ID: P2.26

Title: Numerical Algorithms for Multidimensional Thermonuclear Supernovae Models

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We introduce a new numerical algorithm for setting up multidimensional pre-supernovae evolution models of very massive stars using the results from one-dimension stellar models as initial conditions. The Initial mapping from one-dimensional profiles onto multidimensional grids can generate severe numerical artifacts. One of the most severe problems is the violation of conservation laws for physical quantities. We introduce a mapping algorithm that guarantees all the conservative quantities are conserved at any given resolution and preserves the most important features of the initial models at the same time. One of the major purposes of our multidimensional simulation is to model fluid instabilities which are the outcomes of growing perturbations inherited from the progenitor models. To avoid that the seeds are just numerical or artificial, we introduce a new scheme for seeding perturbation based on the stellar convection physics instead of using a random perturbation or a random power spectrum. We provide a possible solution to the numerical problems in simulations that comprise a range of different spacial scales to resolve the fluid instabilities and nuclear burning. Our algorithm and numerical setup can potentially be applied to various multidimensional simulations beyond stellar explosion problems and offer setups ranging from astrophysics to cosmology.