Numerical Multi-D Radiation (Magneto-) Hydrodynamics

Mats Carlsson[1], Robert F. Stein[2]

[1] *Institute of Theoretical Astrophysics, University of Oslo*
[2] *Dept. of Physics and Astronomy, Michigan State University*

The problem of 3D Radiation Magneto-Hydrodynamics is too complex to solve numerically in the general case; approximations are needed to bring the numerical complexity to tractable levels. These approximations are problem dependent. We will use the case of the Solar chromosphere to illustrate these issues. The implementation of a 1D Radiation Hydrodynamics code with a rather detailed and realistic treatment of the coupling between radiation and matter is described. Scaling properties and parallelization issues are discussed. Various strategies and on-going work for the implementation of a 3D Radiation Magneto-Hydrodynamics code are described.