Hydrodynamic simulation of GRB afterglow

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We will present numerical investigation of the various evolutionary phases in the interaction of a relativistic shell with its surrounding cold interstellar medium (ISM). We do this for both 1D isotropic and full 2D jet-like fireball models. This is relevant for gamma-ray bursts (GRBs), and we demonstrate that, thanks to the AMR strategy, we resolve the internal structure of the shocked shell-ISM matter, which will leave its imprint on the GRB afterglow. We determine the deceleration from an initial Lorentz factor $\gamma = 100$ up to the almost Newtonian phase of the flow. We will discuss as well the 2D effect on the relativistic shell propagation.