Basics Multidimensional Radiative Transfer

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THEMIS

In the last years, the improvement in the observations and the increasing spatial resolution obtained open a wide range of questions related to the diagnostic and simulation of multidimensional plasmas. This contribution focuses on the development and implementation of efficient 2D and 3D radiative transfer (RT) methods that allow Non-LTE effects in inhomogeneous astrophysical plasmas to be rigorously investigated. We discuss the optimal way to solve the multidimensional RT problem with emphasis on the numerical difficulties arising from interpolation and boundary questions. We present some 3D formal solvers that are suitable for both, unpolarized and polarized RT. Finally we show the power of current multidimensional codes with some illustrative and realistic Non-LTE multilevel calculations in 2D and 3D schematic models of stellar atmospheres.