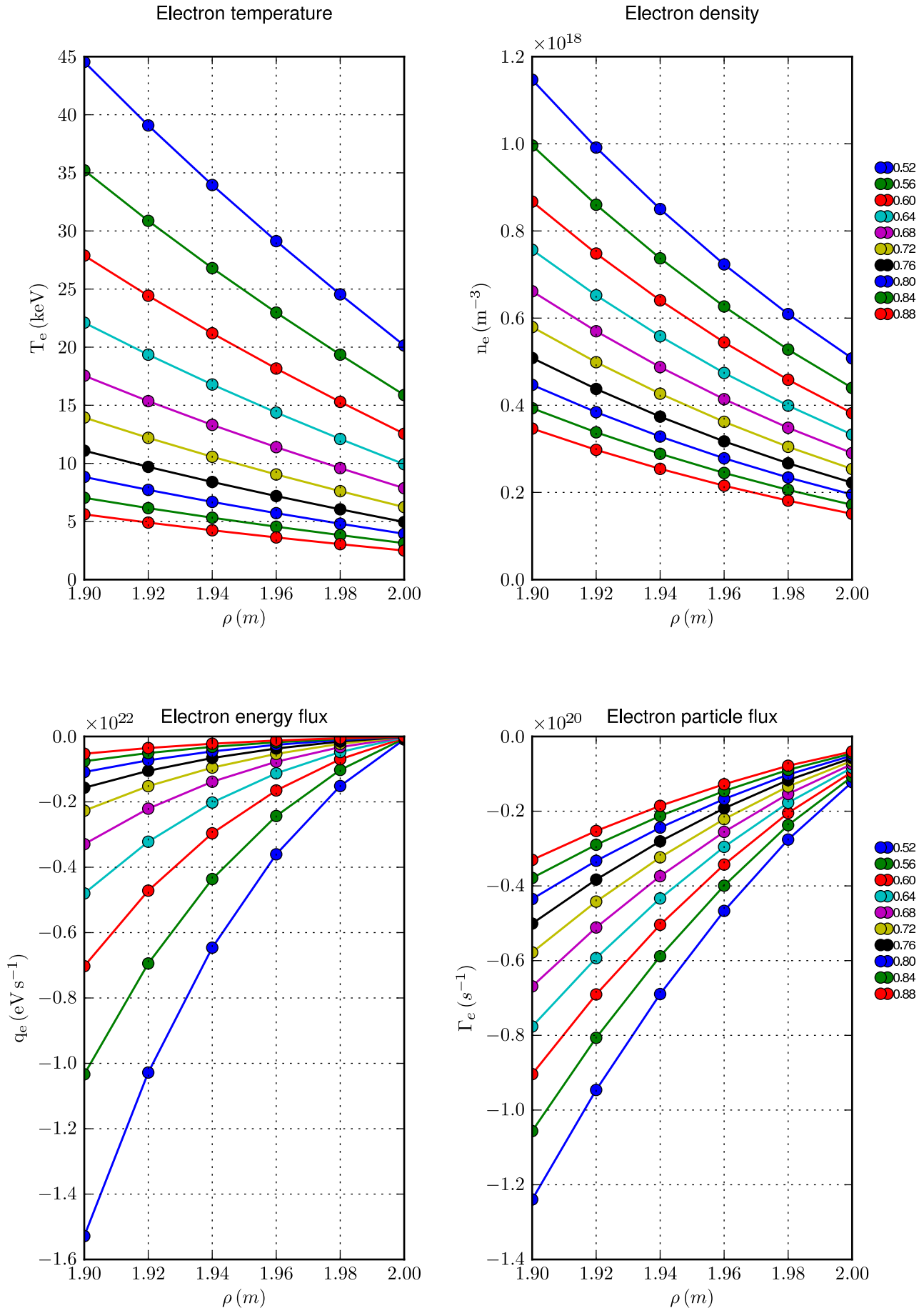Spatial zoom over magnetic axis; time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 3, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
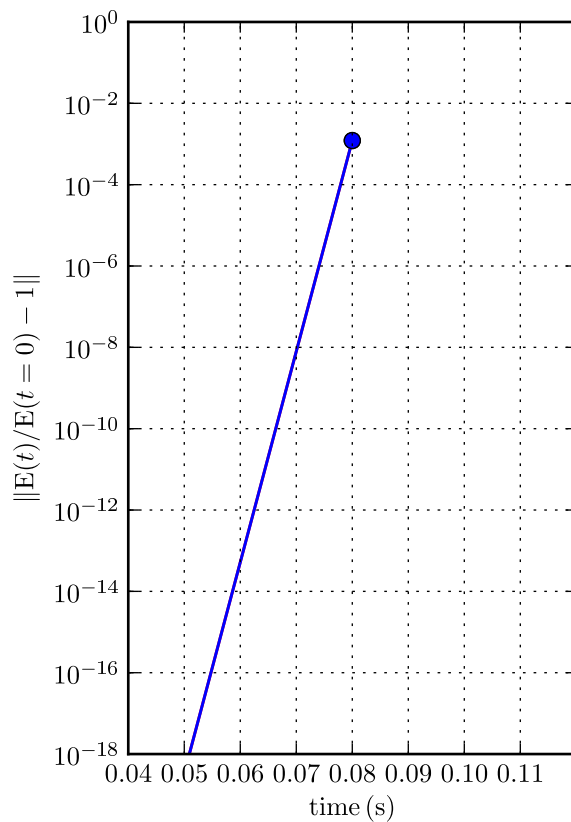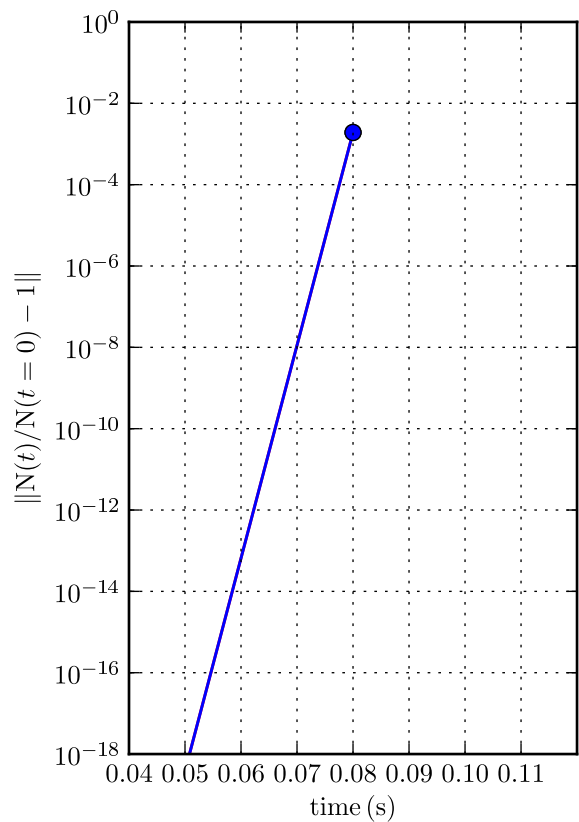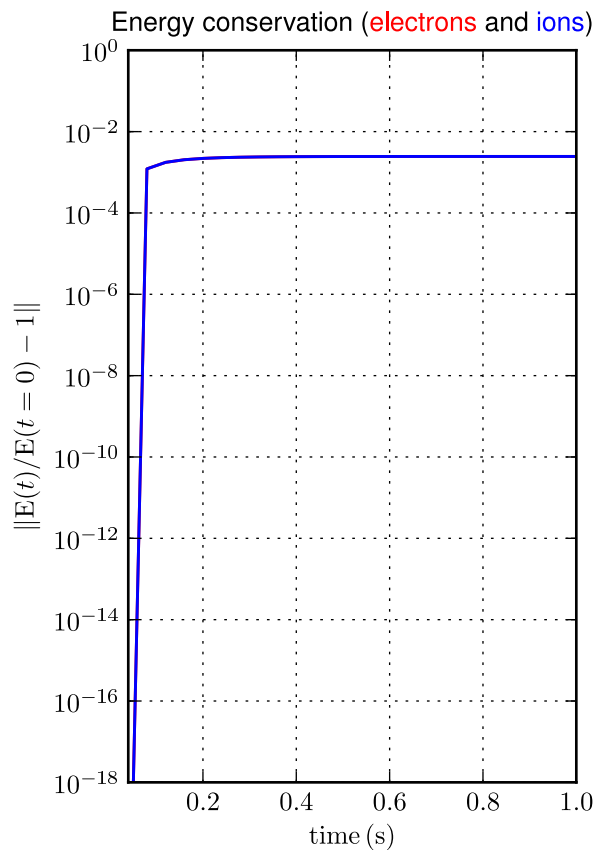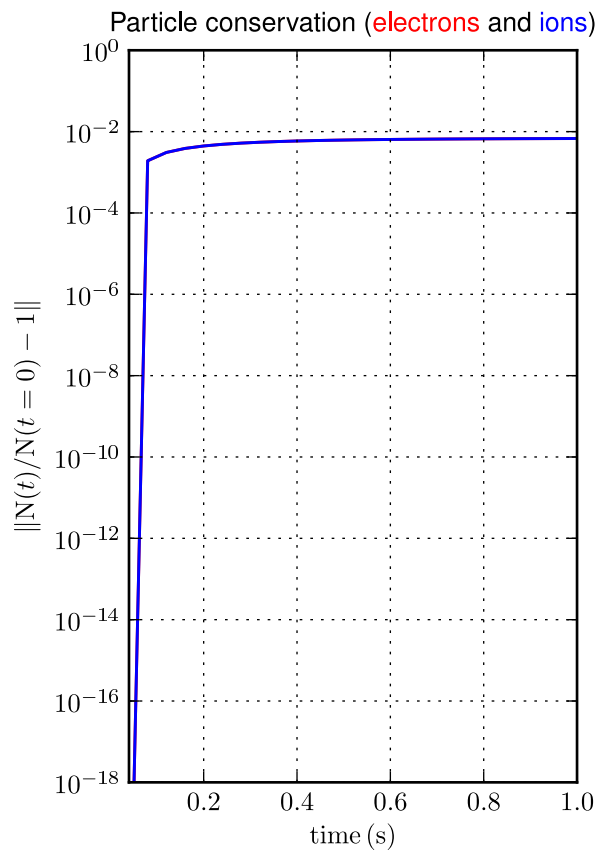Spatial zoom over edge; time sampling: last 10 time slices

Part. & Energy conservation

[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
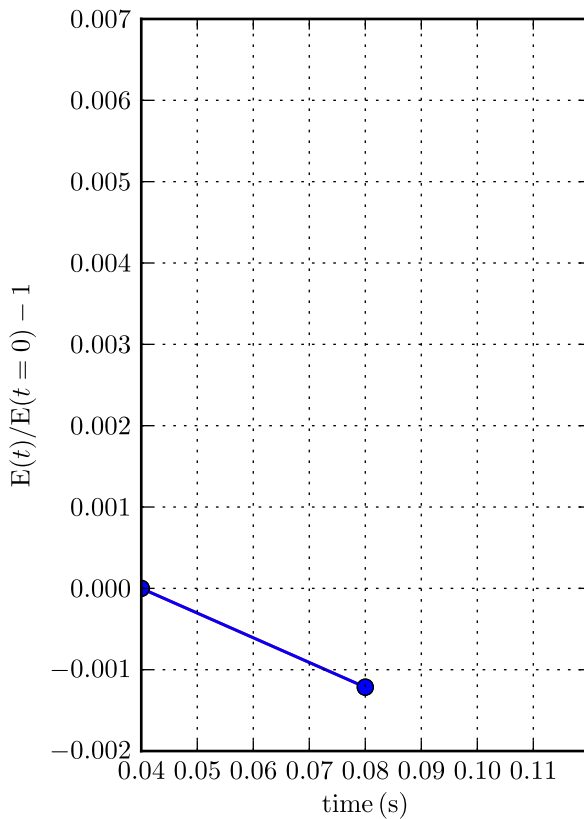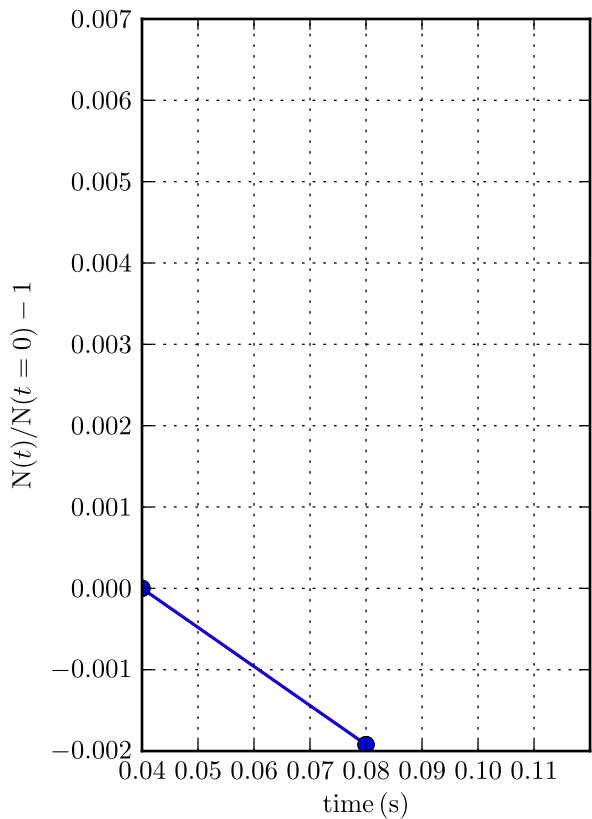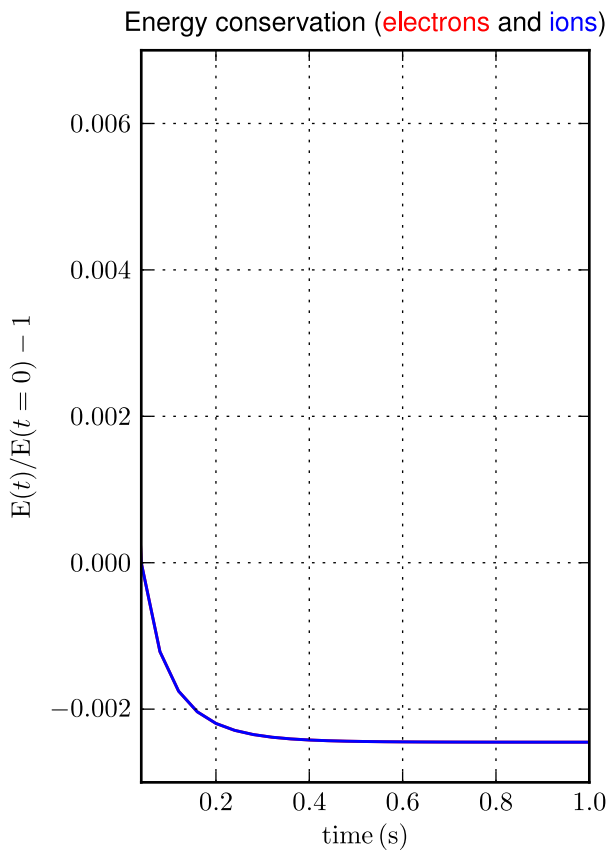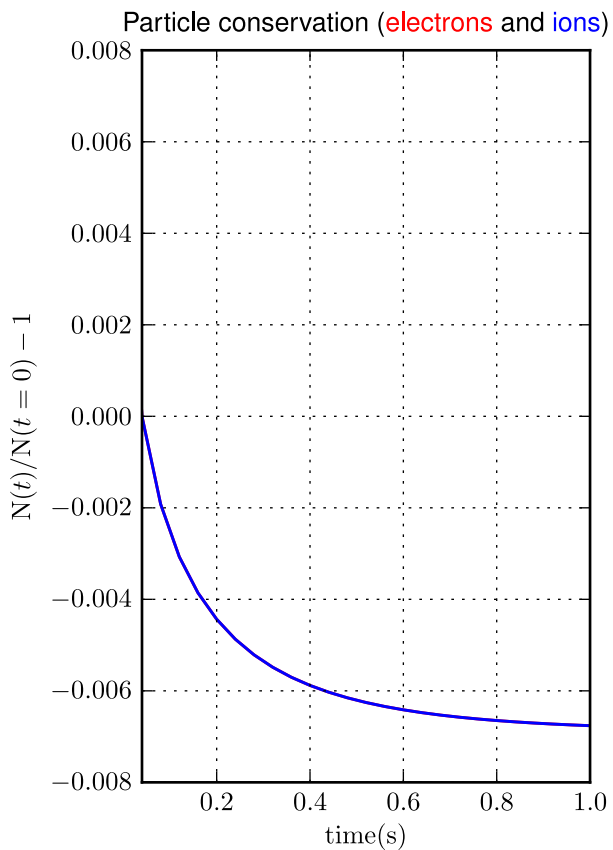
Comparison with initial solution - log scale; total time and zoom over time

Part. & Energy conservation
[Case: I.1.5.j, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
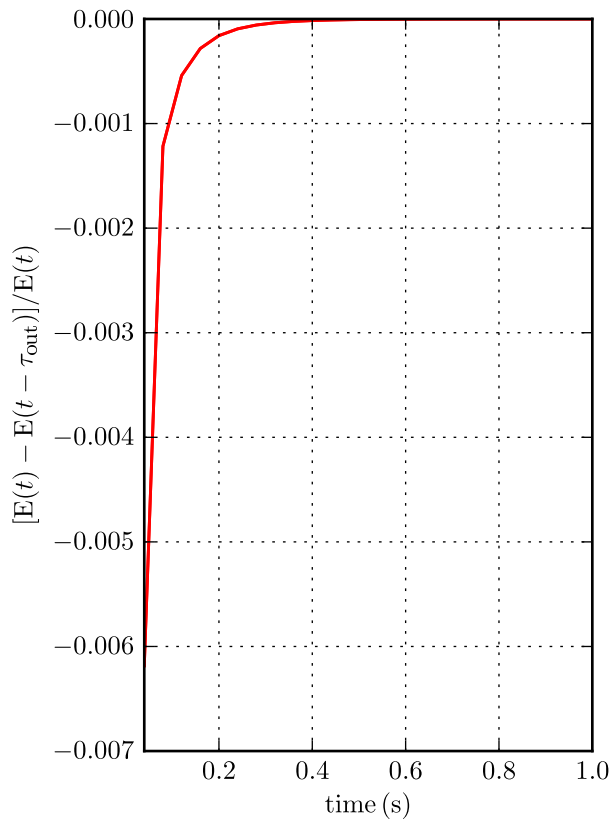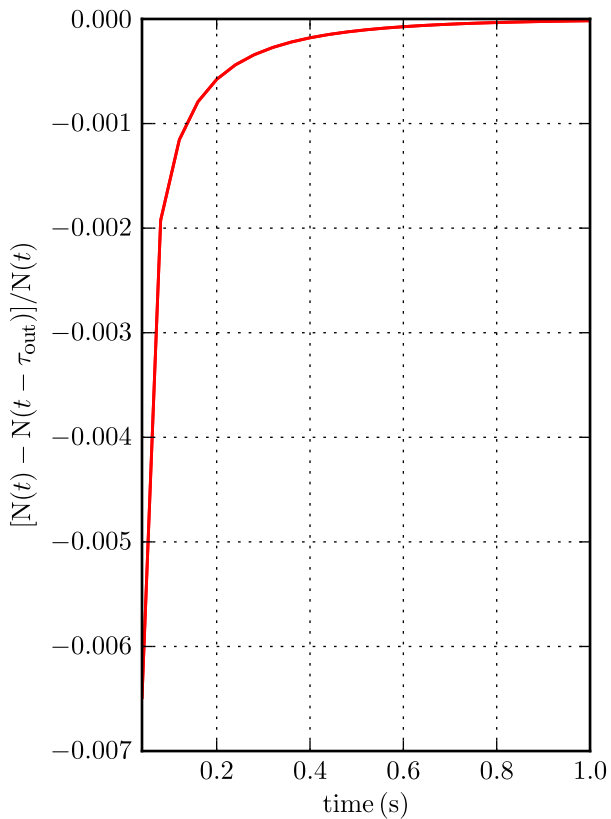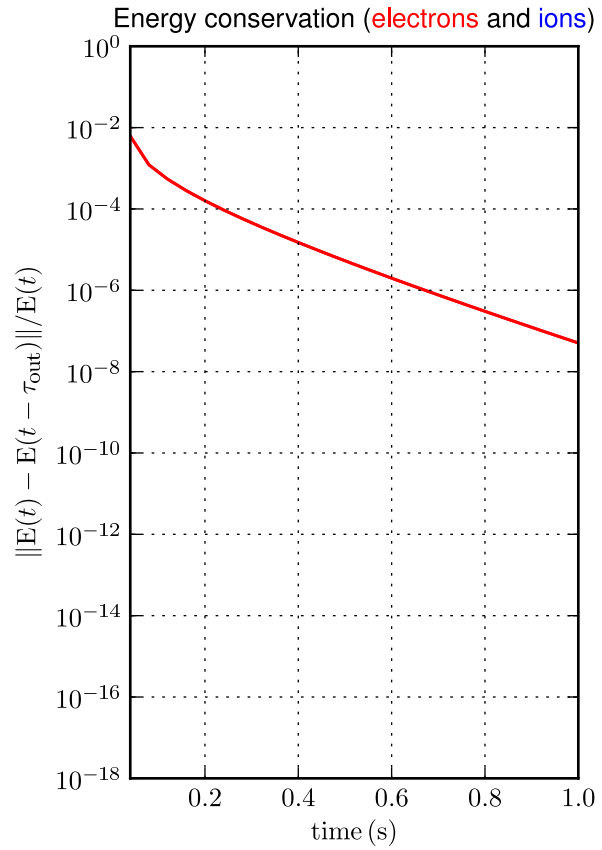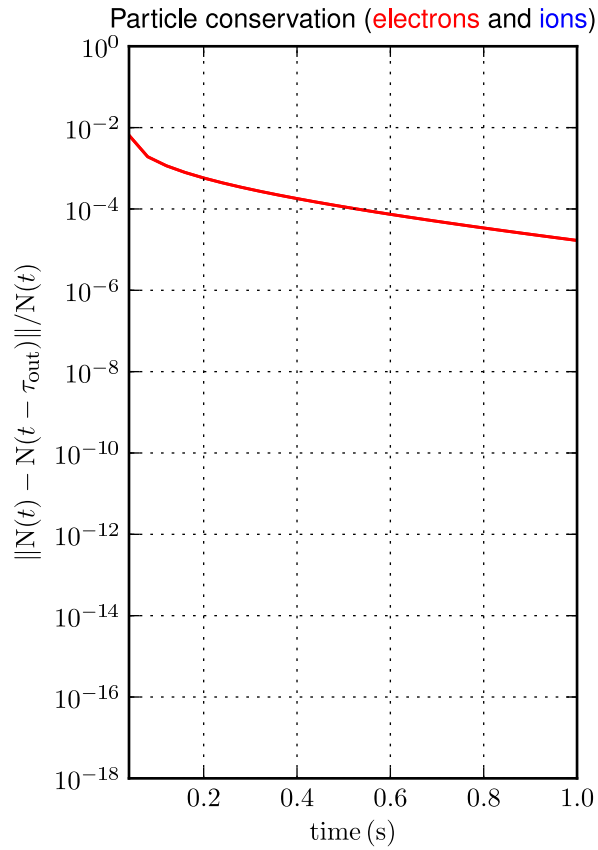Comparison with initial solution - linear scale; total time and zoom over time

Particle conservation (electrons and ions)

Energy conservation (electrons and ions)

Part. & Energy conservation
[Case: **I.1.5.**j, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
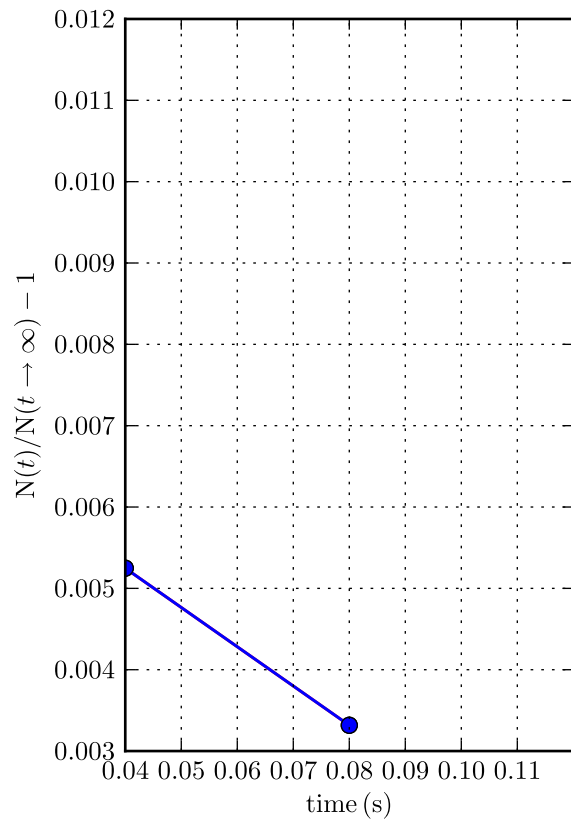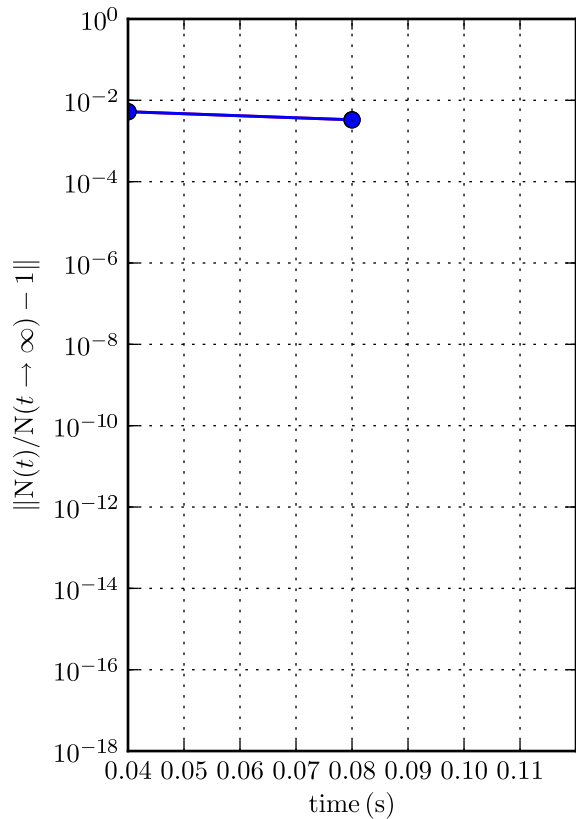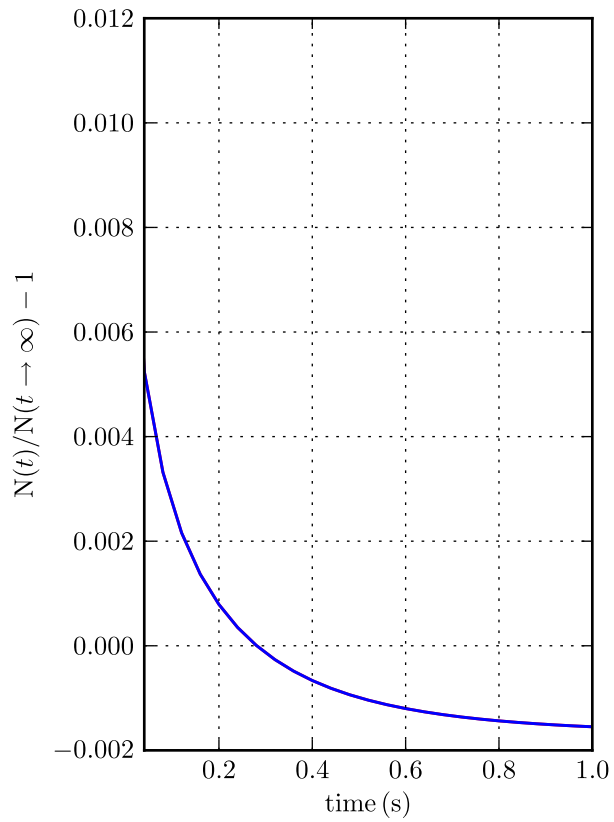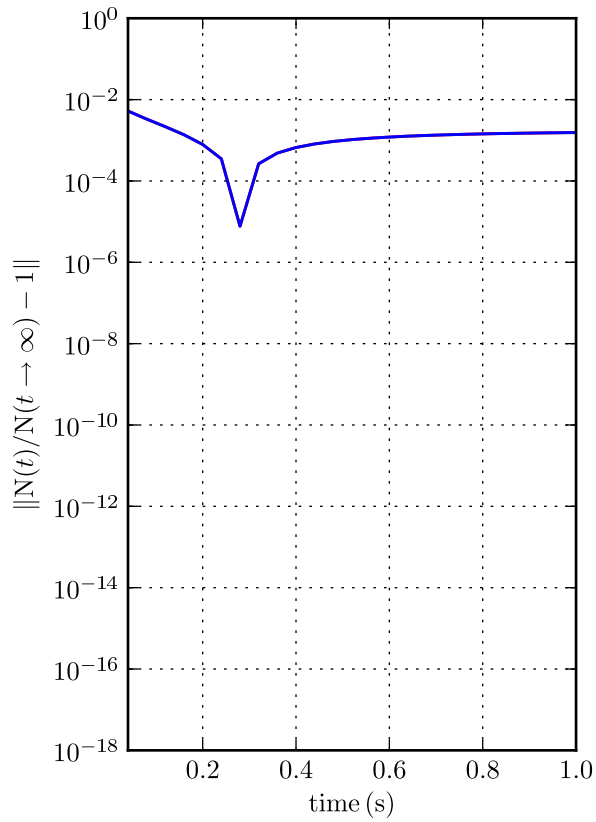Comparison with previous time-sampled (τ_{out}) solution - log and linear scales

Particle conservation
[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
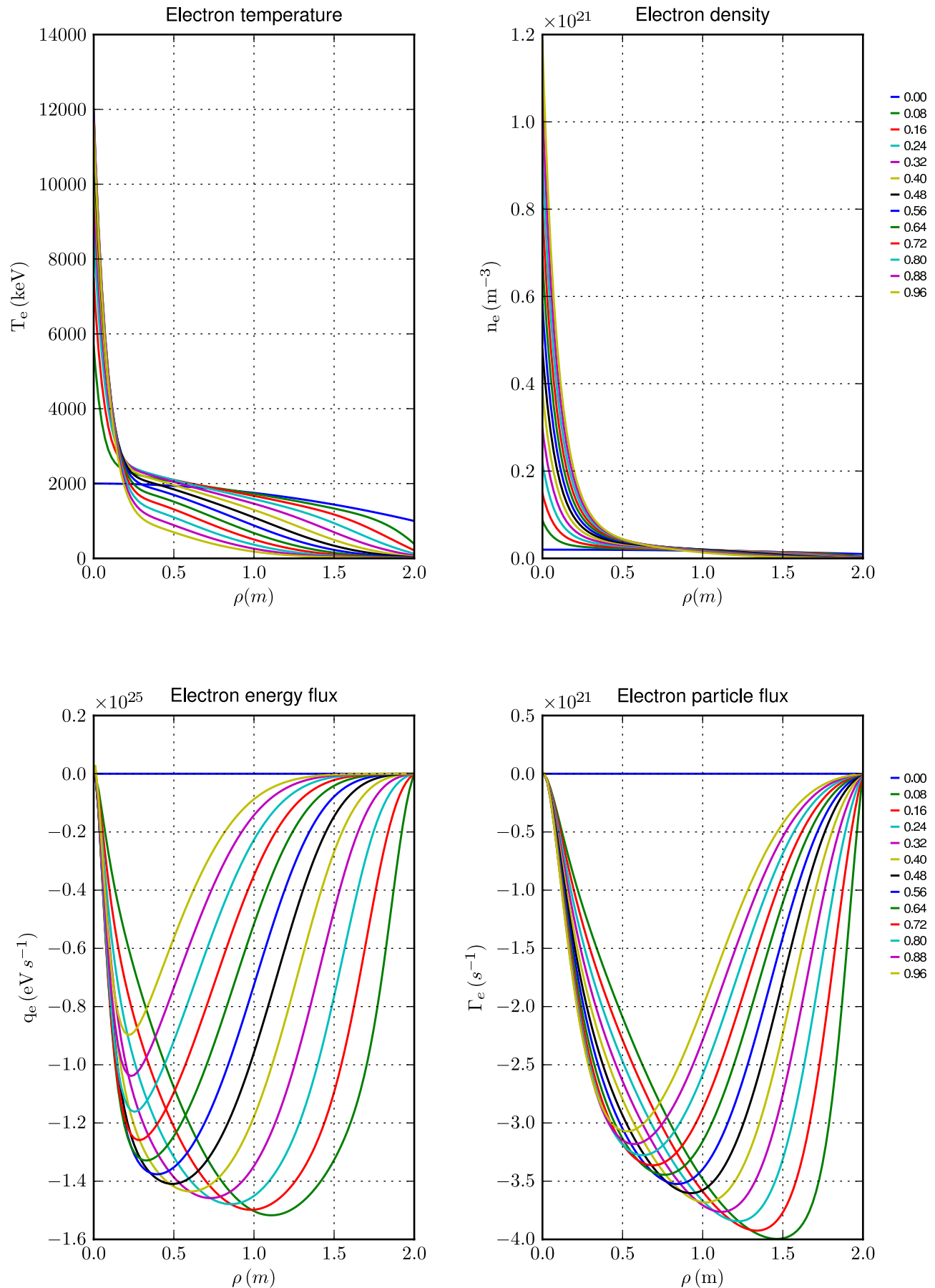Comparison with asymptotic solution (electrons and ions); total time and zoom over time

Profiles
[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
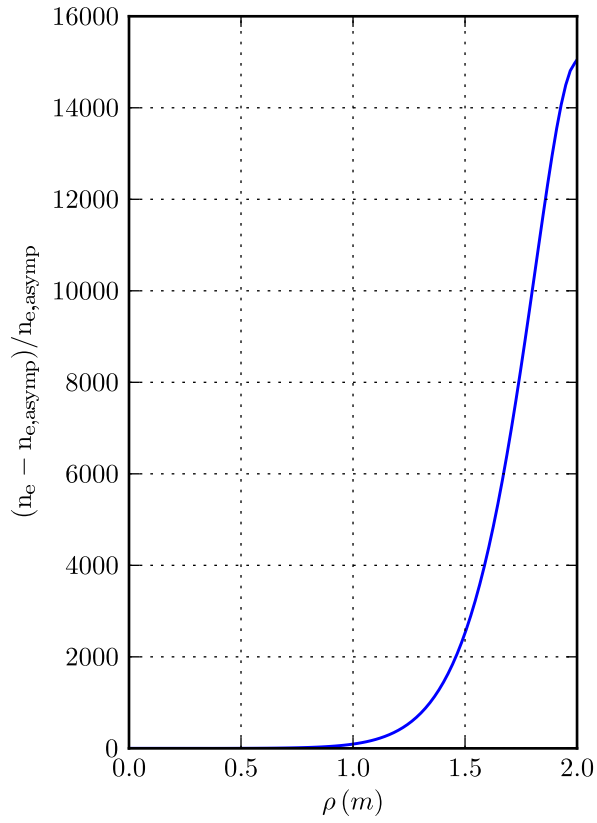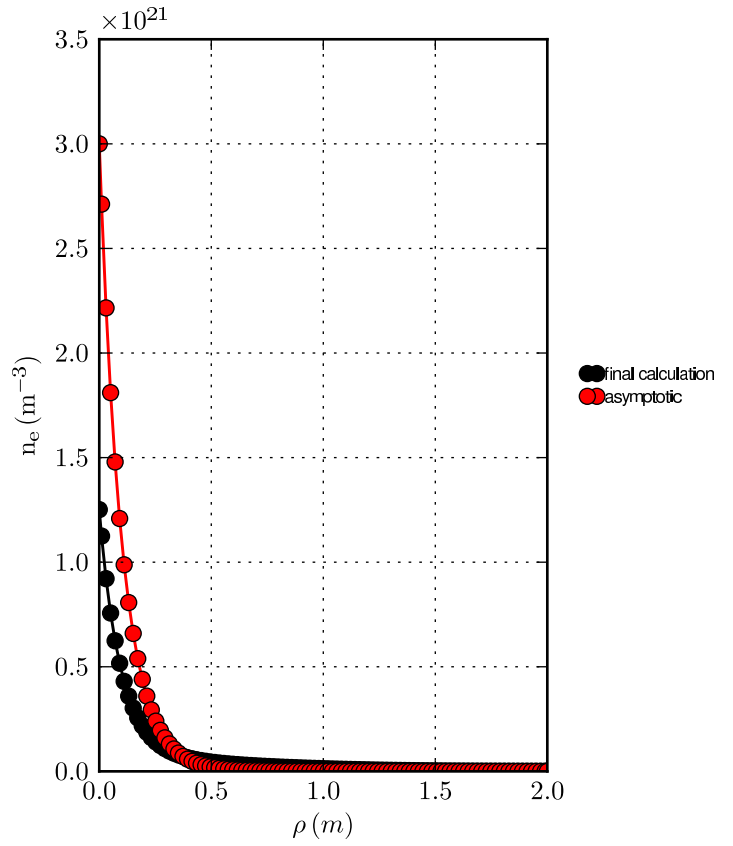Time sampling: total simulation time/10

Profiles

[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
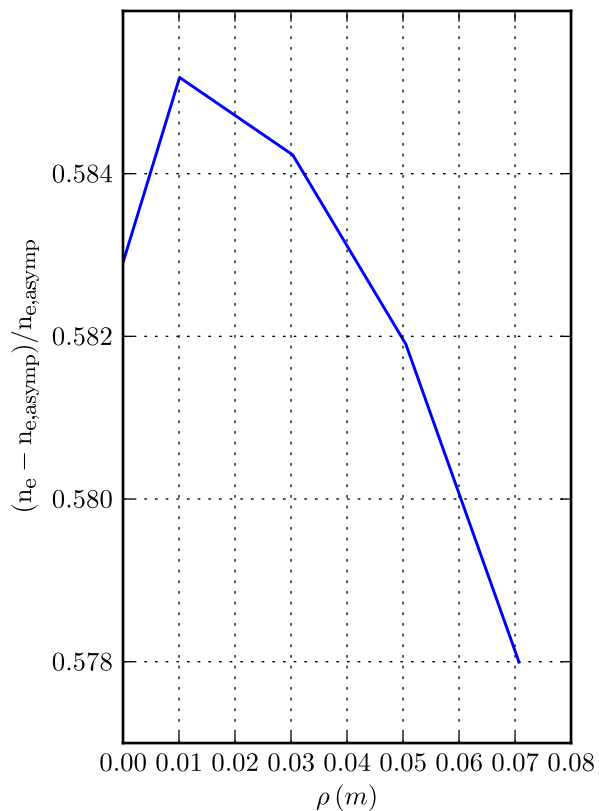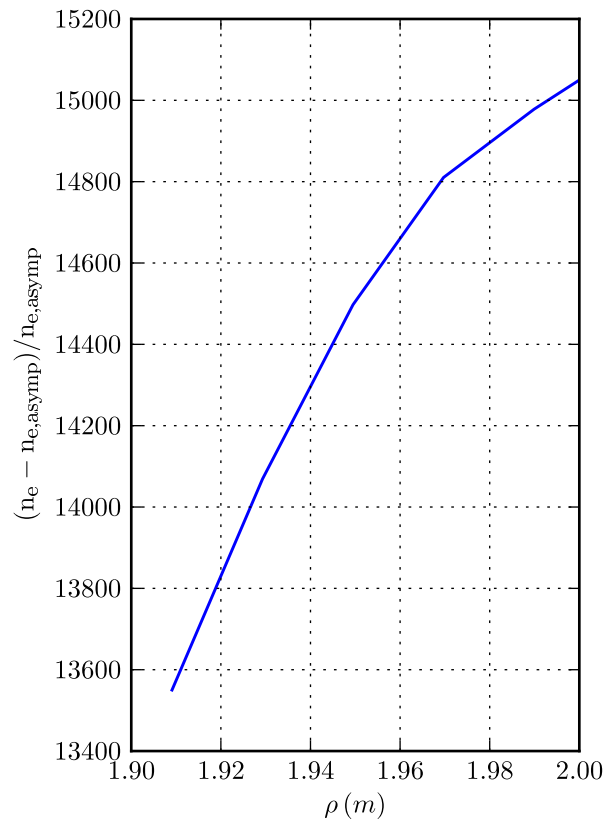
Comparison with asymptotic solution

Electron density relative error

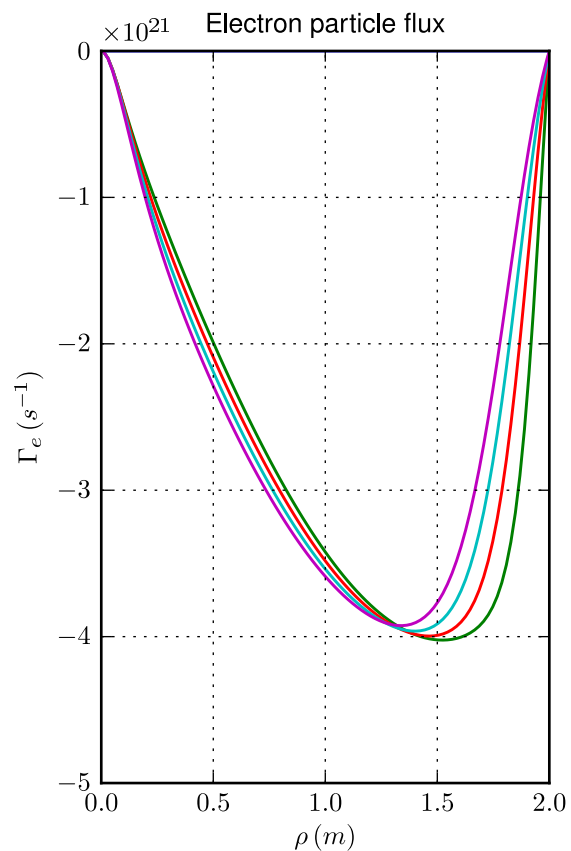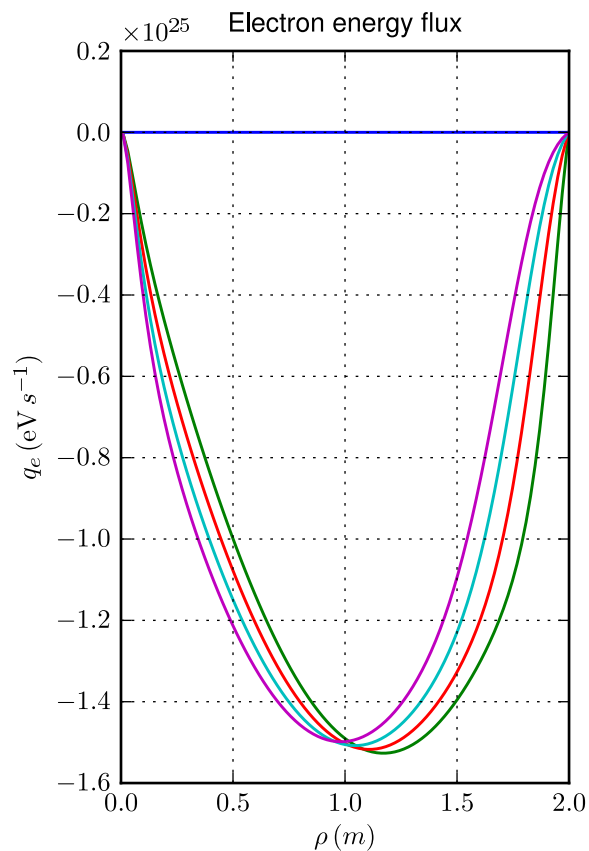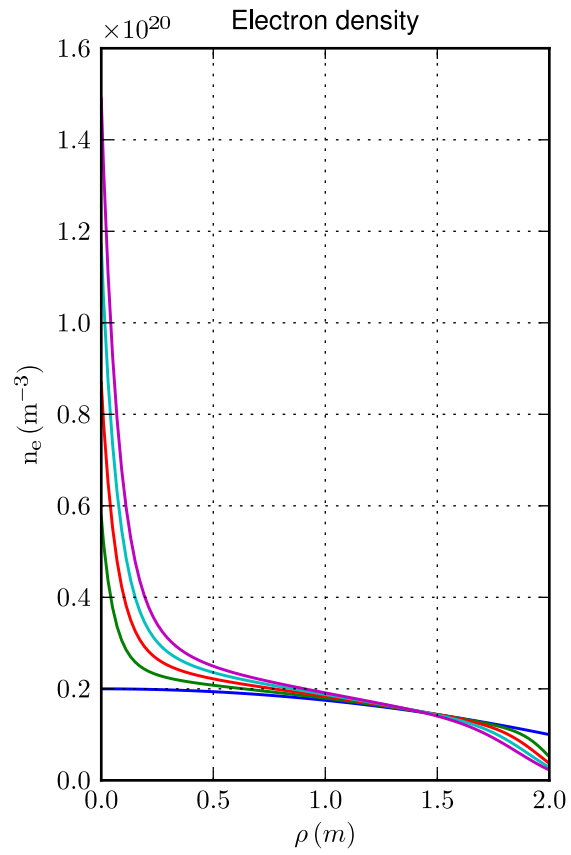### Electron density

Error: zoom over axis

Error: zoom over edge

Profiles
[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
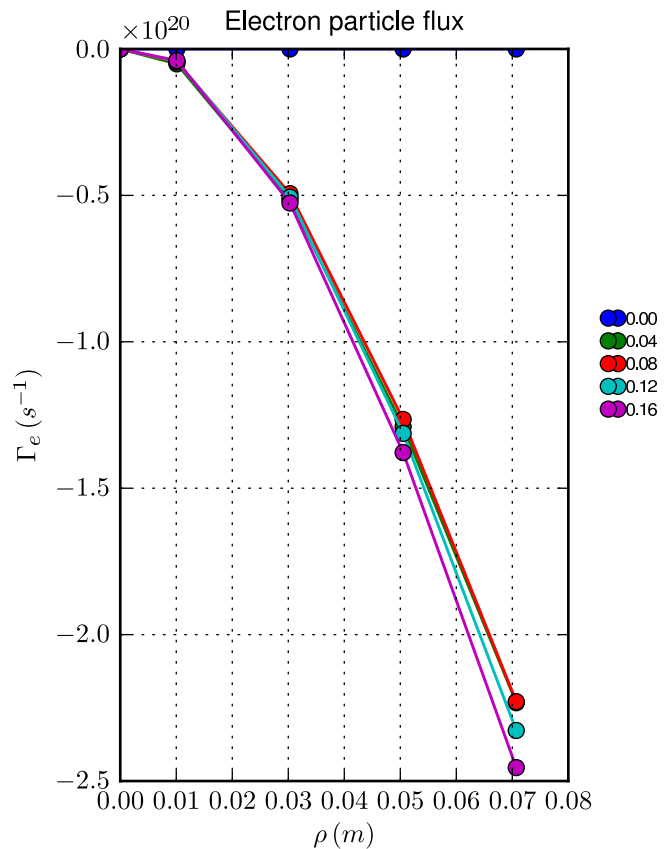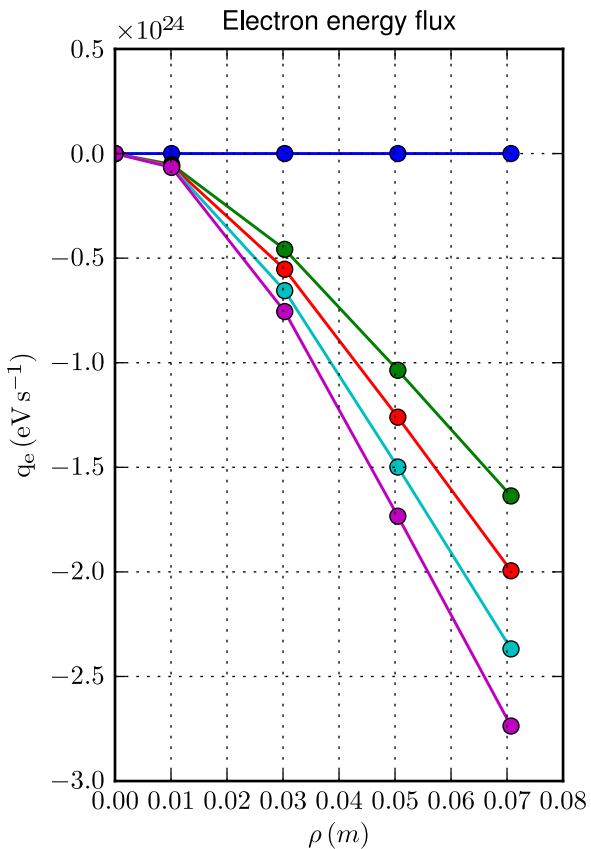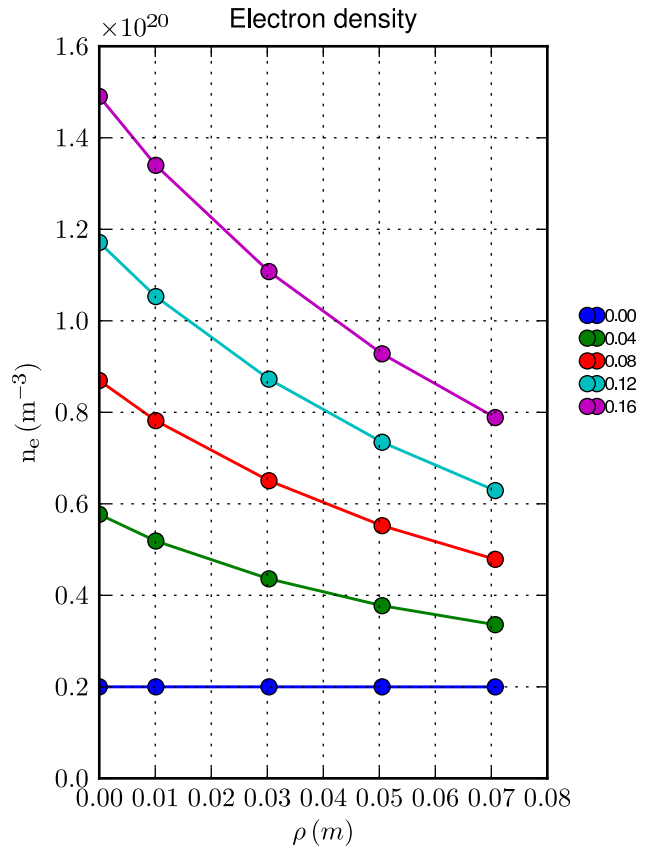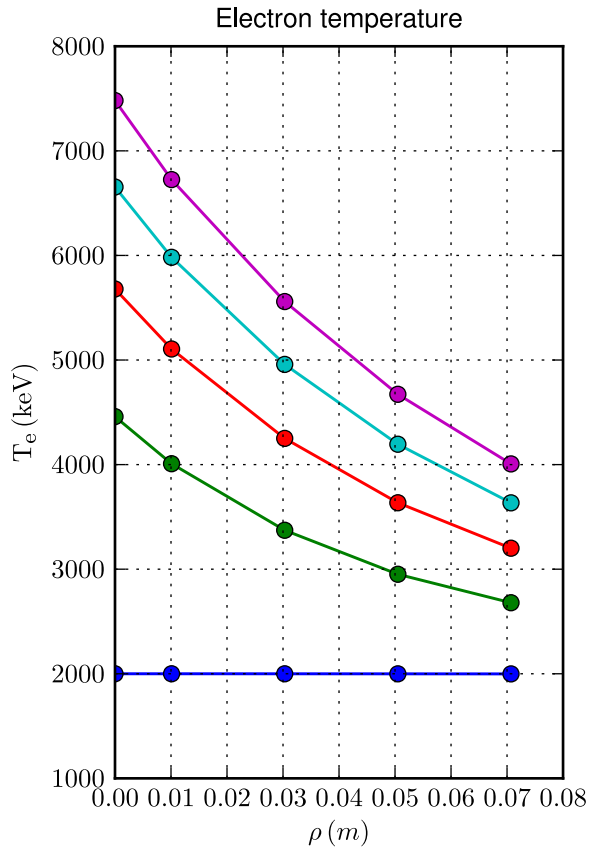Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles

[Case: **I.1.5.j**, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]

Spatial zoom over magnetic axis

Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

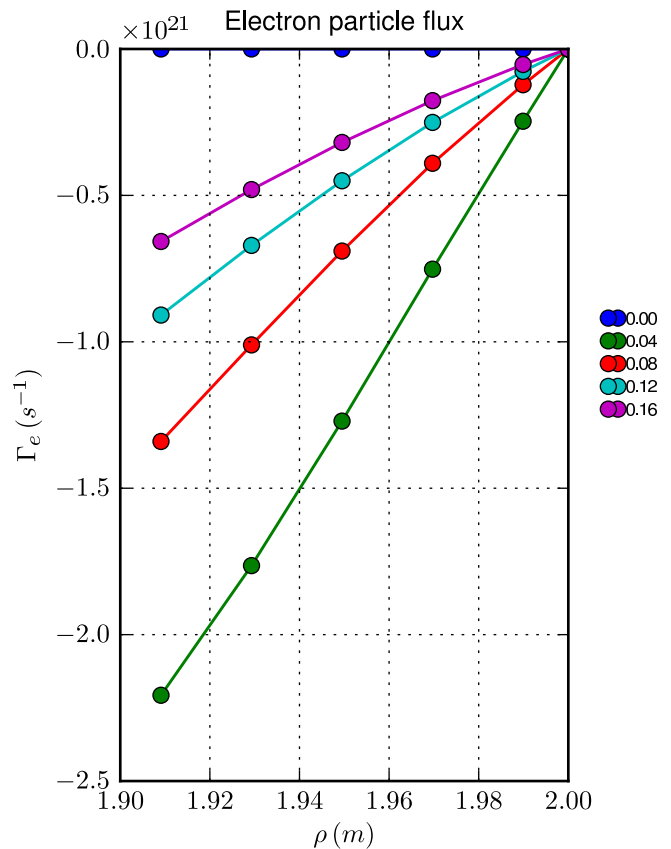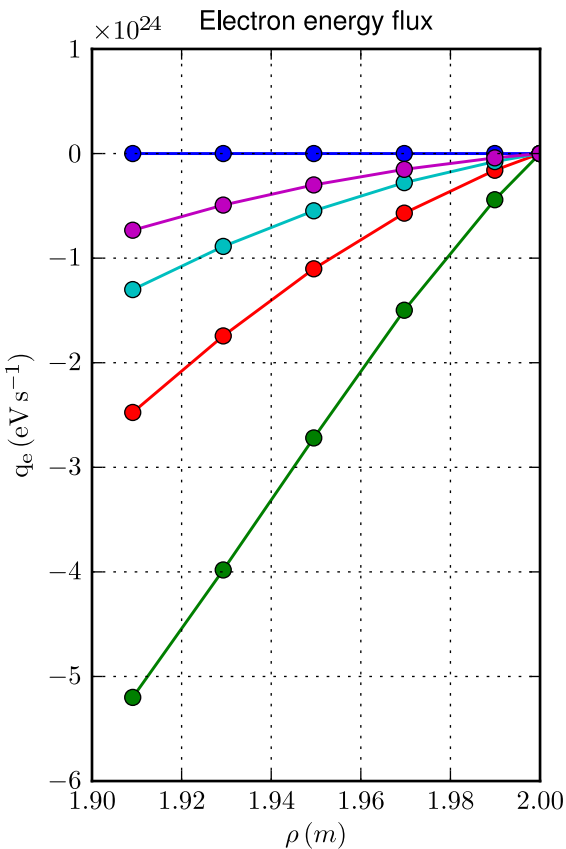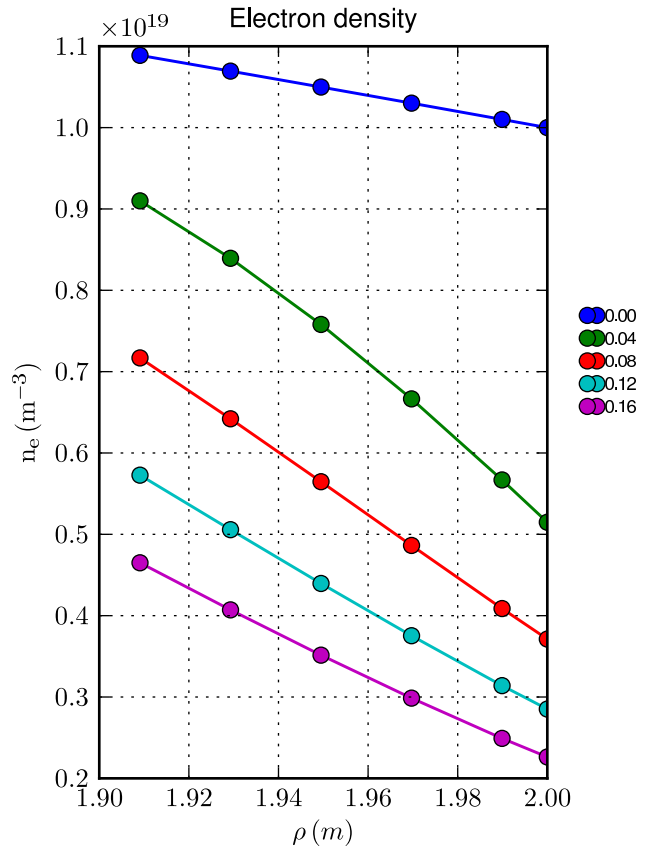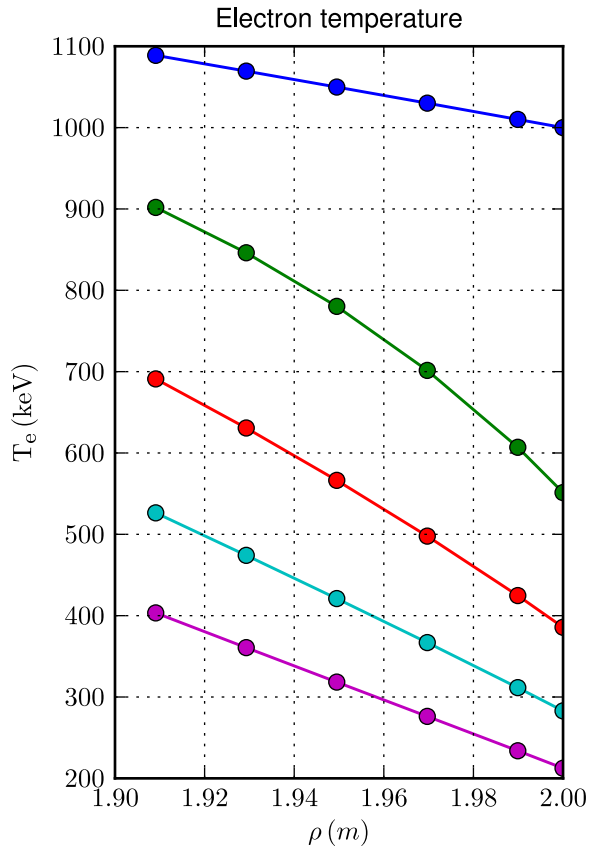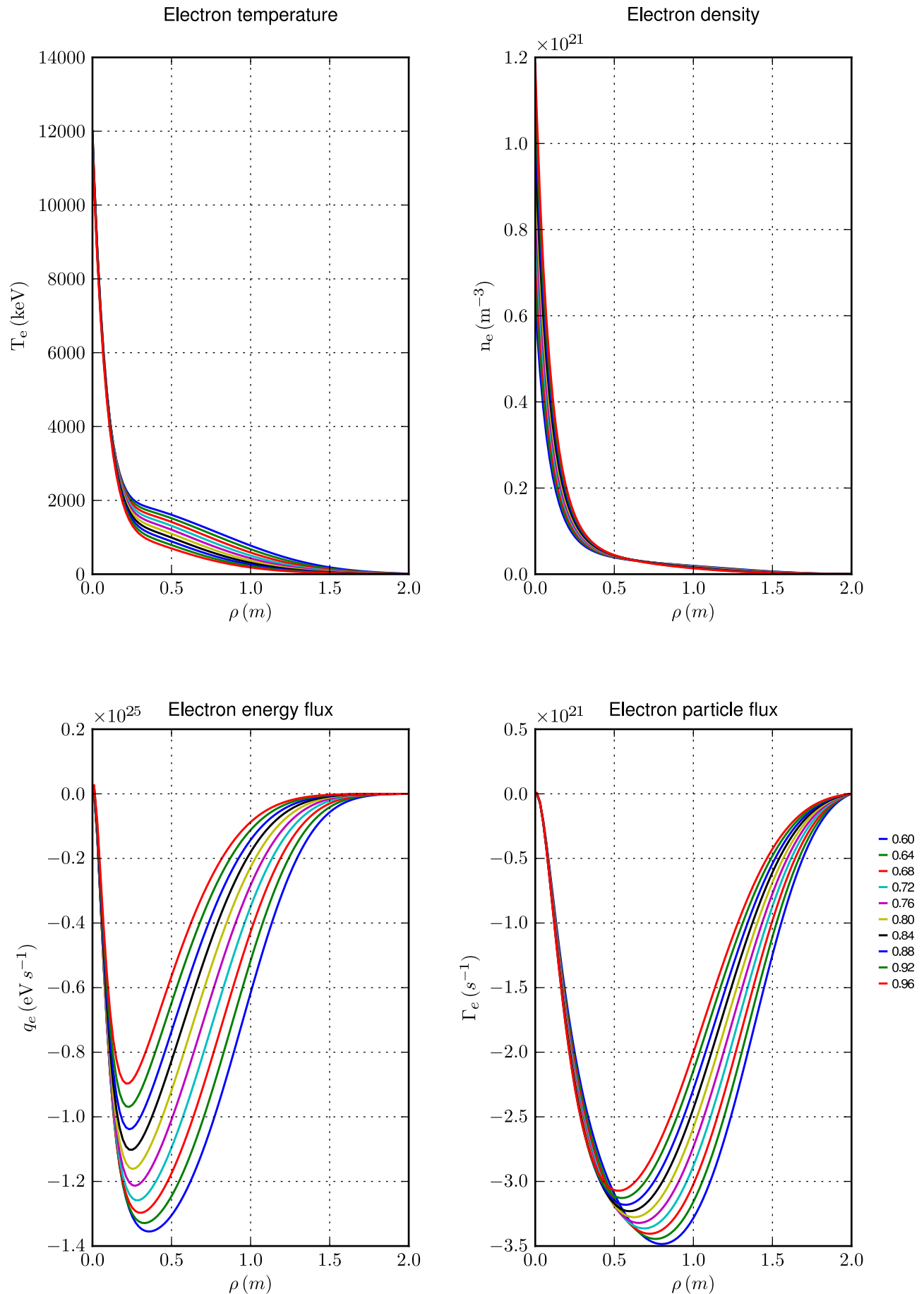**Profiles**
[Case: **I.1.5.j**, Solver: **4**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Spatial zoom over edge
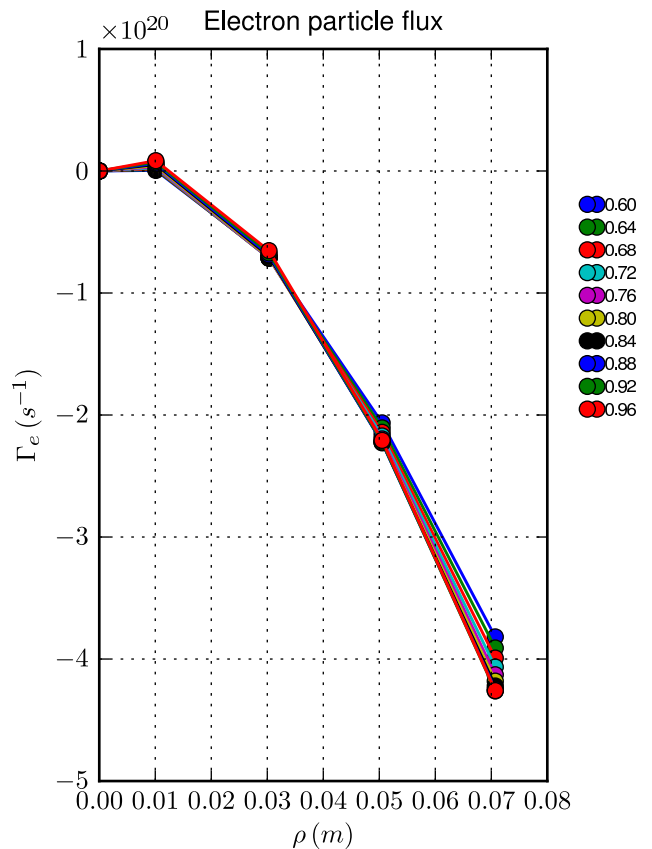Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19\,\mathrm{s}$
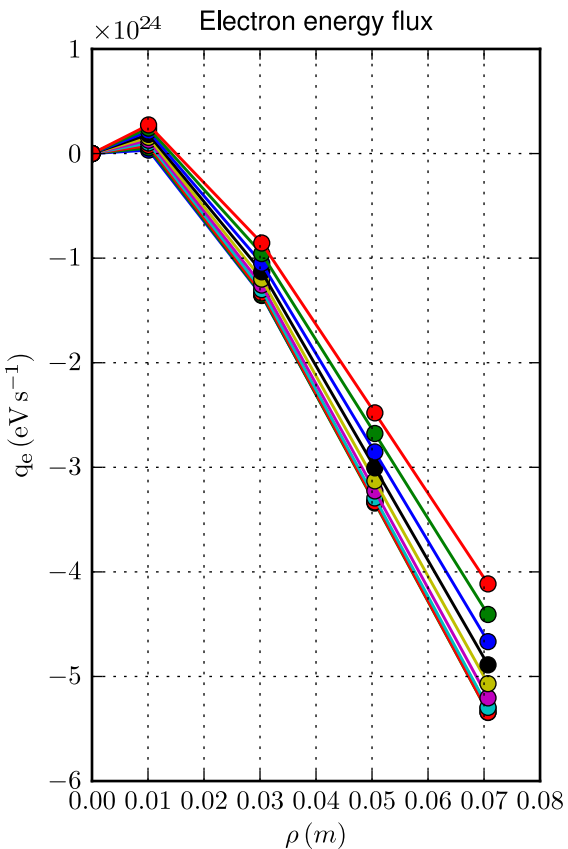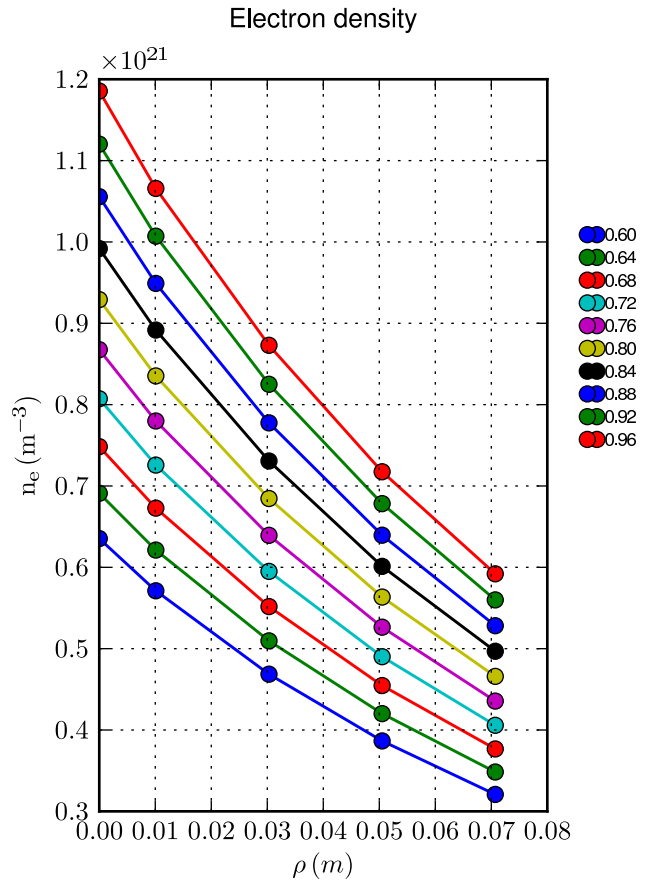
Profiles

Time sampling: last 10 time slices

Profiles

[Case: I.1.5.j, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
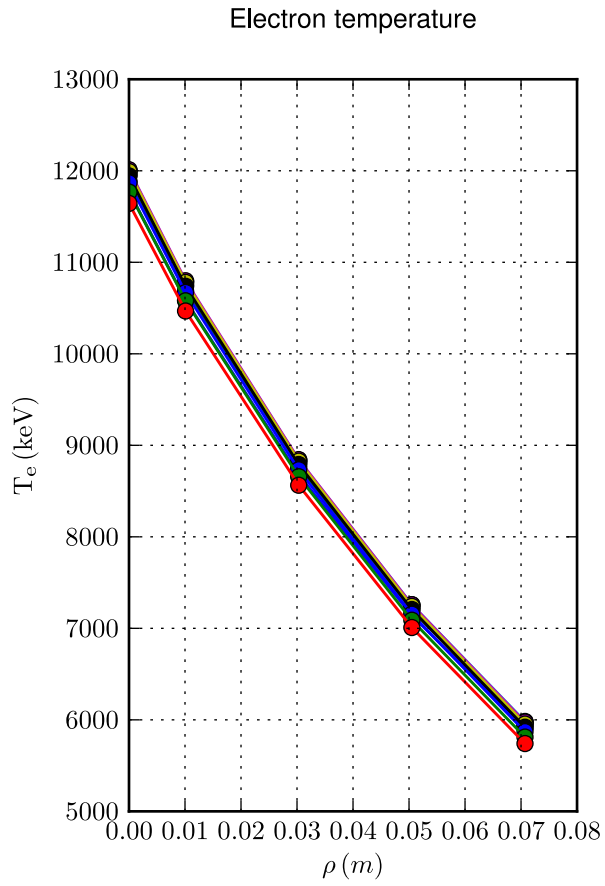
Spatial zoom over magnetic axis; time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 4, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Spatial zoom over edge; time sampling: last 10 time slices

Part. & Energy conservation

[Case: **I.1.5.j**, Solver: 7, $D = 0.1\,\text{m}^2/\text{s}$, $v = -1.00\,\text{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\text{s}$, $N_\rho = 101$]
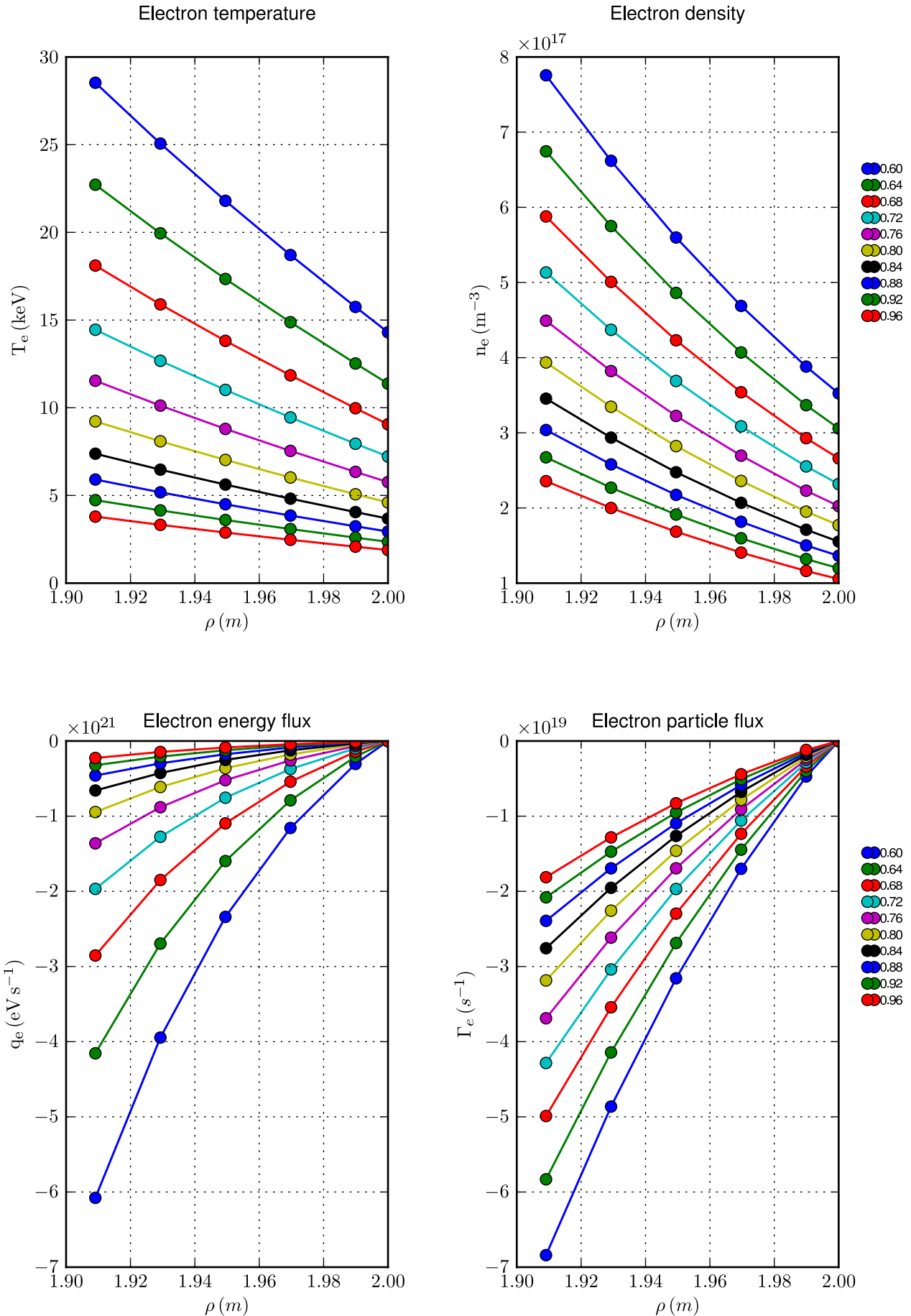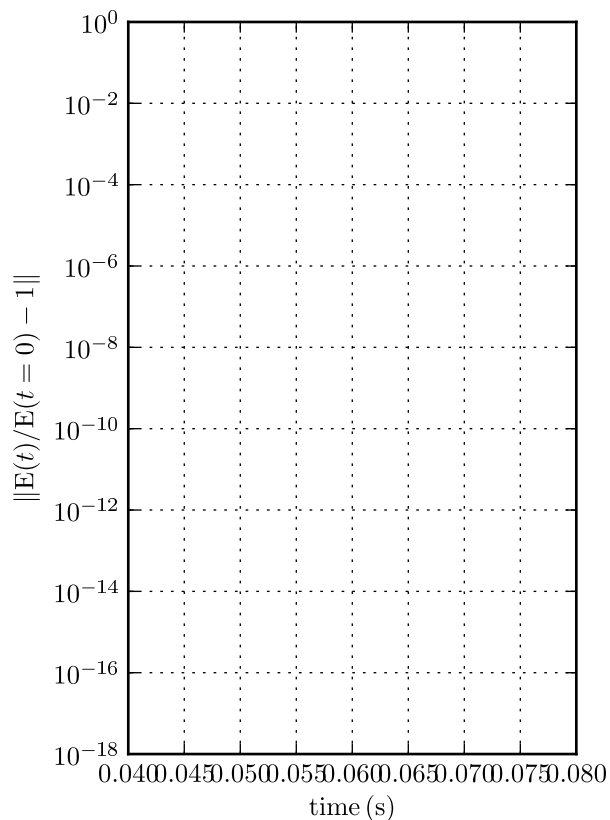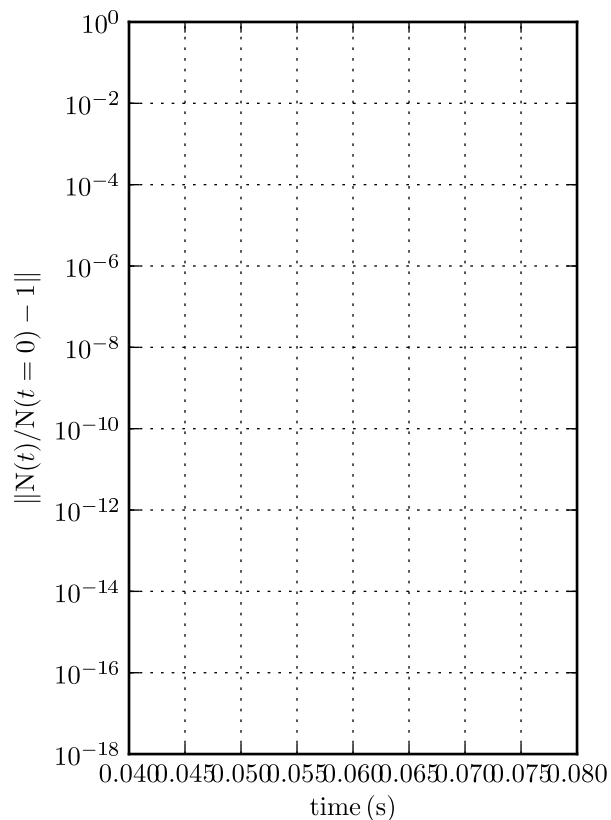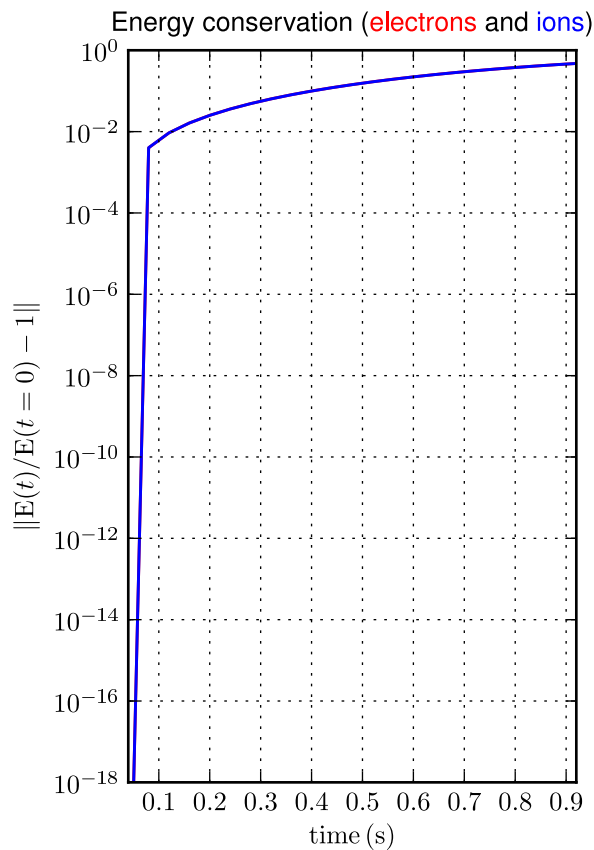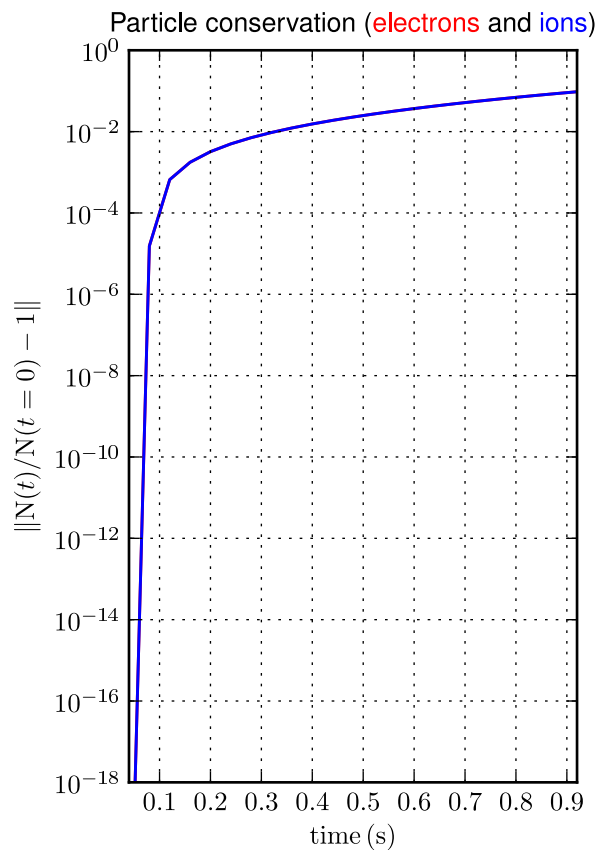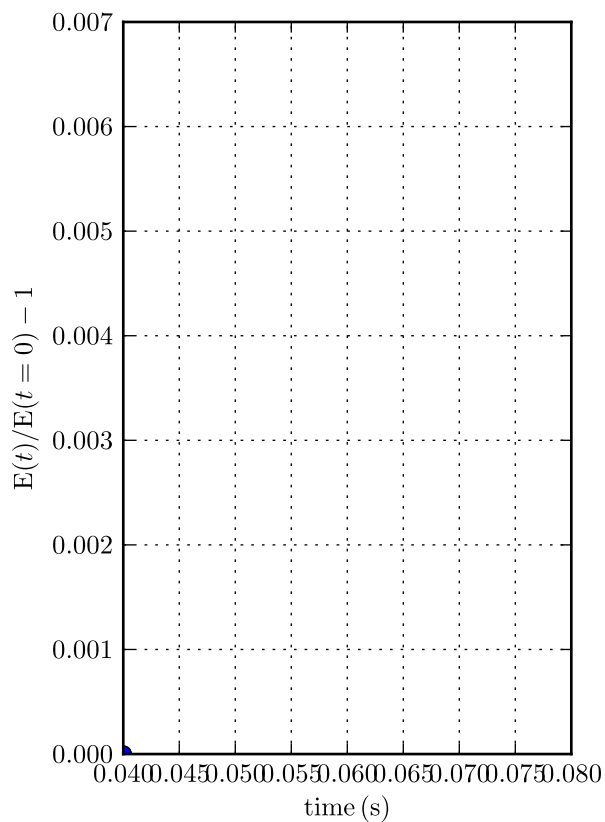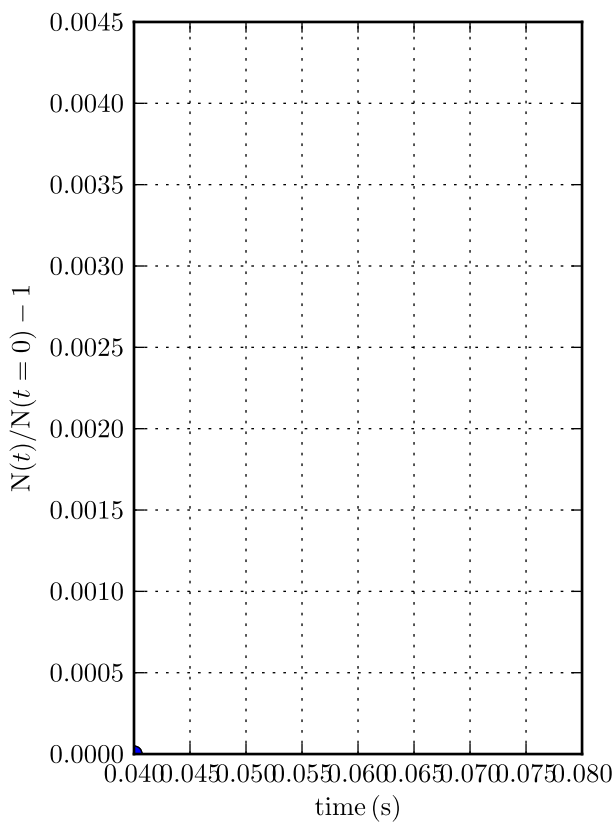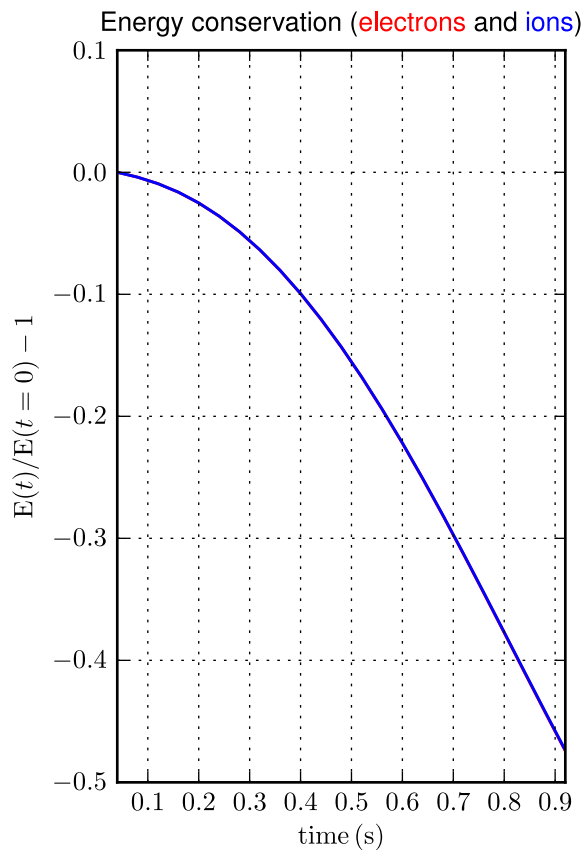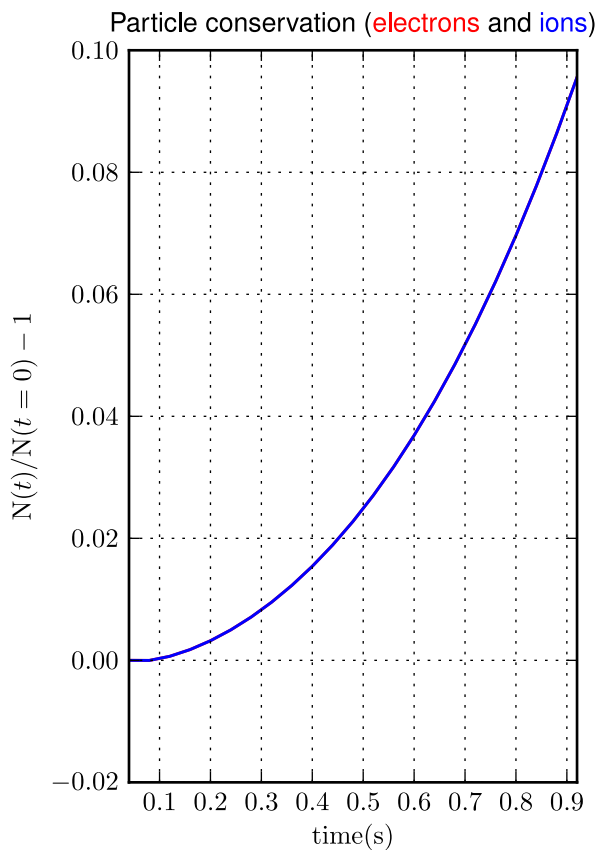
Comparison with initial solution - log scale; total time and zoom over time

Part. & Energy conservation

[Case: **I.1.5.j**, Solver: **7**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
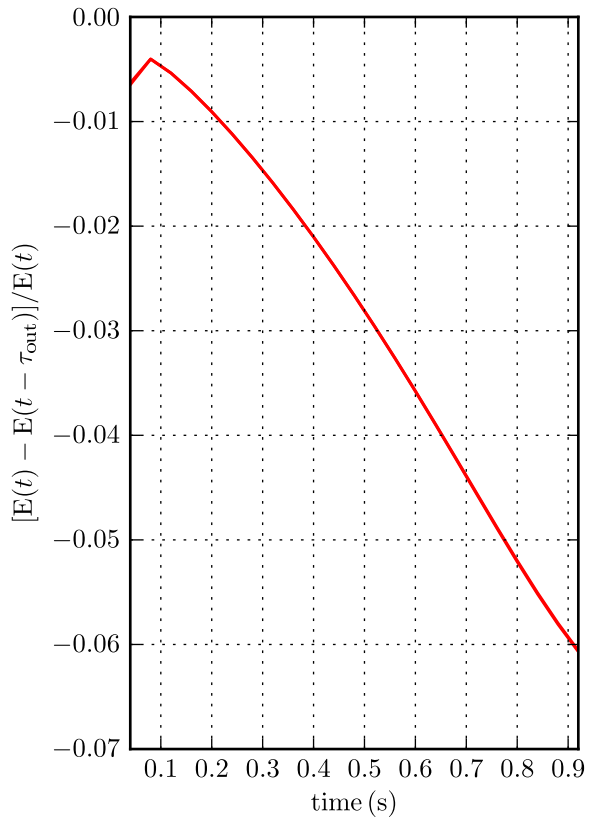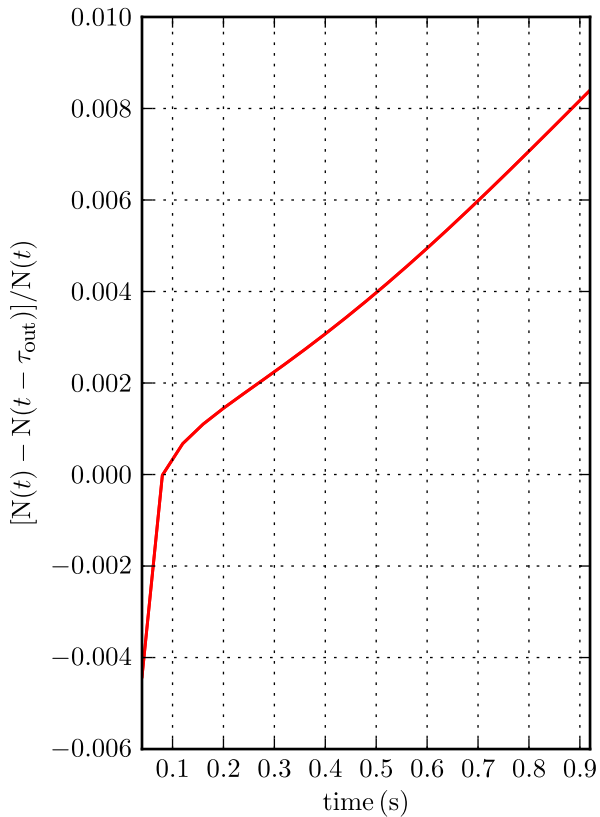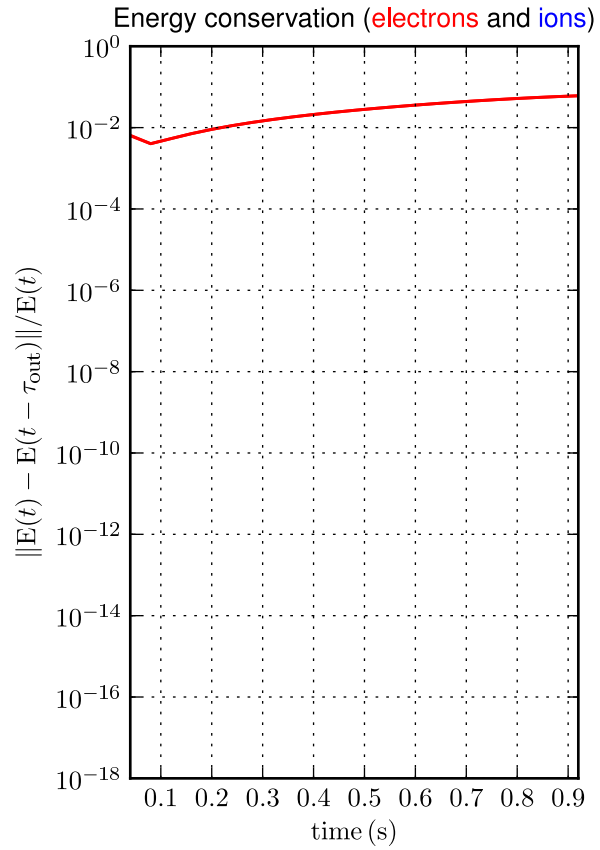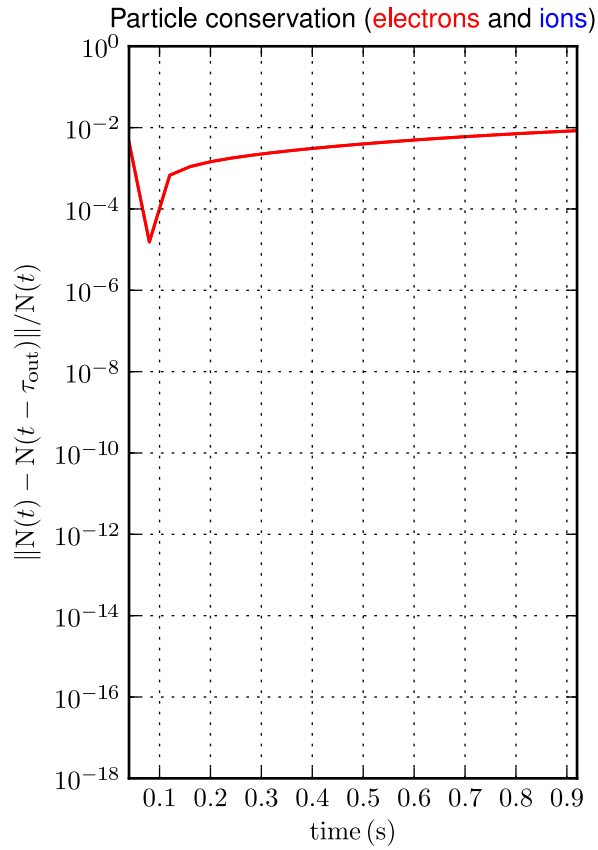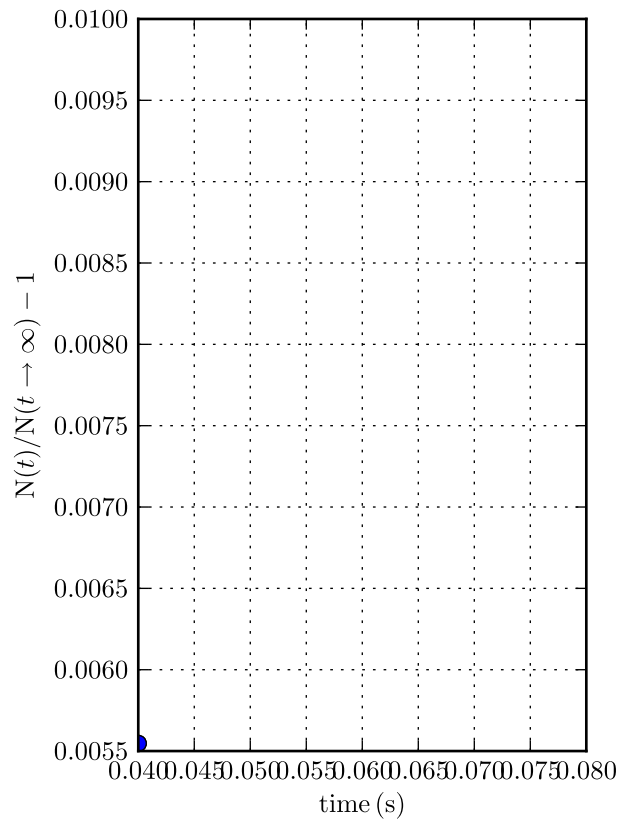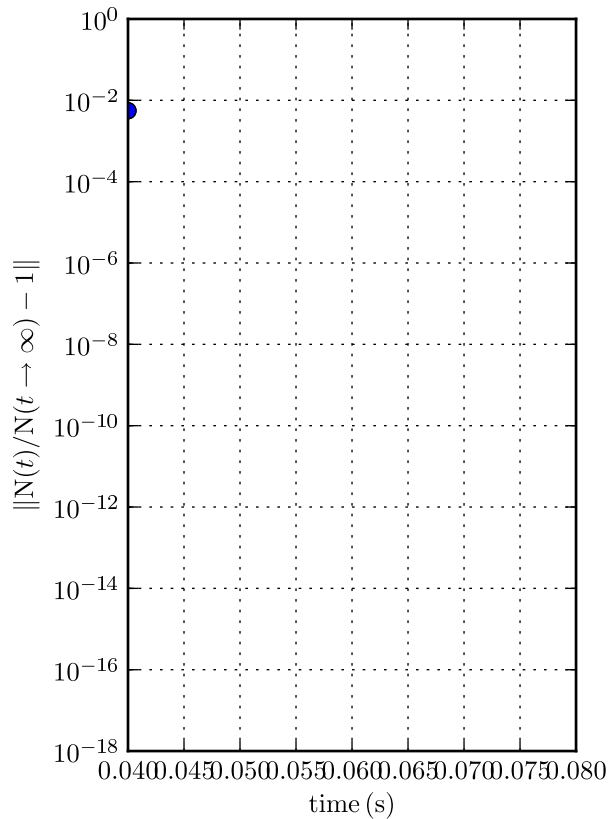
Comparison with initial solution - linear scale; total time and zoom over time

Particle conservation (electrons and ions)

Energy conservation (electrons and ions)

Part. & Energy conservation
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
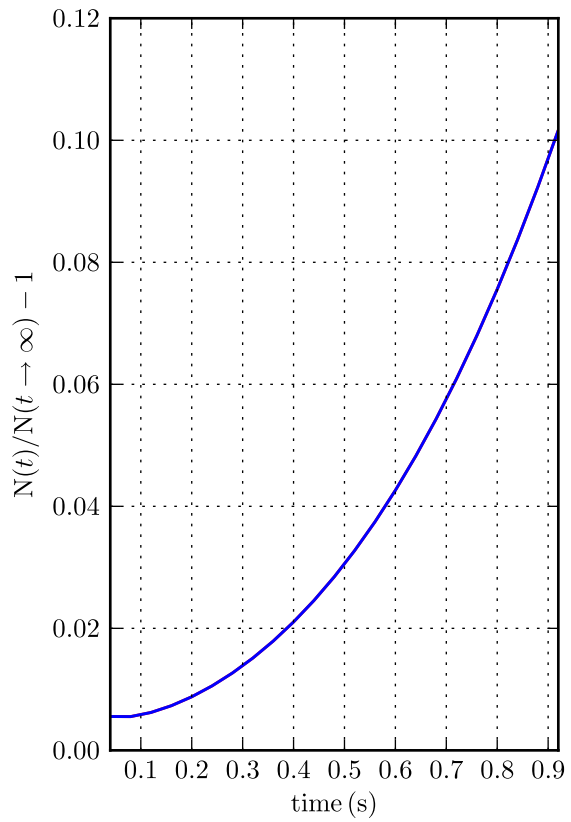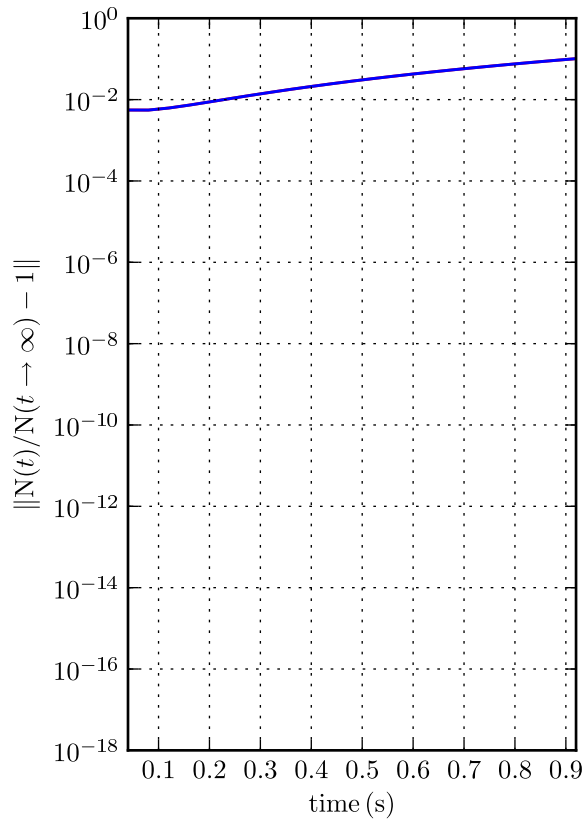Comparison with previous time-sampled (τ_{out}) solution - log and linear scales

Particle conservation

[Case: **I.1.5.j**, Solver: **7**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
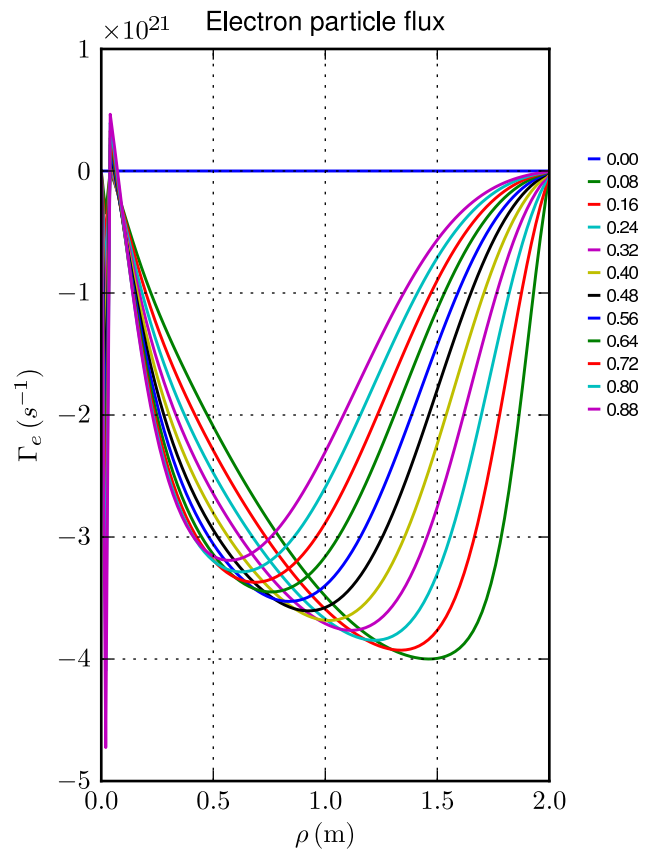
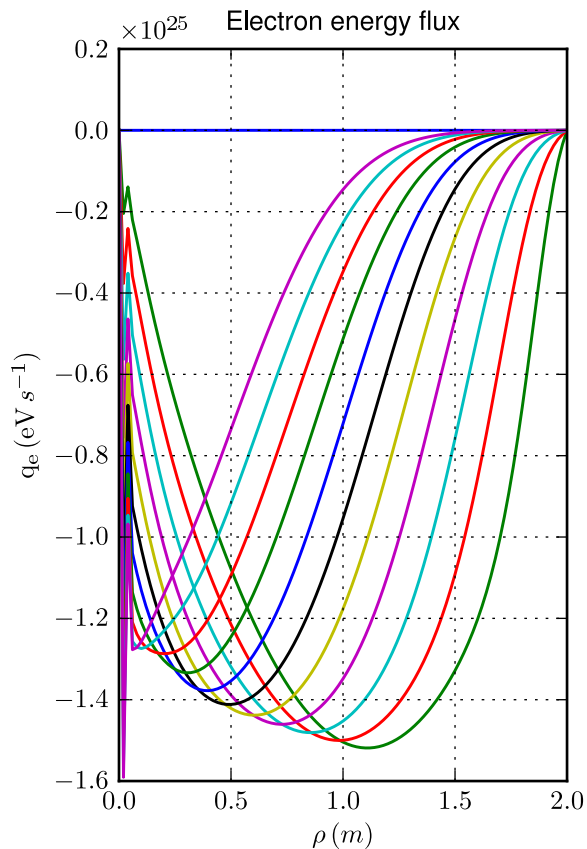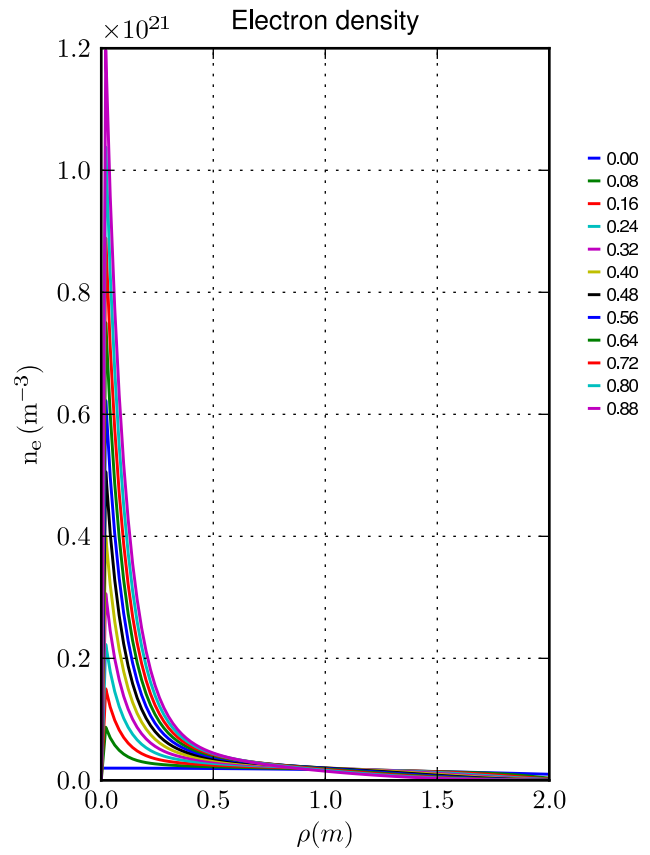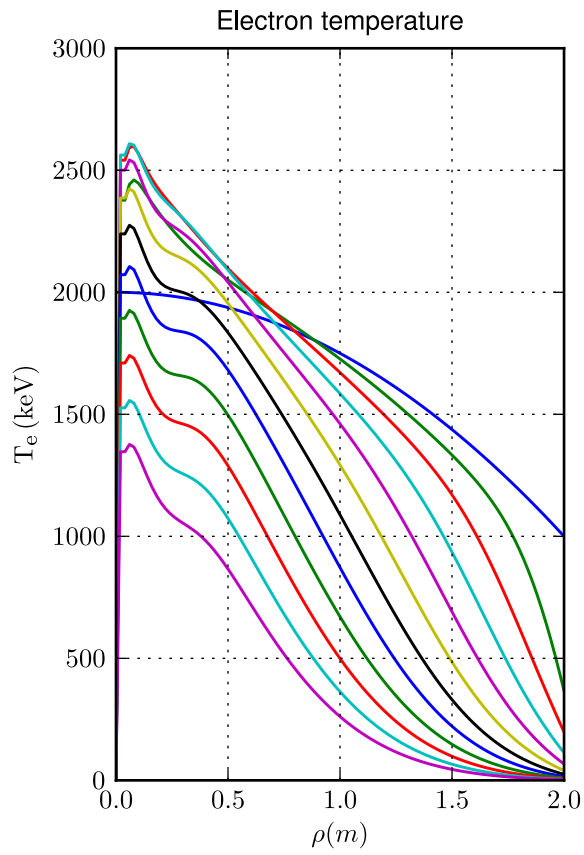Comparison with asymptotic solution (electrons and ions); total time and zoom over time

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
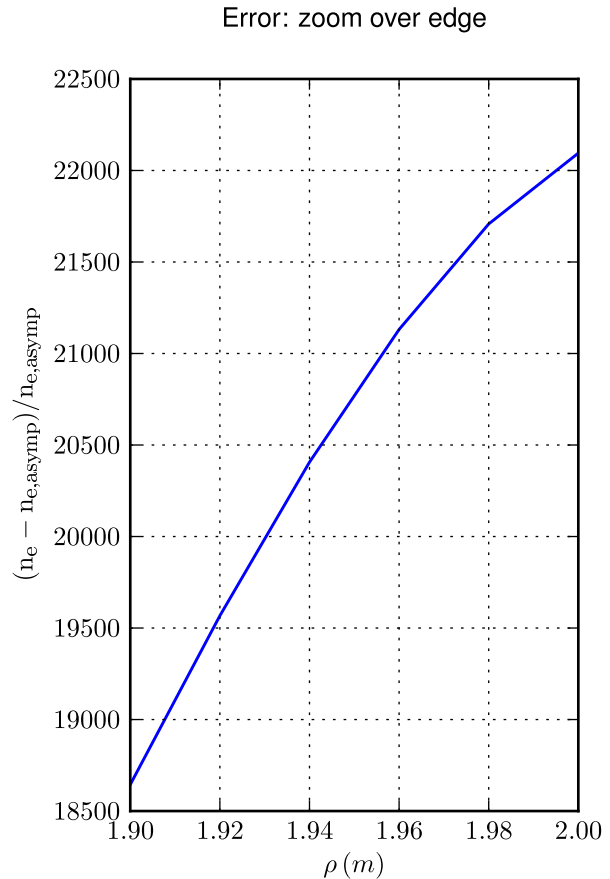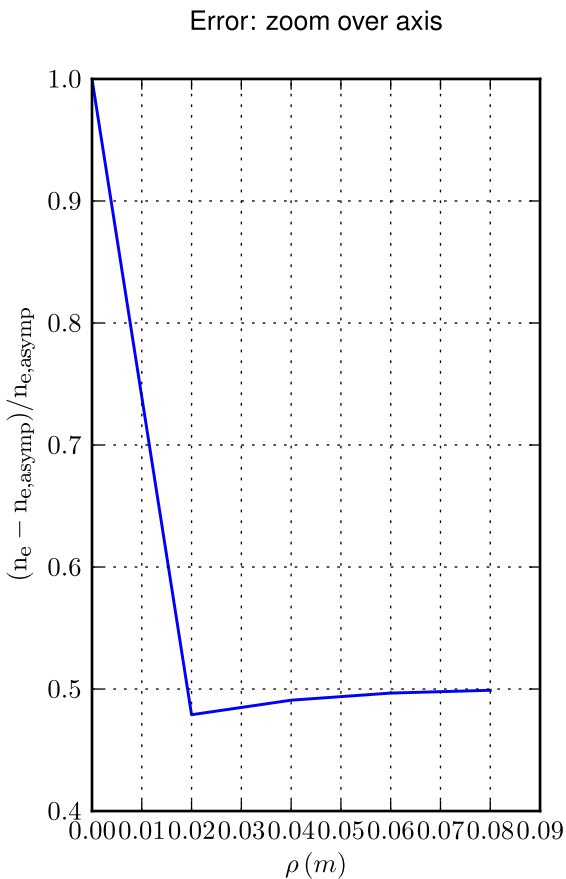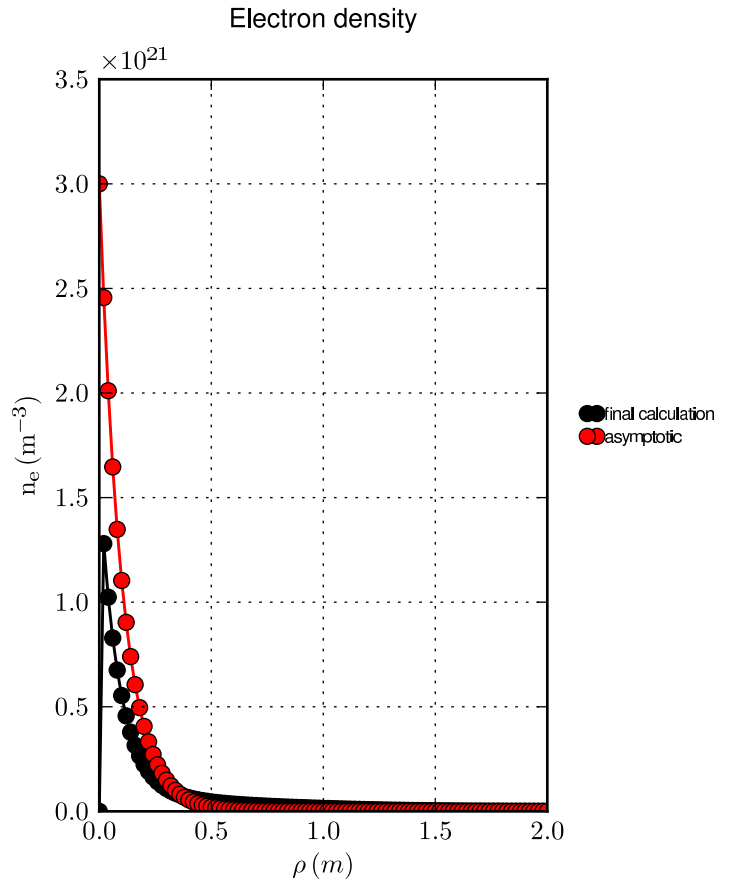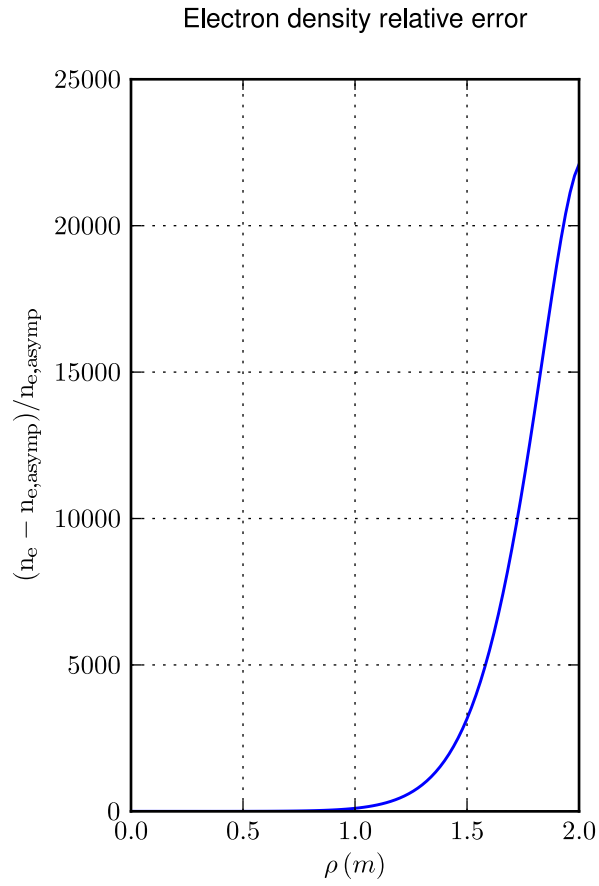Time sampling: total simulation time/10

Profiles

[Case: **I.1.5.j**, Solver: **7**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = \mathbf{4.01}$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
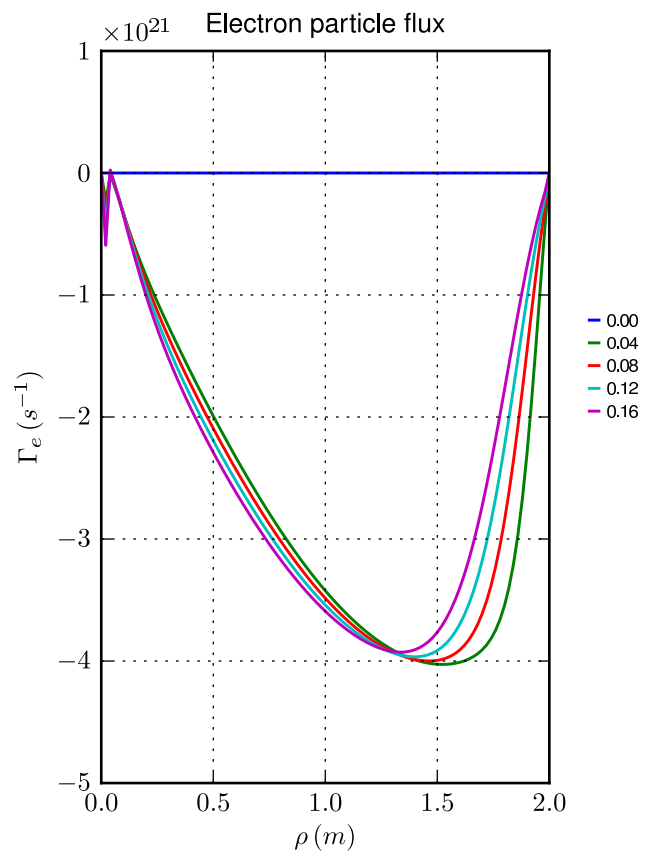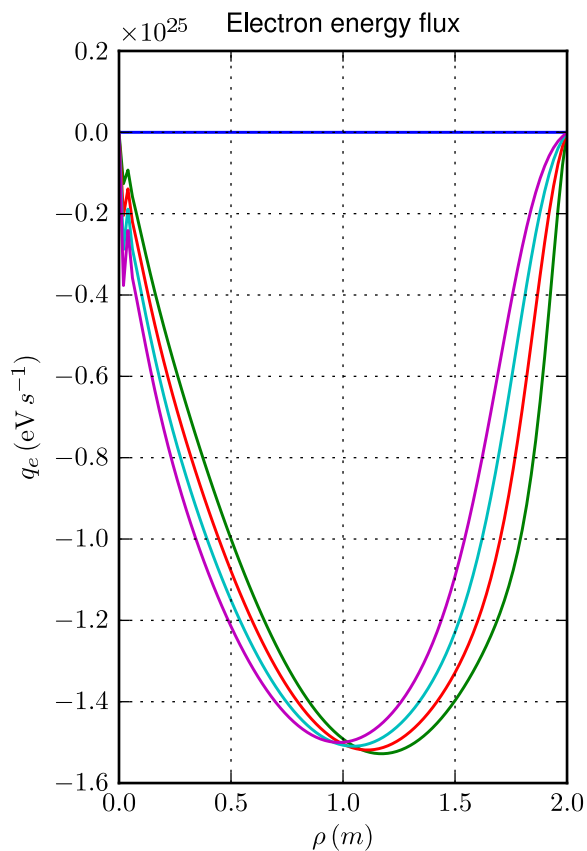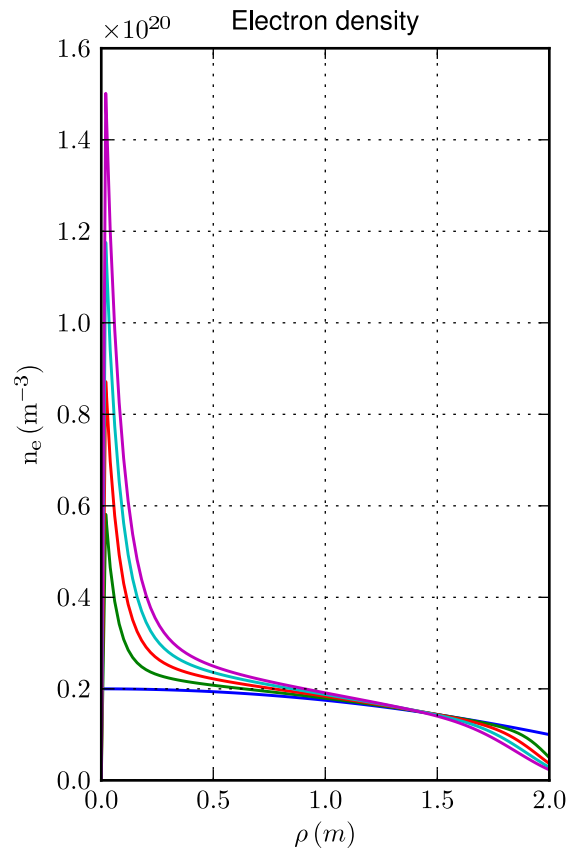
Comparison with asymptotic solution

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
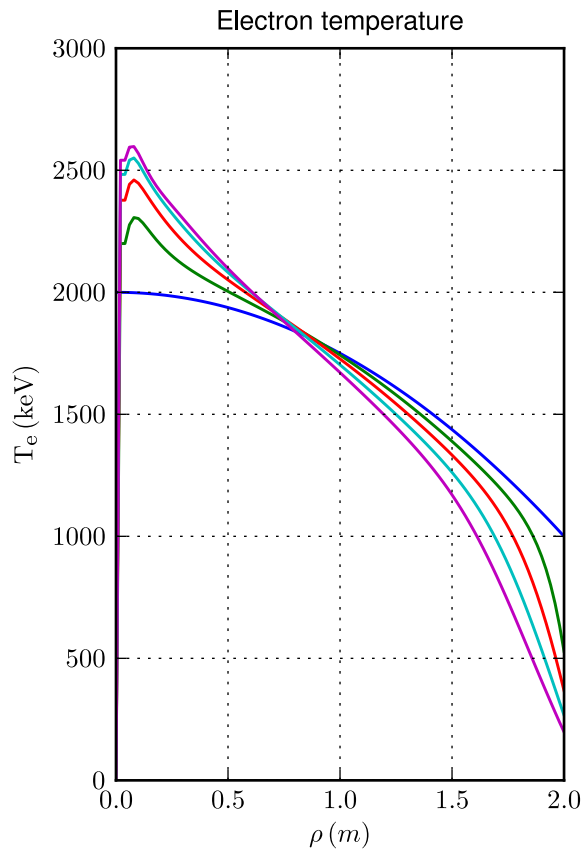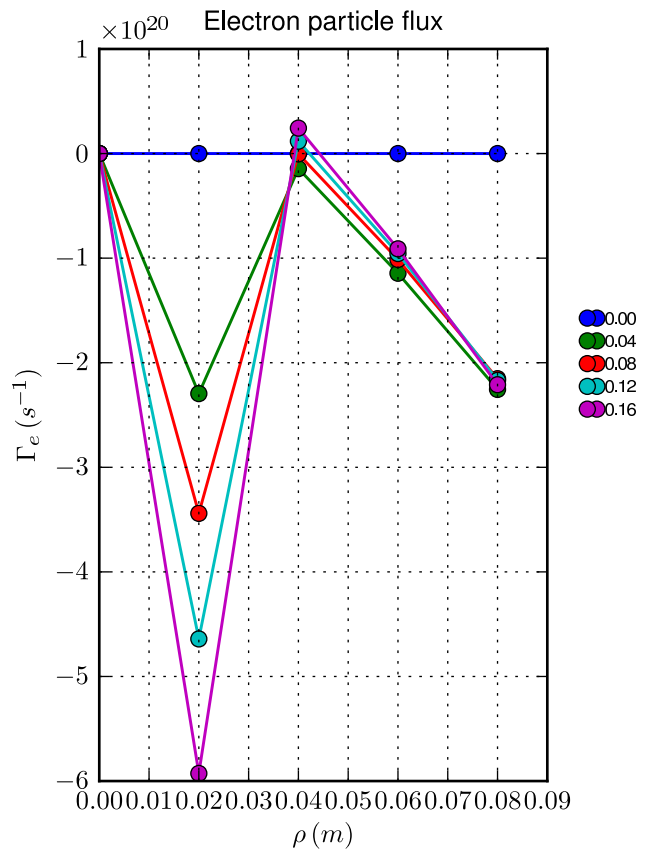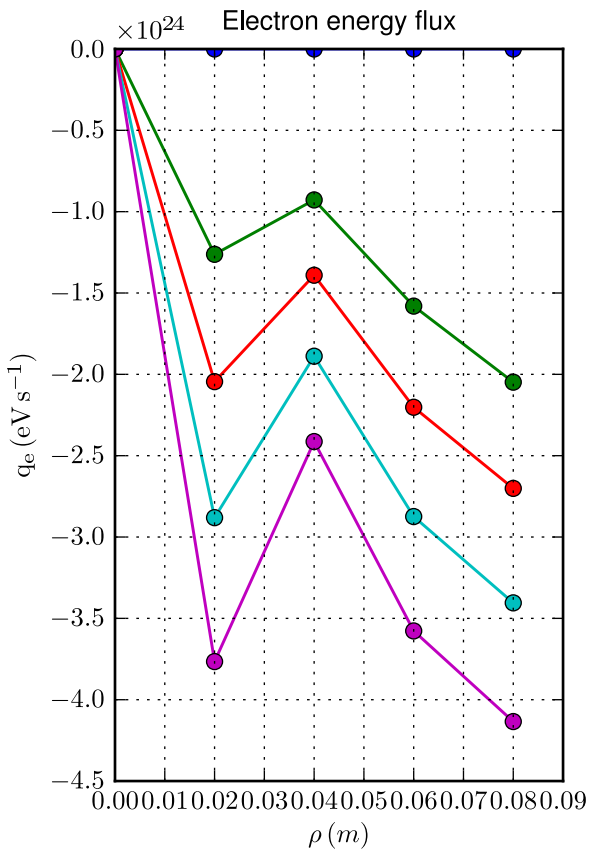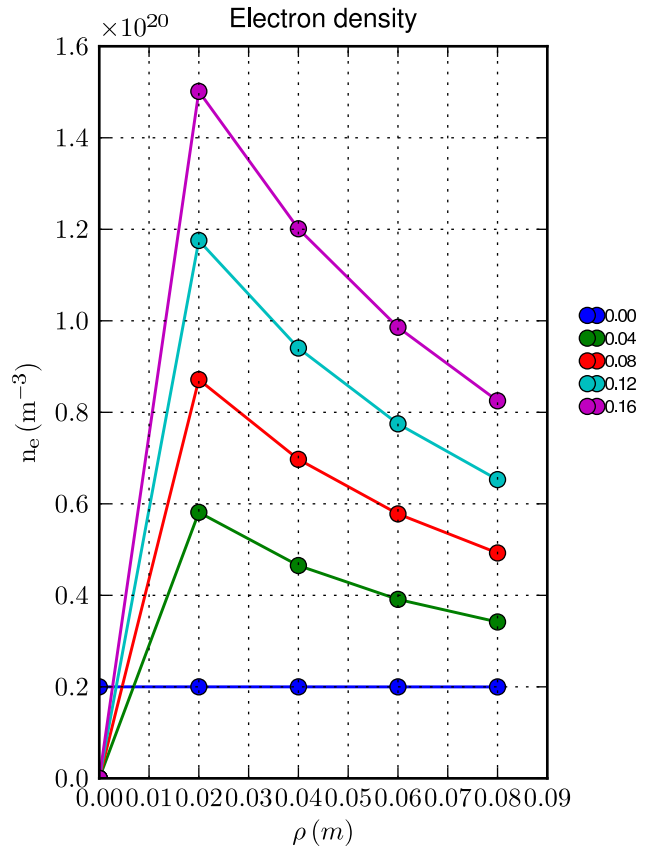Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
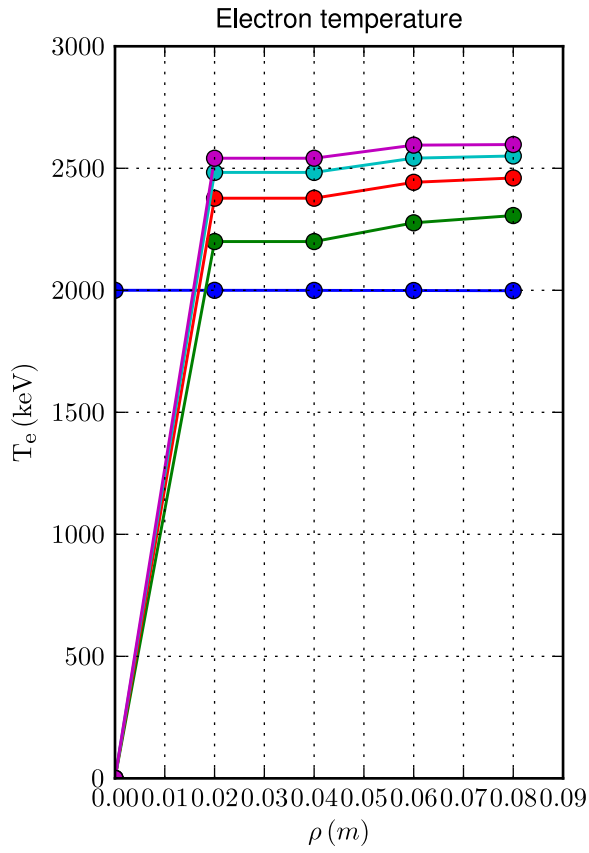
[Case: **I.1.5.j**, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]

Spatial zoom over magnetic axis

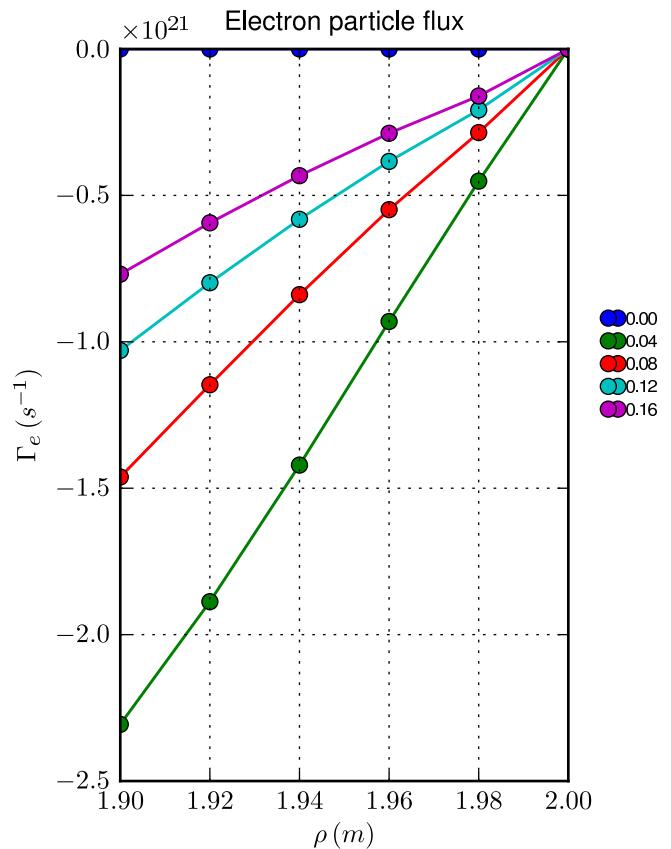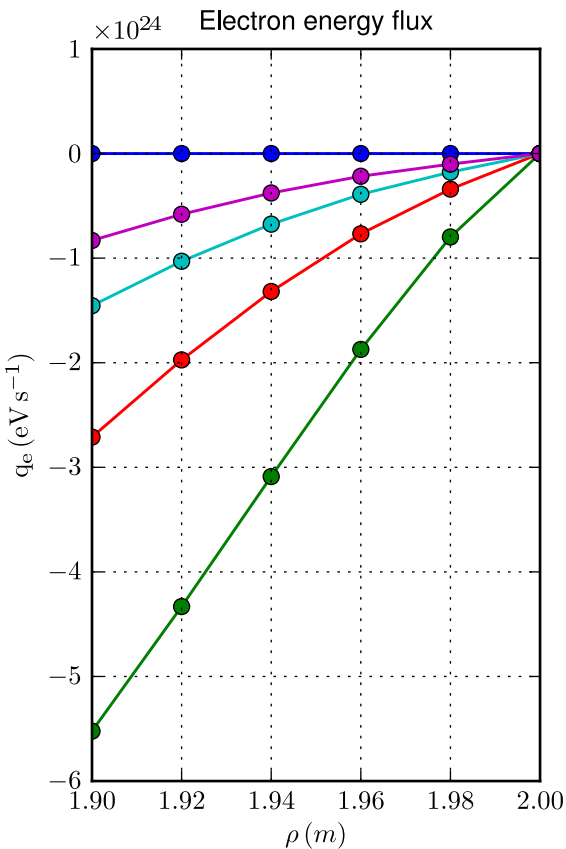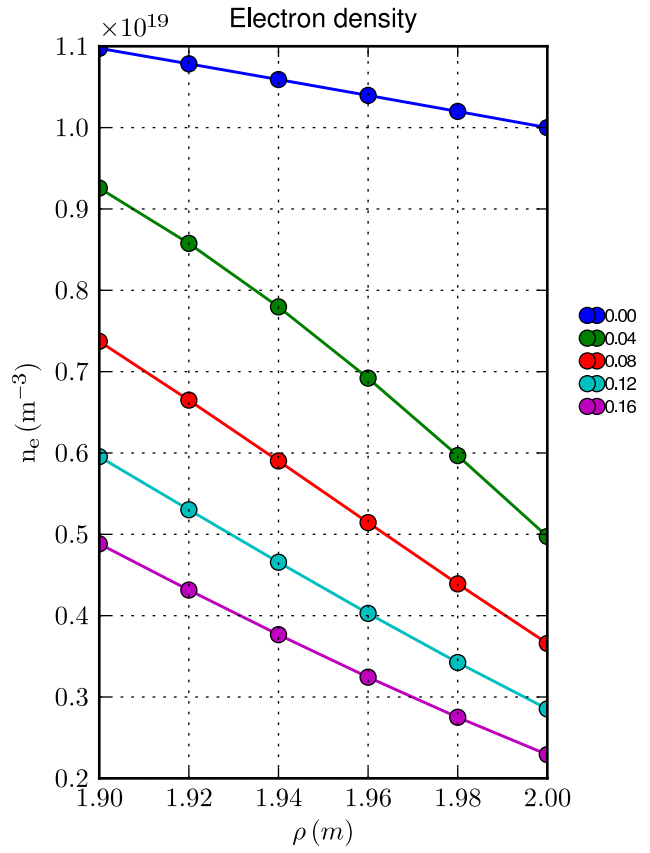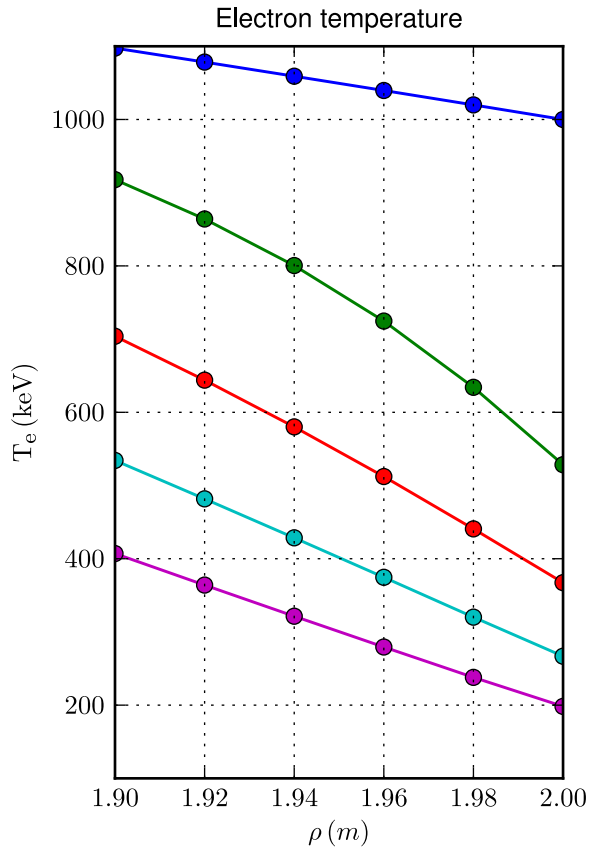Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
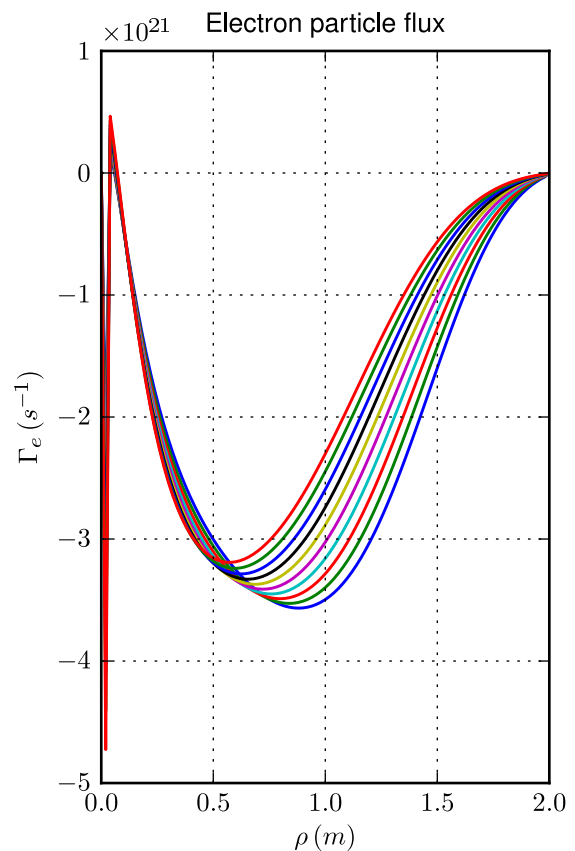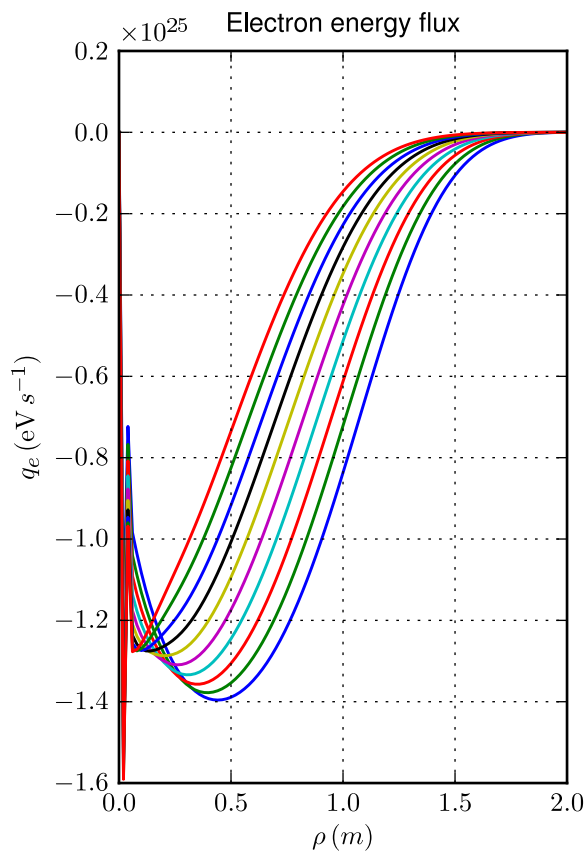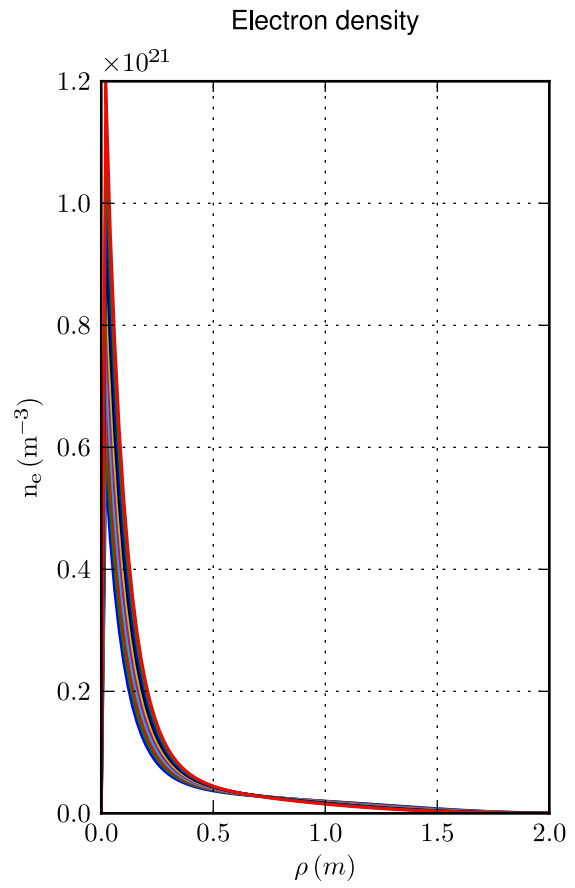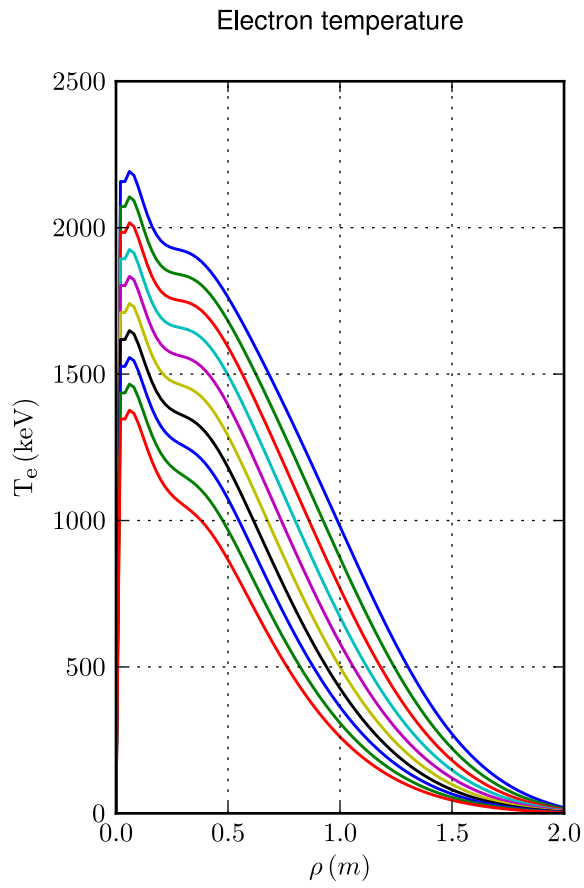Spatial zoom over edge
Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
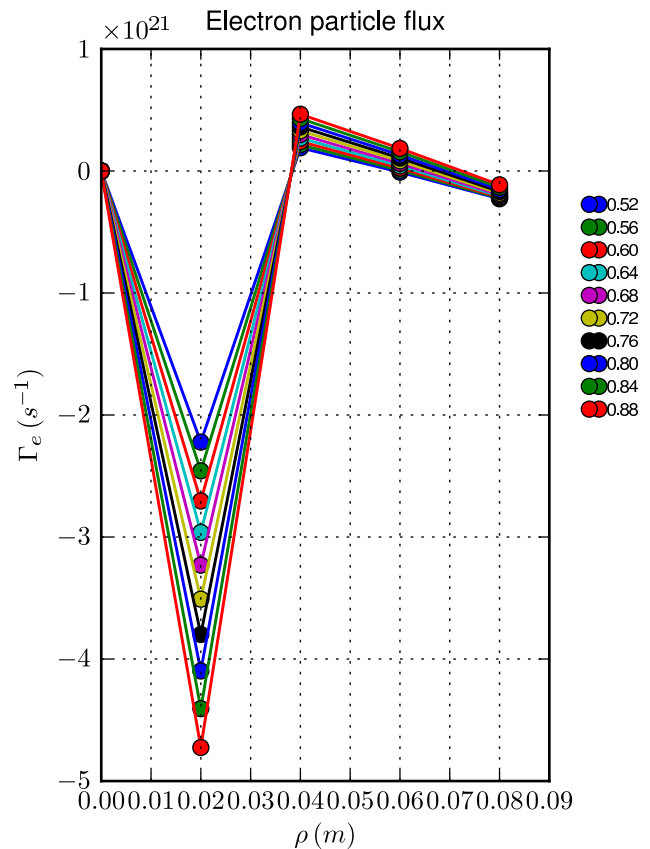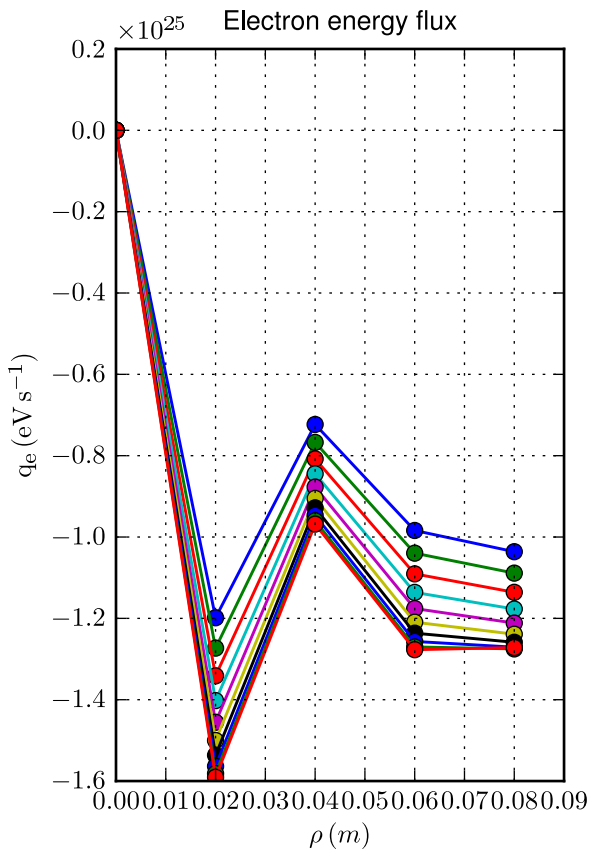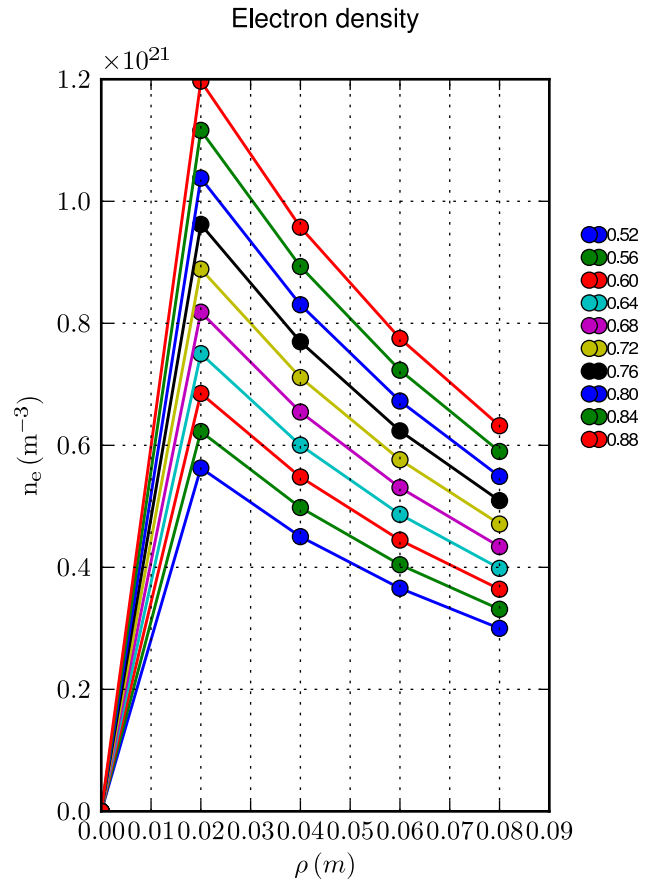Time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
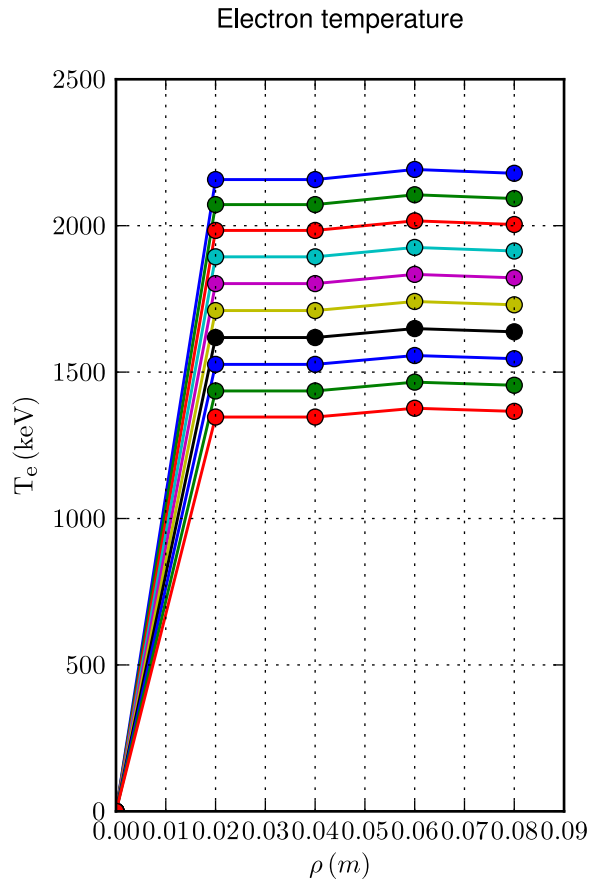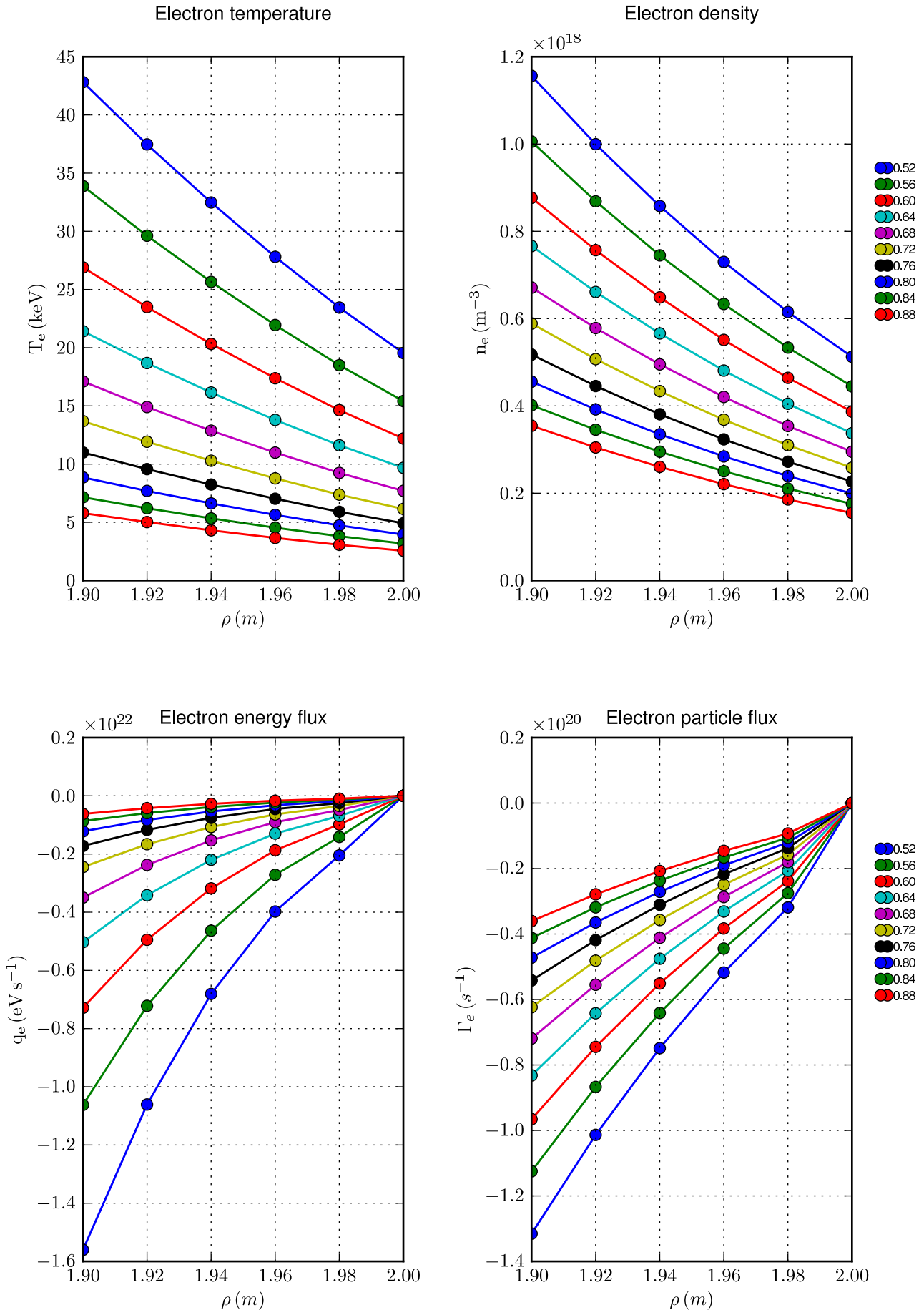Spatial zoom over magnetic axis; time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 7, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
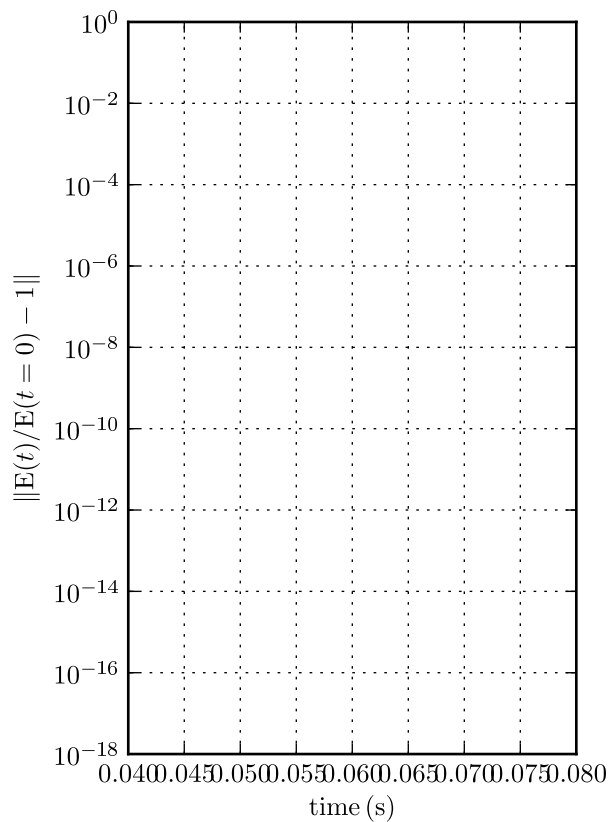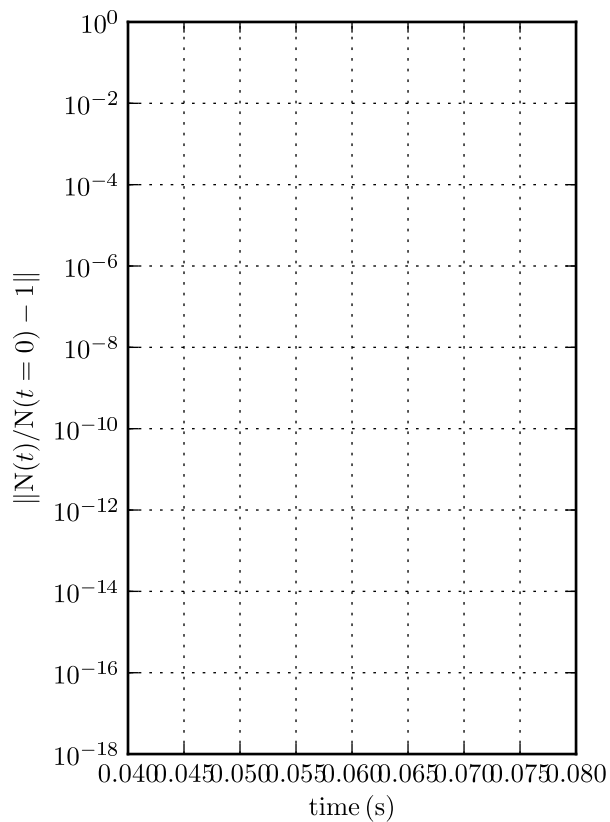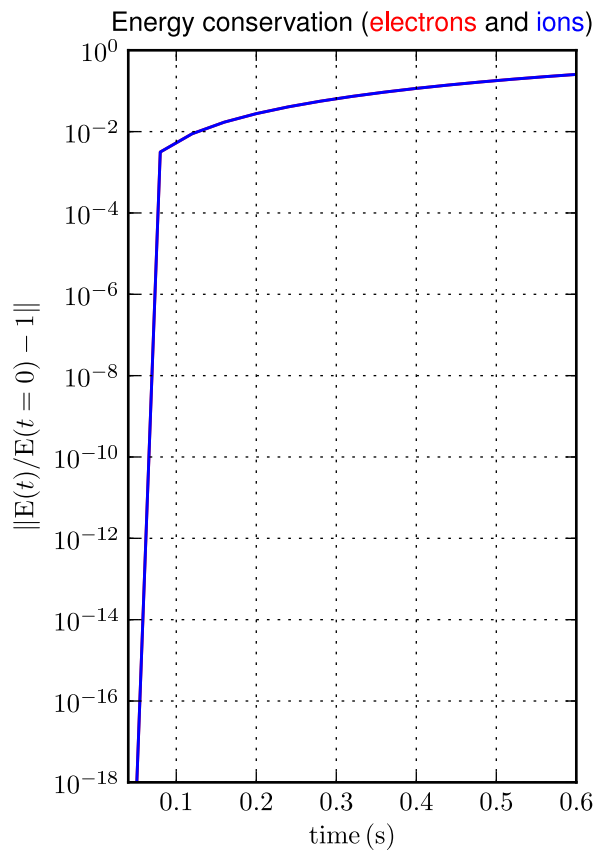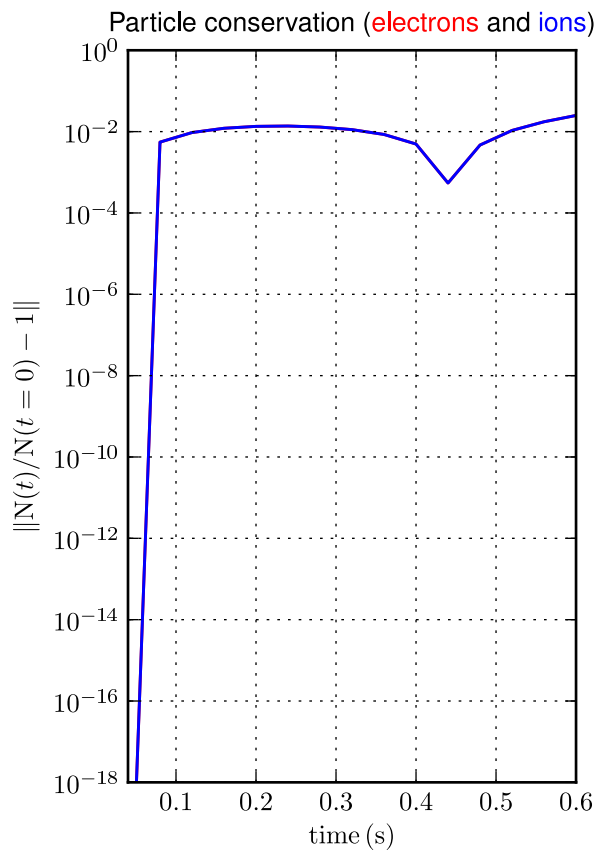Spatial zoom over edge; time sampling: last 10 time slices

Part. & Energy conservation

[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = 4.01, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
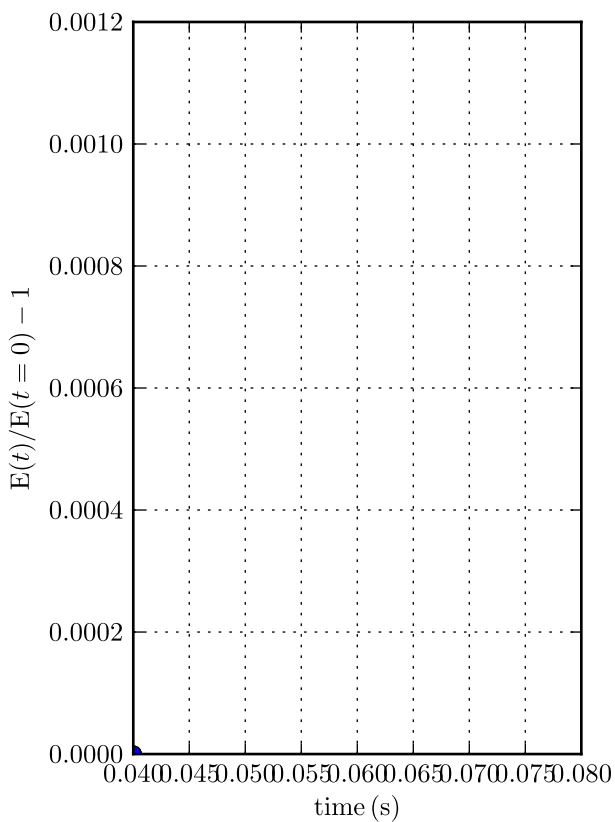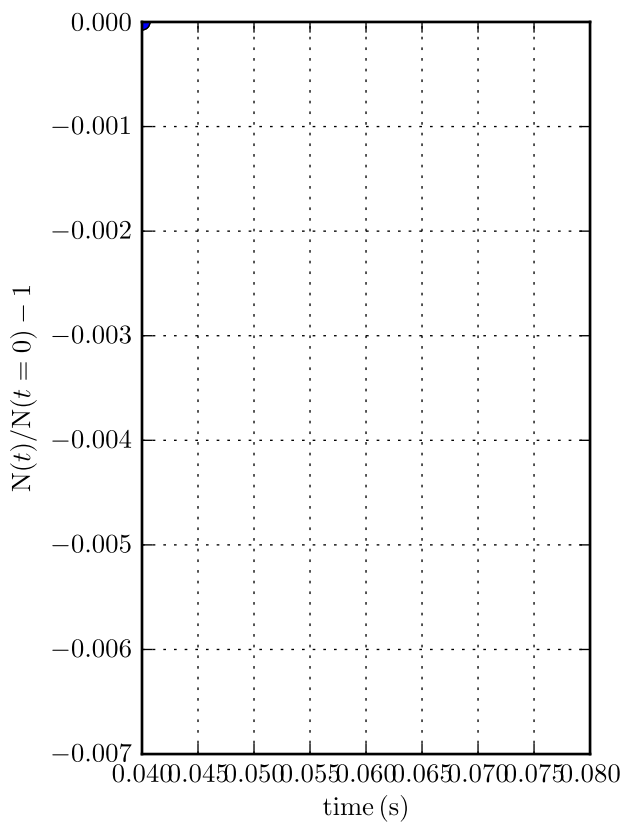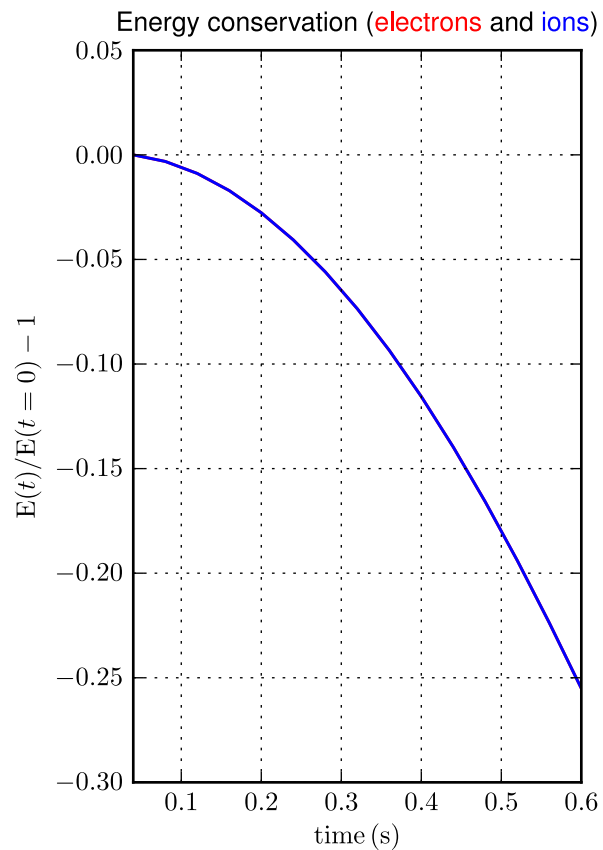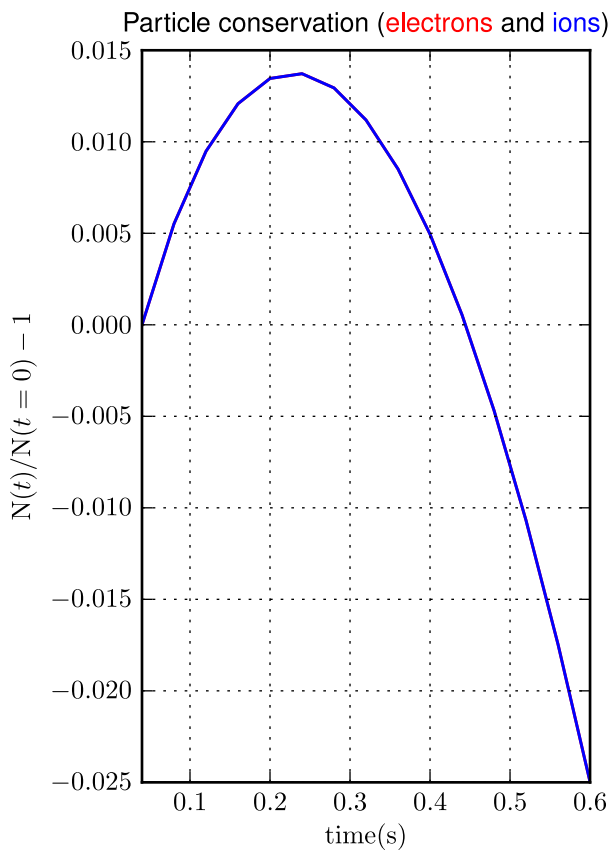
Comparison with initial solution - log scale; total time and zoom over time

Part. & Energy conservation
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m}^2/\mathrm{s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
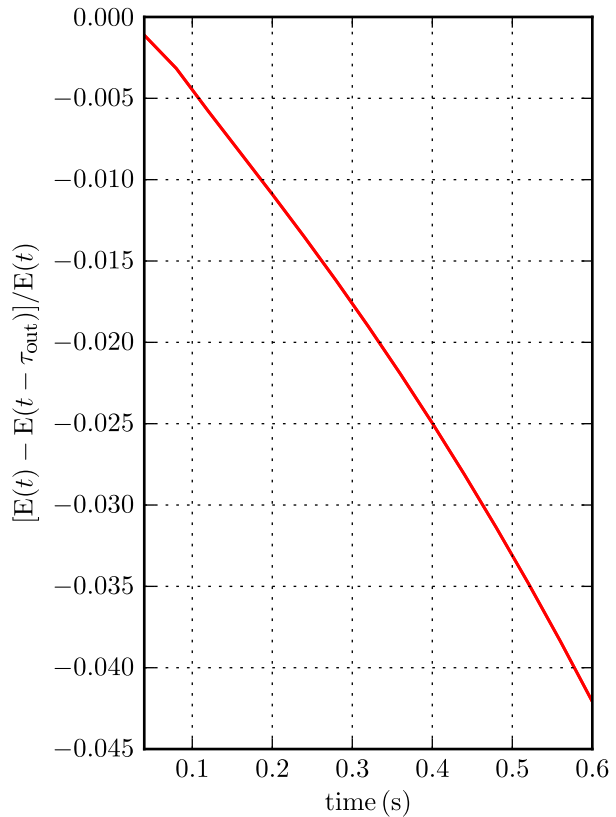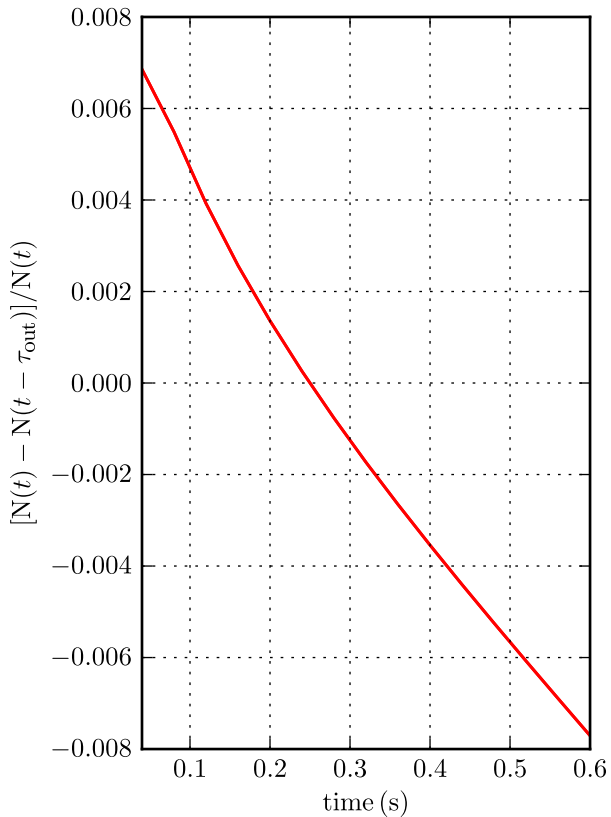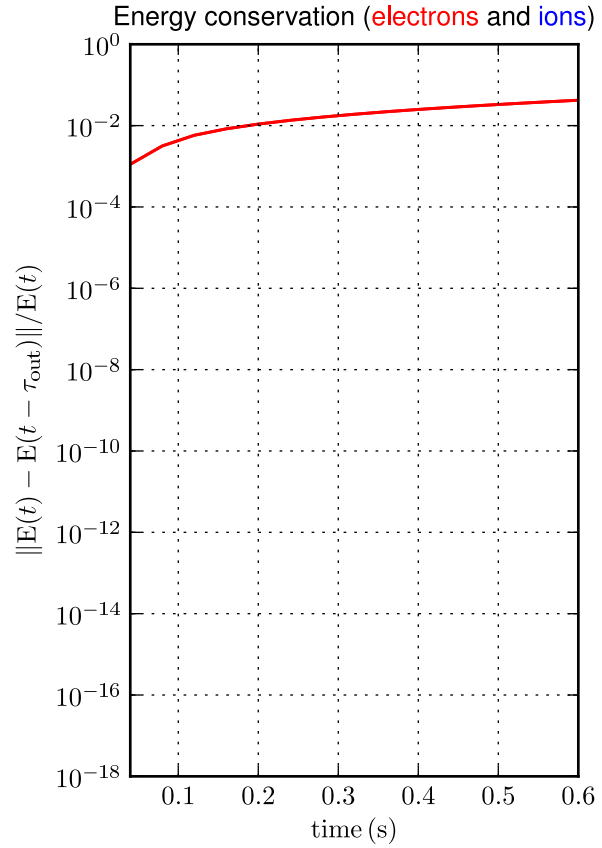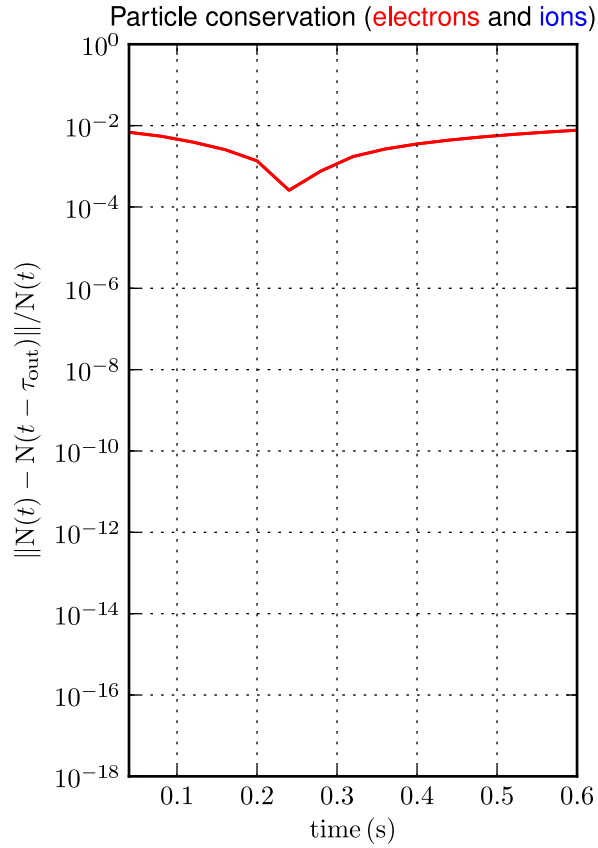Comparison with initial solution - linear scale; total time and zoom over time

Part. & Energy conservation
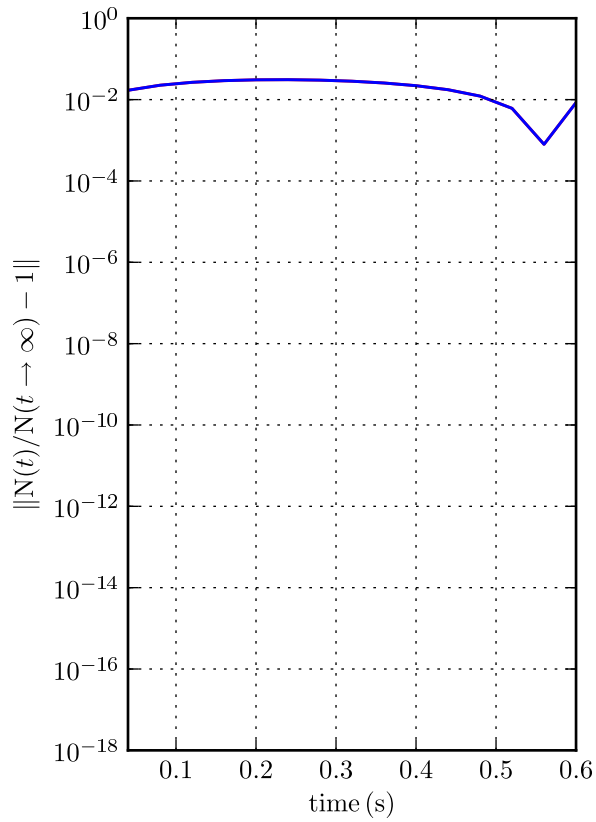[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Comparison with previous time-sampled (τ_{out}) solution - log and linear scales

Particle conservation

[Case: **I.1.5.j**, Solver: **10**, $D = 0.1\,\mathrm{m}^2/\mathrm{s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Comparison with asymptotic solution (electrons and ions); total time and zoom over time
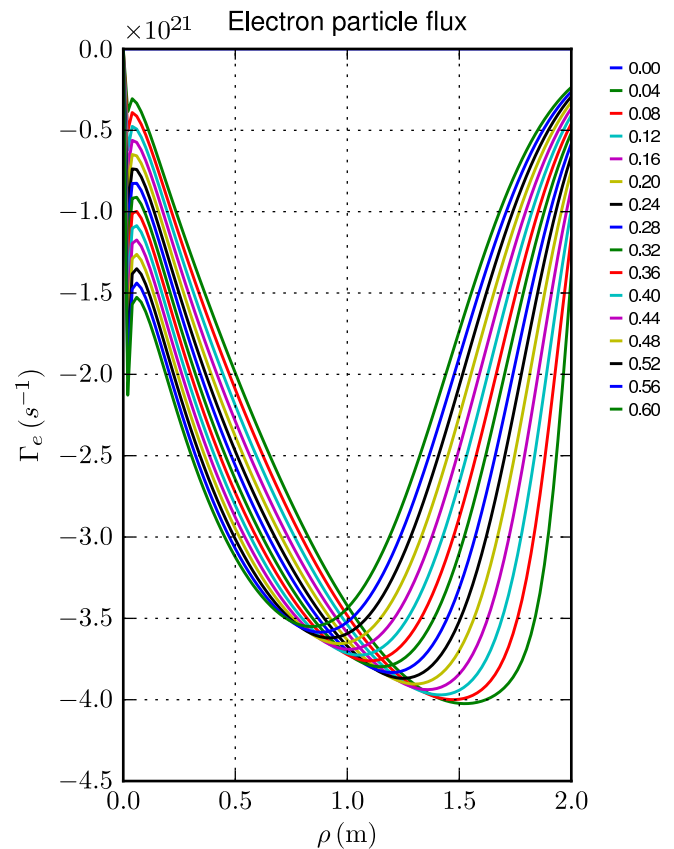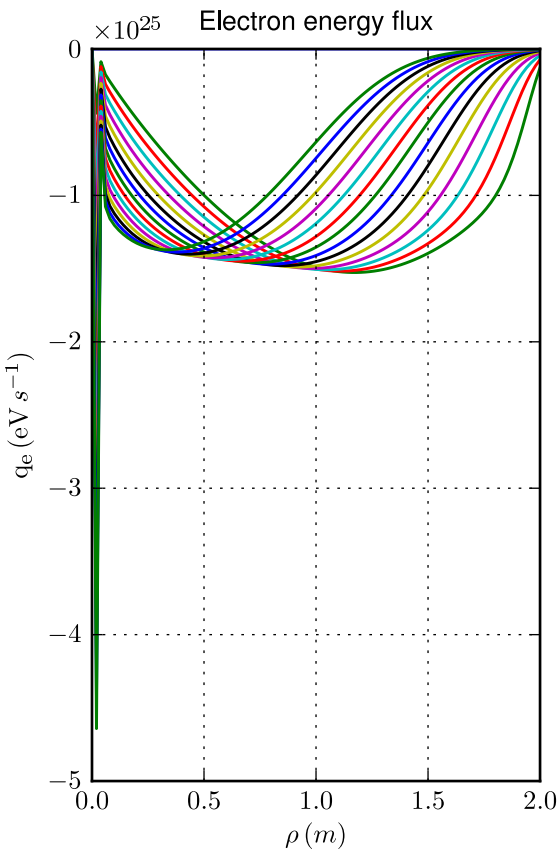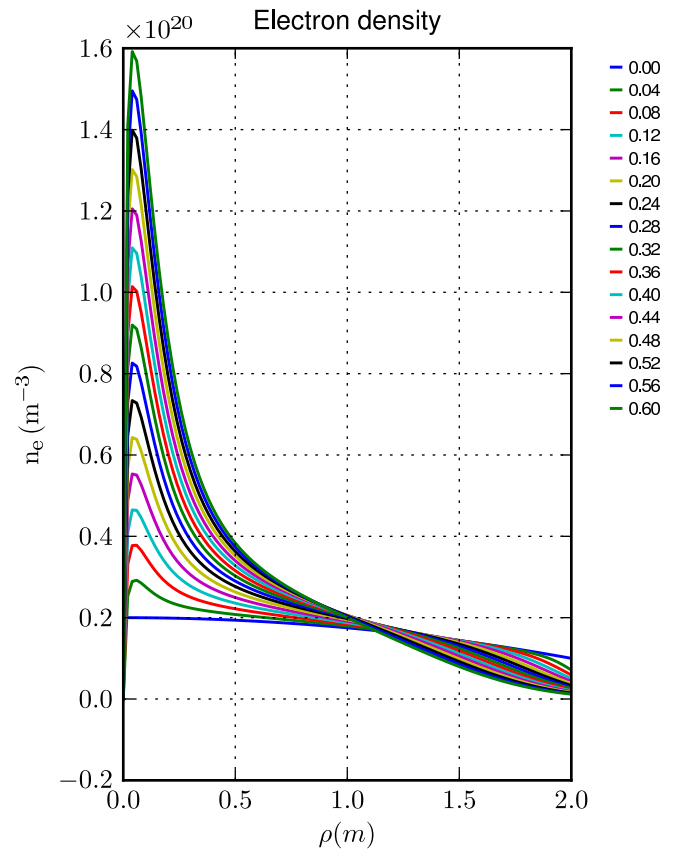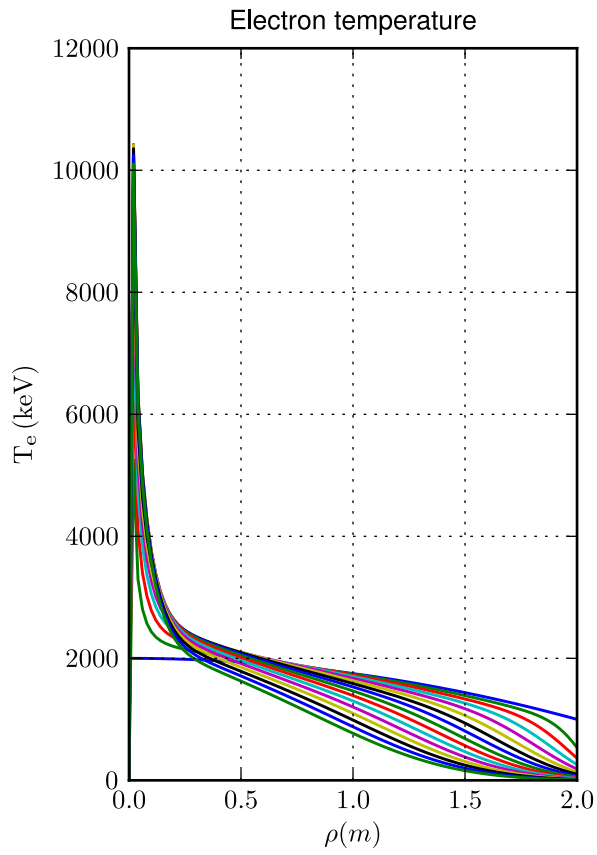
Profiles
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
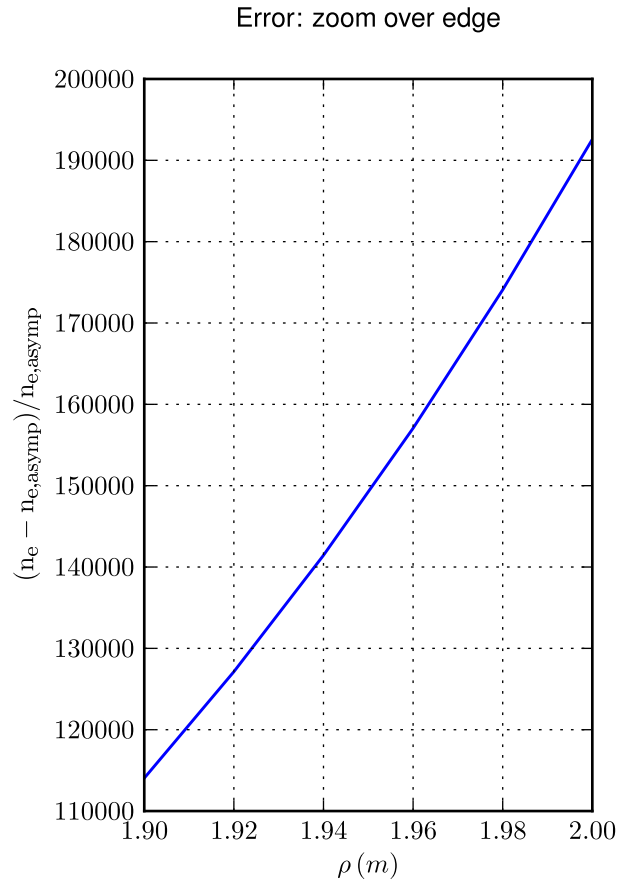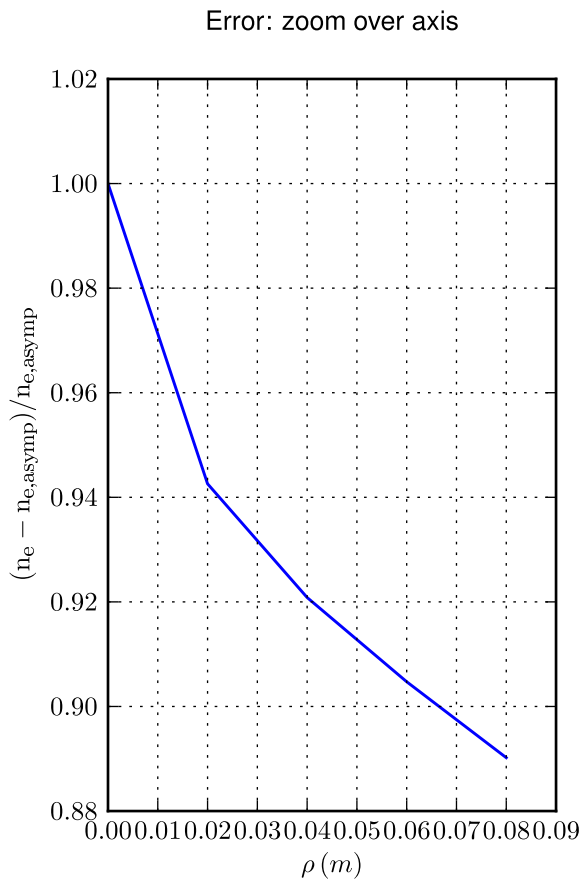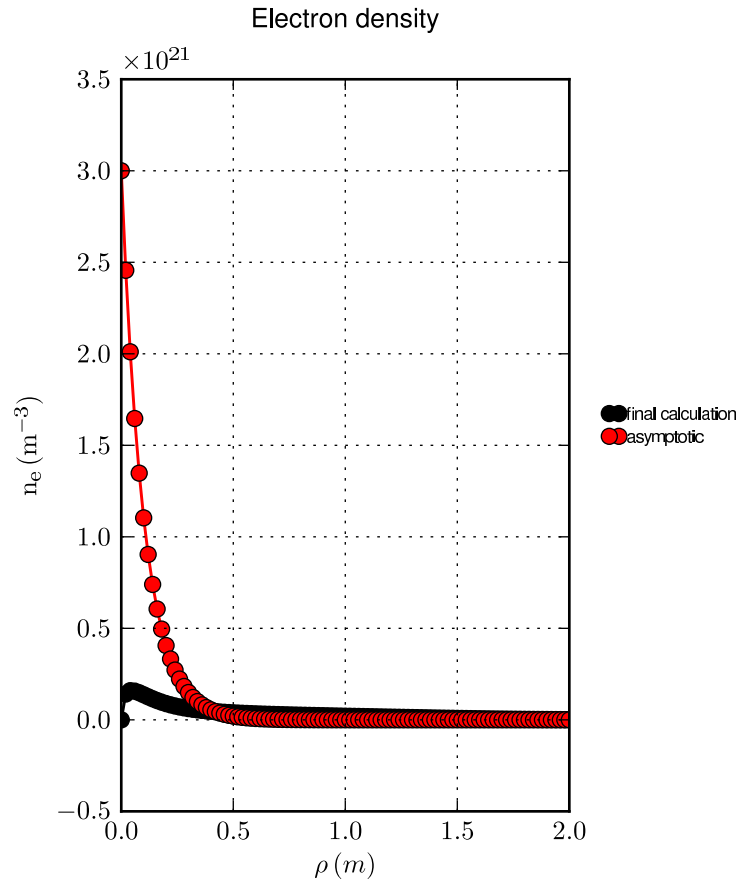Time sampling: total simulation time/10

Profiles

[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
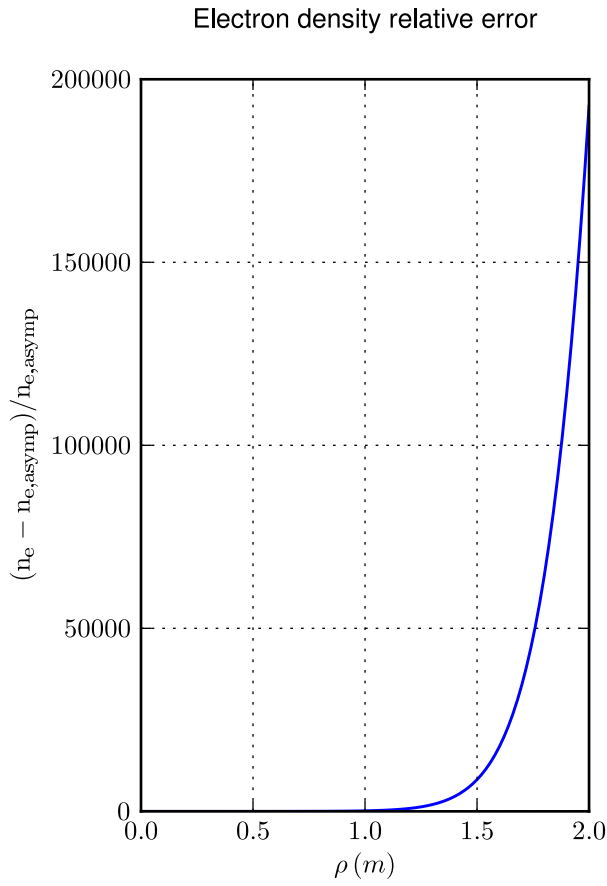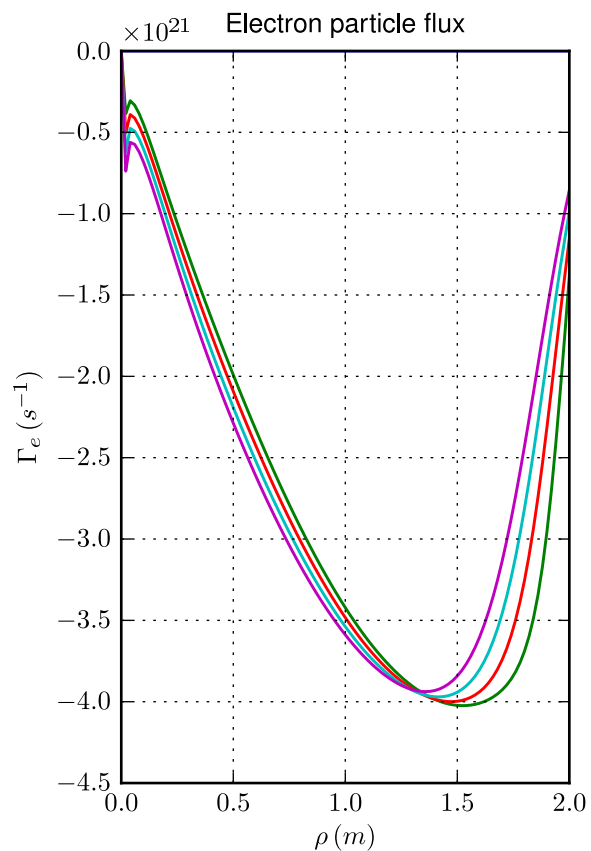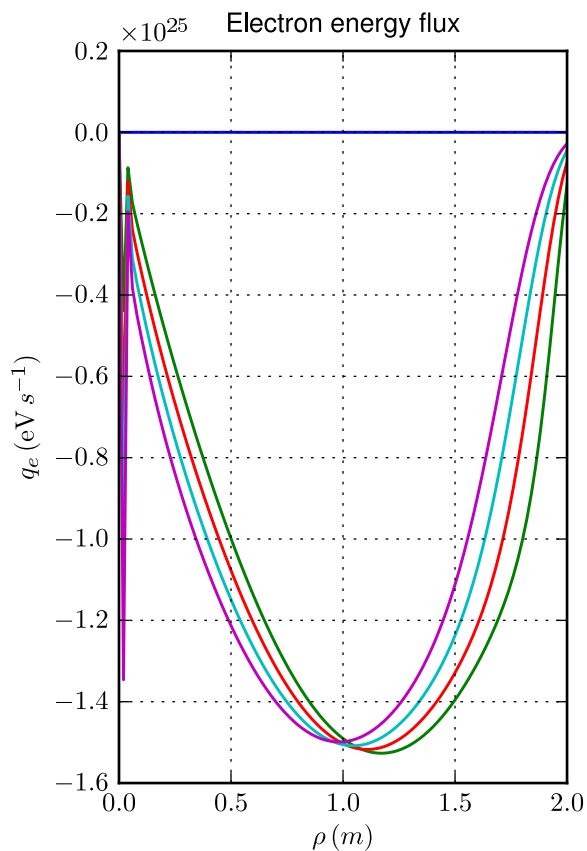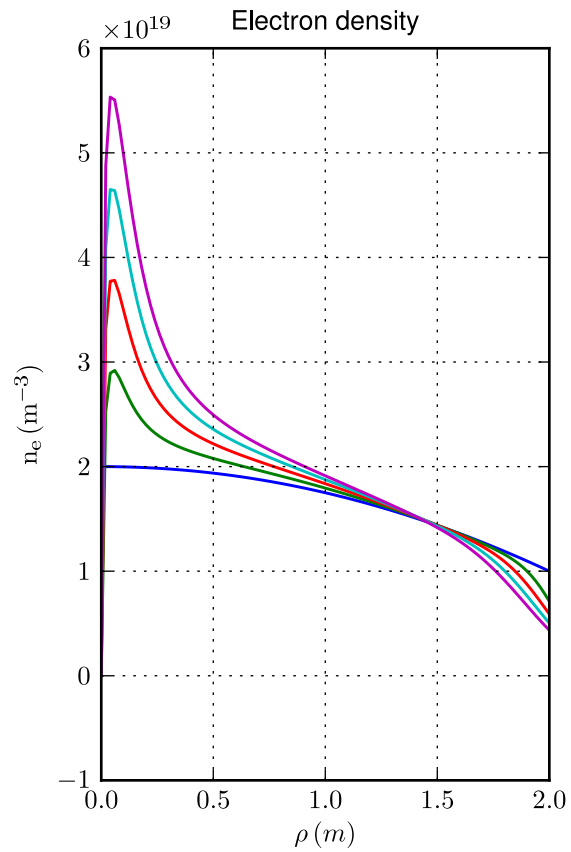
Comparison with asymptotic solution

Profiles
[Case: **I.1.5.j**, Solver: **10**, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, Δt = **4.01**, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)|$ =**0.19** s

Profiles
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
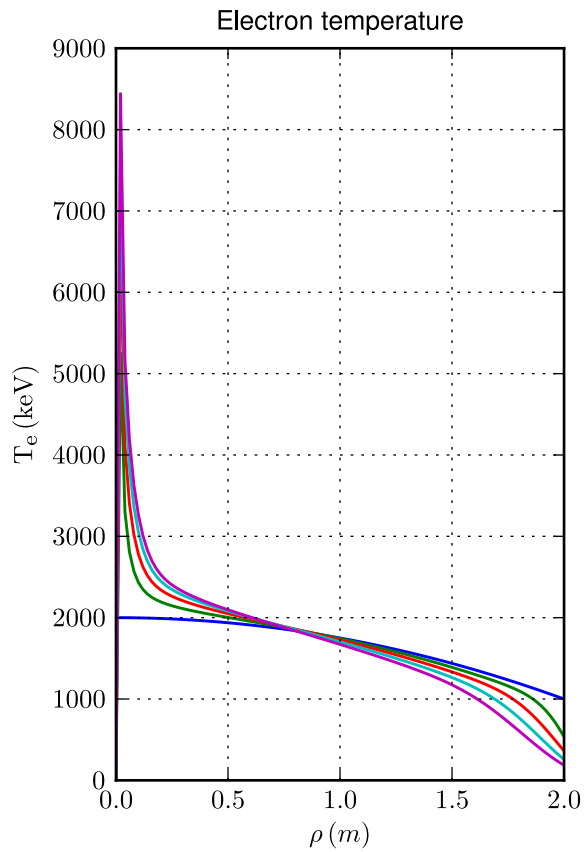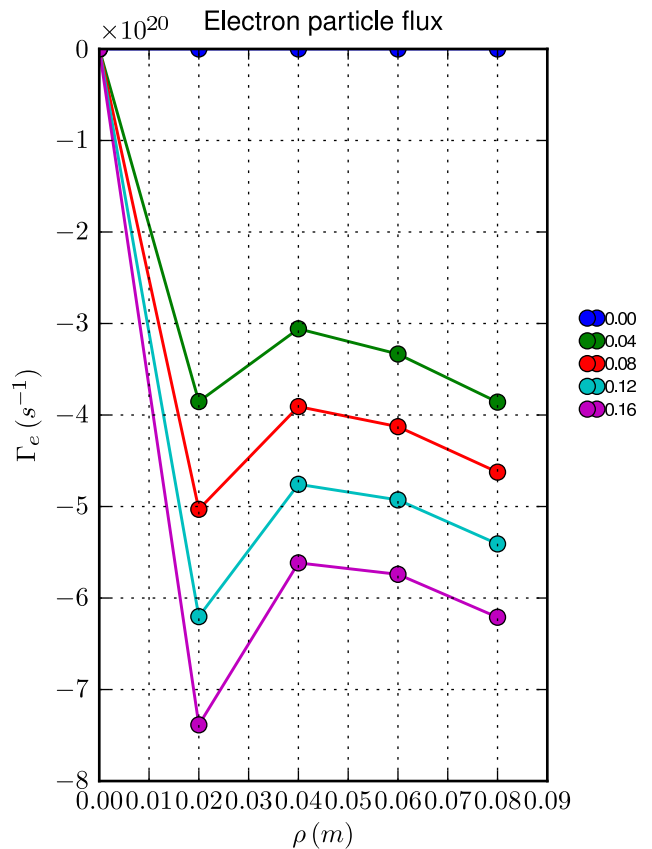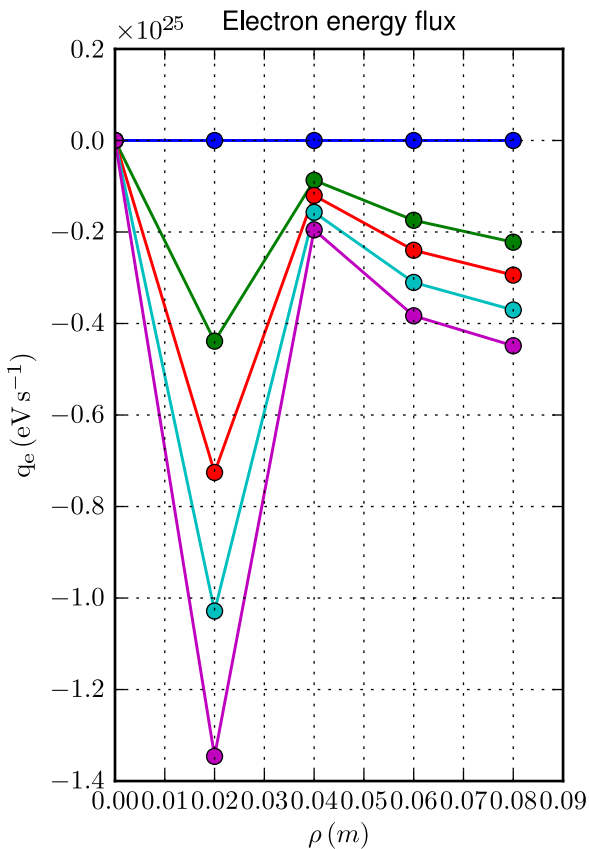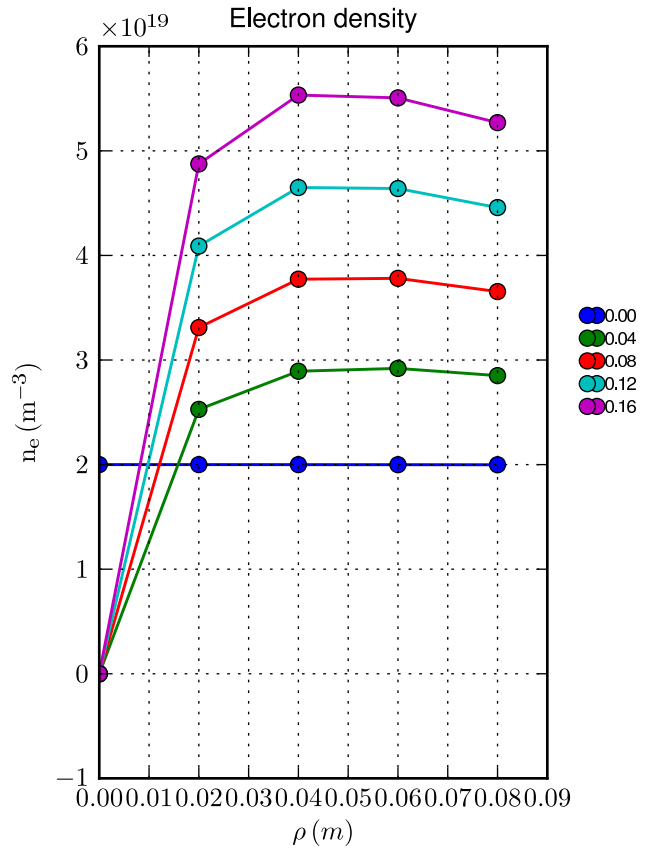Spatial zoom over magnetic axis
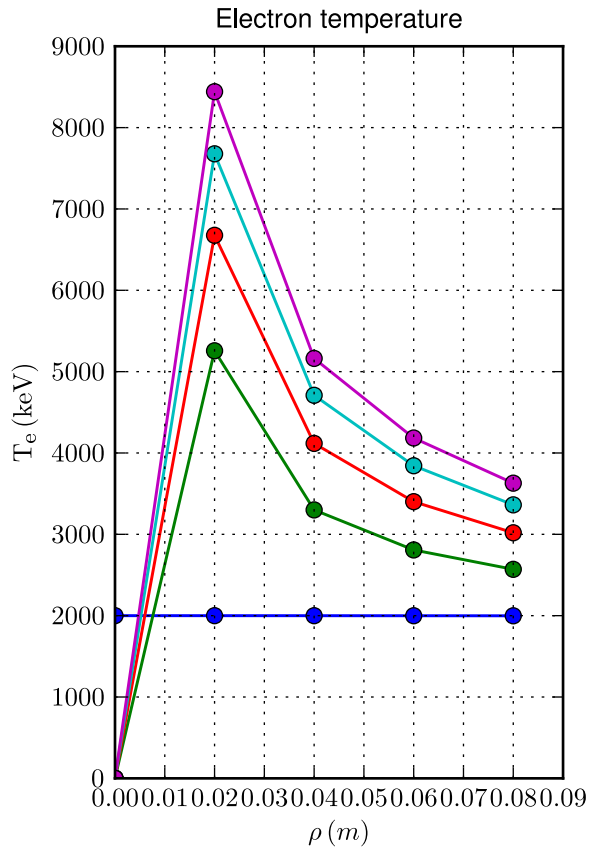Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19\,\mathrm{s}$
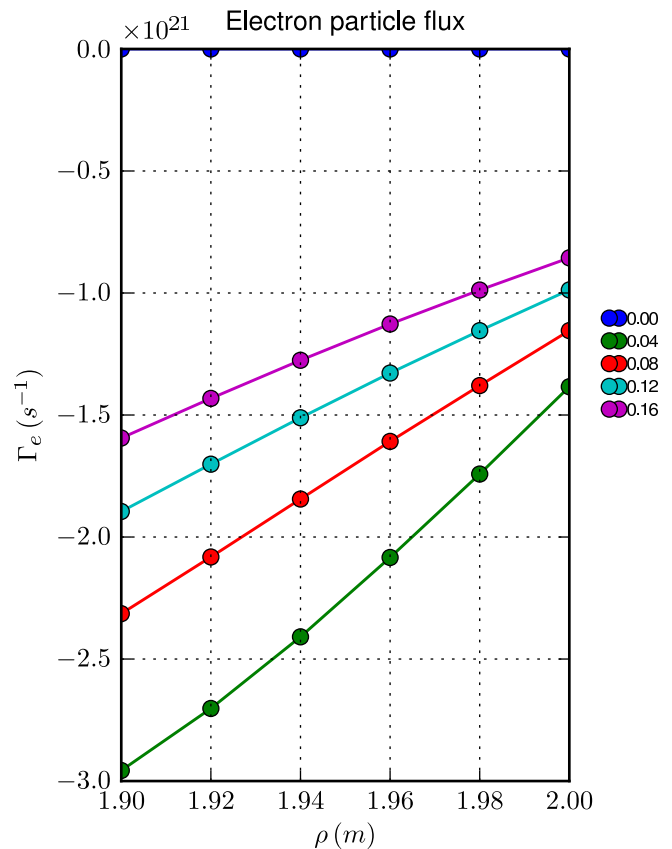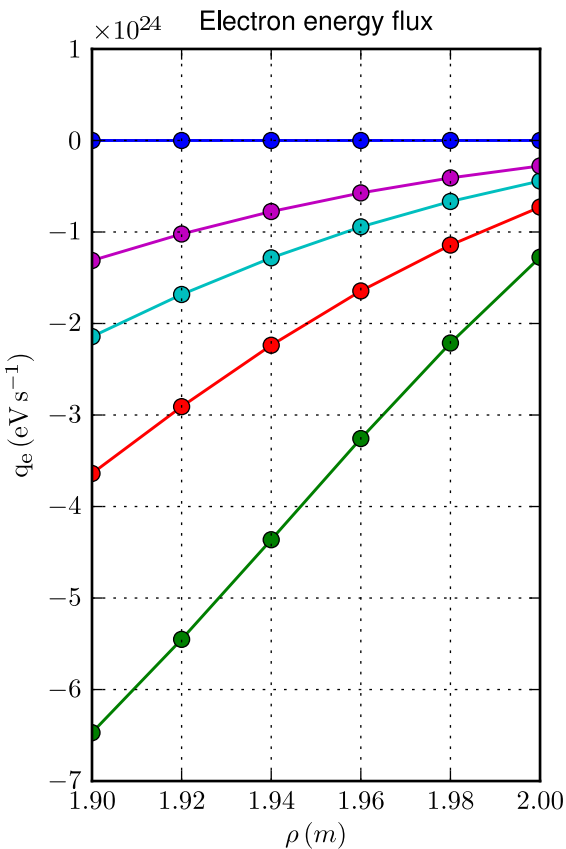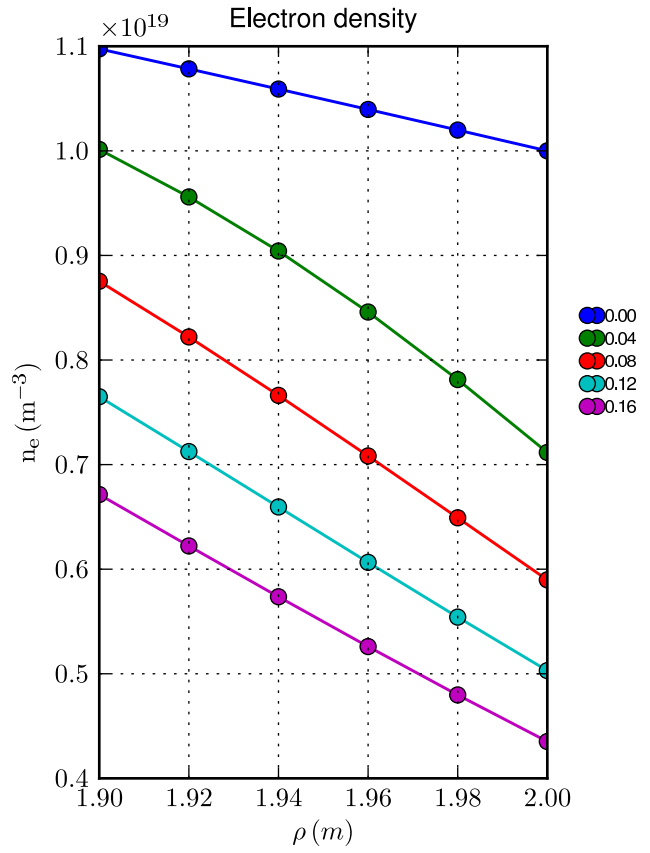
Profiles
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Spatial zoom over edge
Time sampling: first 10 time slices or zoom over time $0.1 \times (a^2/D)/|1 - (Va/D)| = 0.19$ s

Profiles
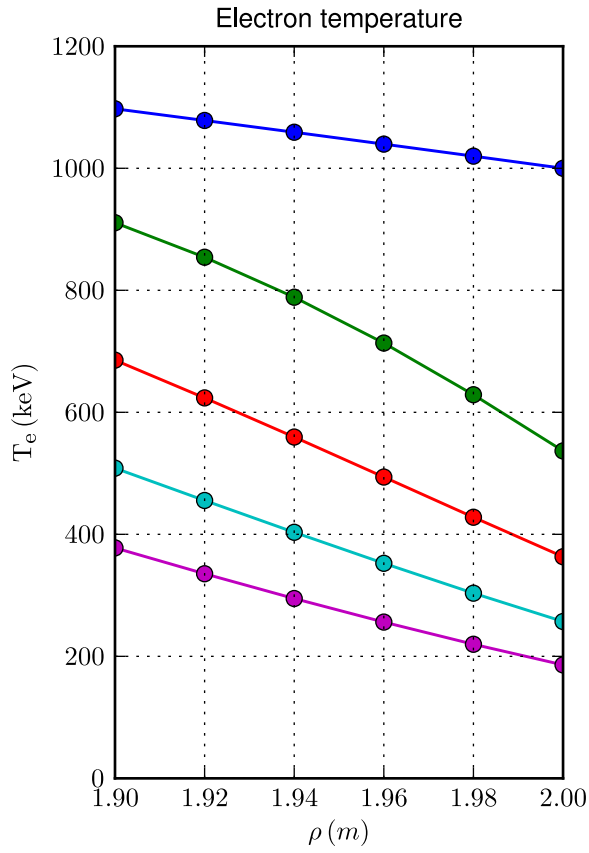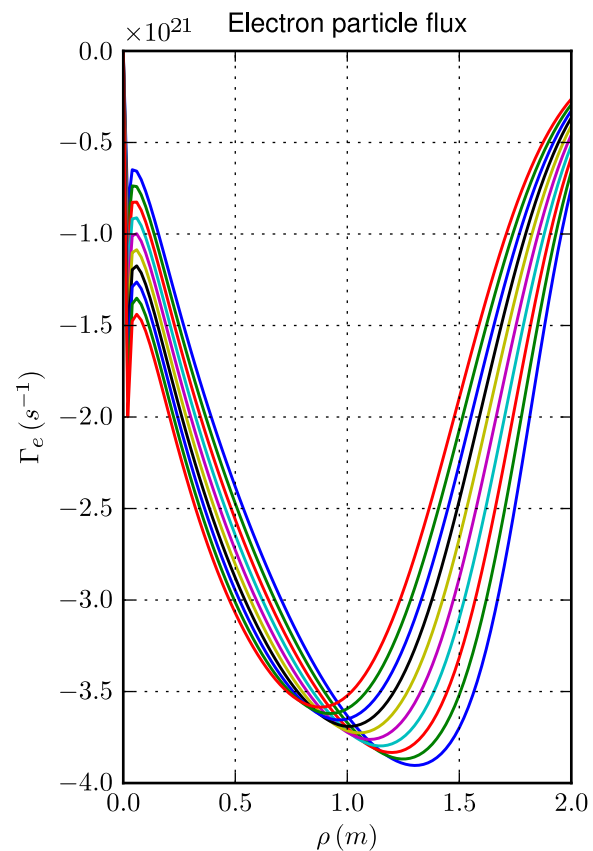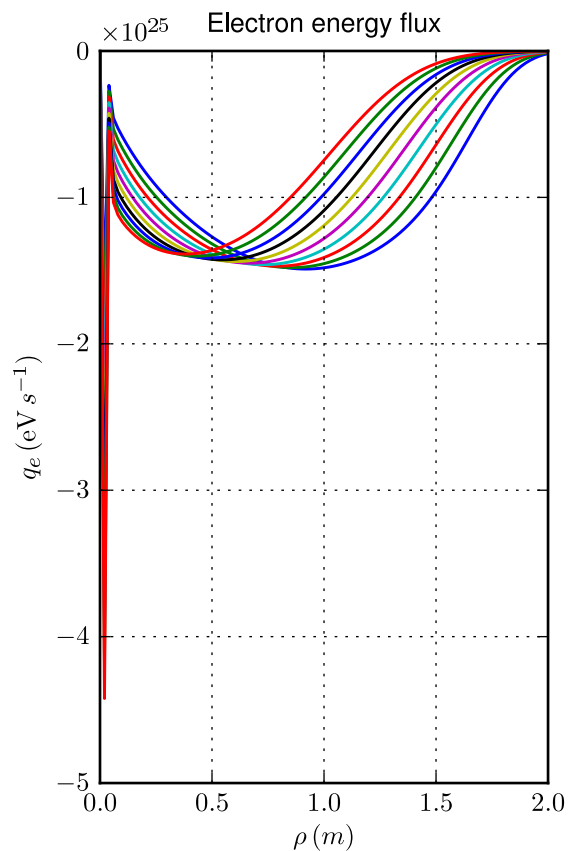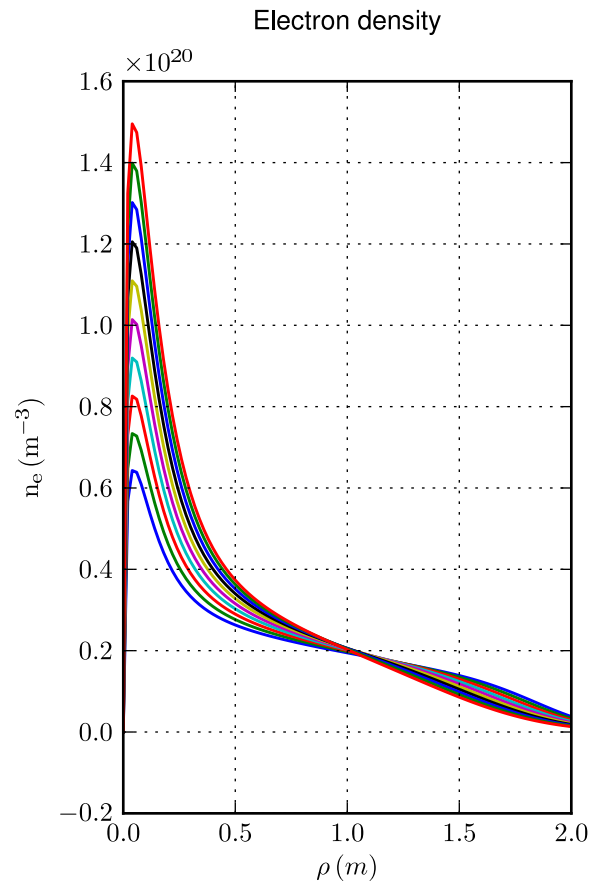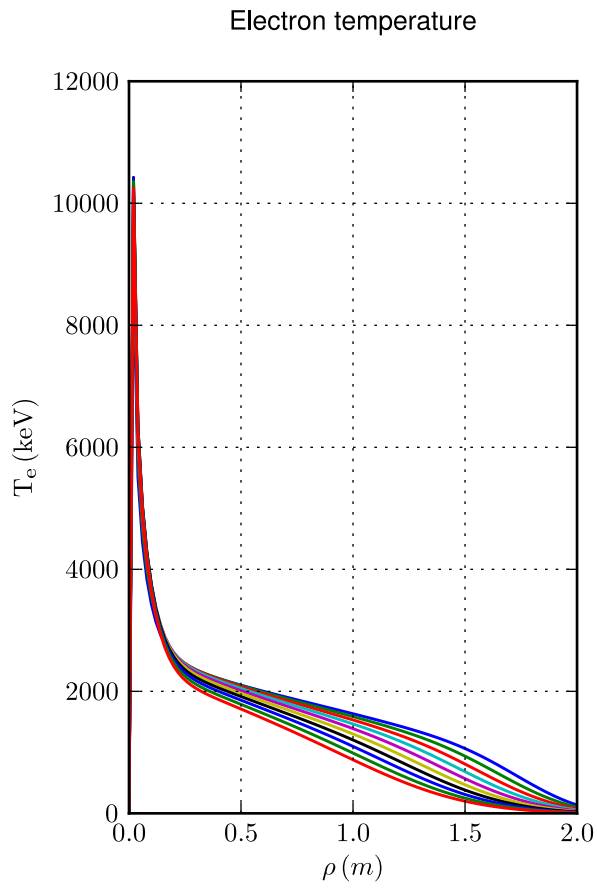
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]

Time sampling: last 10 time slices

Profiles
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
Spatial zoom over magnetic axis; time sampling: last 10 time slices
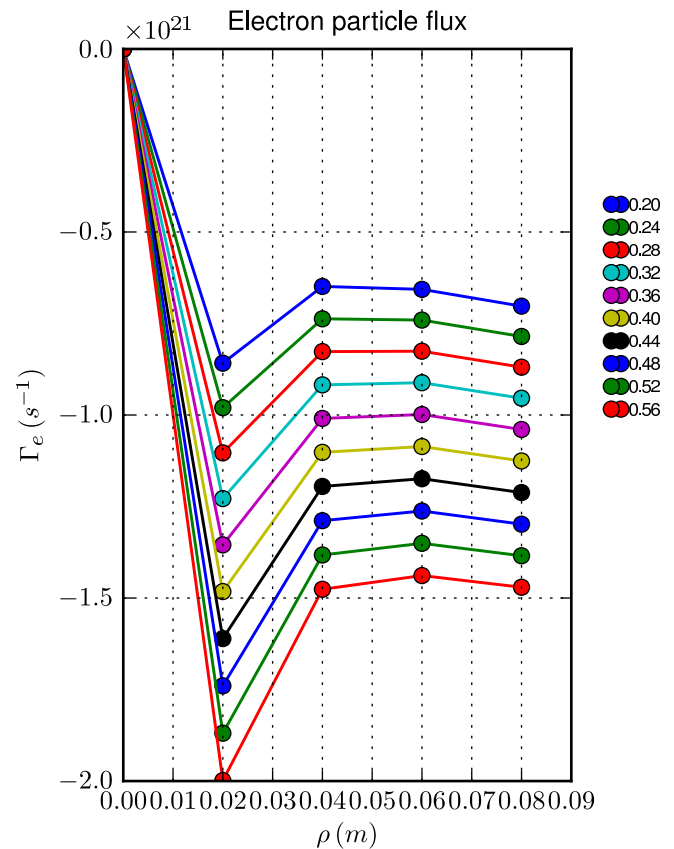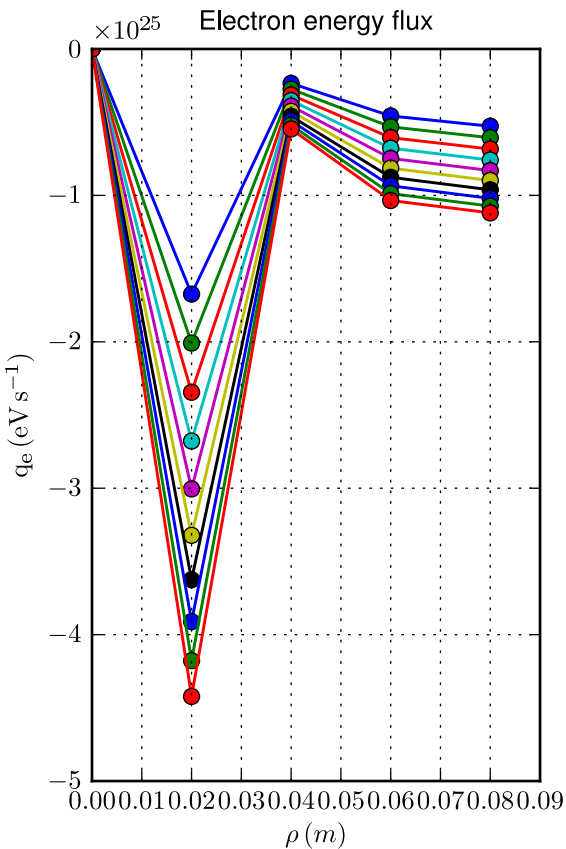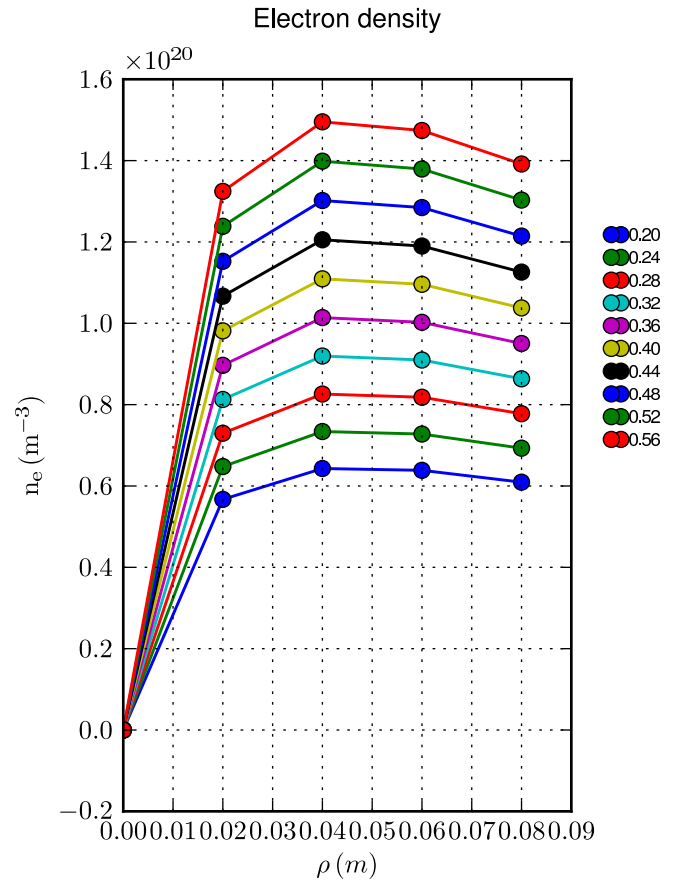
Profiles
[Case: I.1.5.j, Solver: 10, $D = 0.1\,\mathrm{m^2/s}$, $v = -1.00\,\mathrm{m/s}$, $\Delta t = 4.01$, $\tau = 1.0 \times 10^{-2}\,\mathrm{s}$, $N_\rho = 101$]
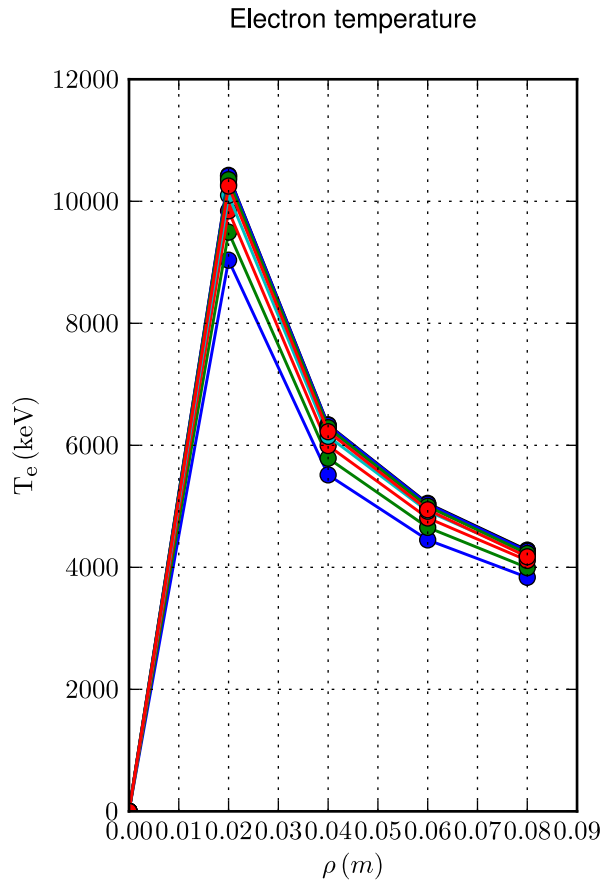Spatial zoom over edge; time sampling: last 10 time slices