Numerical techniques for modeling relativistic hydrodynamics

SS2017
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Course content:

C1: Properties of fluids and plasmas in astrophysics
   - Euler and the Navier-Stokes equations

C2: Explicit & implicit numerical methods for solving simple hydro-equations

C3: Introduction into programming and computer-solving of simple equations

C4: Introduction to General Relativity

C5: Derivation of the relativistic & general relativistic Euler equations

C6: Numerical treatments of GR hydro-equations in astrophysics

C7: Numerical methods, programming and computational techniques for modeling:

- The propagation of relativistic shock fronts (in one-dimension)

- Exploring the internal structure of neutron stars by solving
**Literature:**

4. Hobson et al., "General Relativity"

- All lecture notes are downloadable from: [http://www1.iwr.uni-heidelberg.de/groups/compastro/home/](http://www1.iwr.uni-heidelberg.de/groups/compastro/home/)
- All exercises should be answered and submitted before the start of the subsequent lecture