

Core-Collapse Supernova Simulations with a Multidimensional Full Boltzmann Solver in Gmunu

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Simulations of astrophysical systems where neutrinos play a significant role, like core-collapse supernovae, would ideally solve the neutrino transport equation fully, i.e. solve the full Boltzmann equation. Because of its very high computational cost (6+1D), simulations generally rely on approximations of the equation that are more affordable. It is however difficult to estimate what is lost through these approximations if we do not have access to a full solution. Therefore, we developed a multidimensional full Boltzmann solver based on the Finite Volume method within the GRMHD simulation code Gmunu in order to perform those more accurate simulations. We present our solver, its performance on some first test cases and show the results of 1D core-collapse supernova simulations.

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