# A NEW METHOD FOR 3D RADIATIVE TRANSFER WITH ADAPTIVE GRIDS

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We present a new method for 3D NLTE radiative transfer in moving media, including an adaptive grid, along with some test examples and first applications. The central features of our approach we briefly outline in the following.

For the solution of the radiative transfer equation, we make use of a generalized mean intensity approach. In this approach, the transfer eqation is solved directly, instead of using the moments of the transfer equation, thus avoiding the associated closure problem. In a first step, a system of equations for the transfer of each directed intensity is set up, using short characteristics. Next, the entity of systems of equations for each directed intensity is re-formulated in the form of one system of equations for the angle-integrated mean intensity. This system then is solved by a modern, fast BiCGStab iterative solver. An additional advantage of this procedure is that convergence rates barely depend on the spatial discretization.

For the solution of the rate equations we use Housholder transformations. Lines are treated by a 3D generalization of the well-known Sobolev-approximation. The two parts, solution of the transfer equation and solution of the rate equations, are iteratively coupled.

We recently have implemented an adaptive grid, which allows for recursive refinement on a cell-by-cell basis. The spatial resolution, which is always a problematic issue in 3D simulations, we can thus locally reduce or augment, depending on the problem to be solved.