

Multi-dimensional simulations of core-collapse supernova explosions with CHIMERA

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Unraveling the core-collapse supernova (CCSN) mechanism is a problem that remains essentially unsolved despite more than four decades of effort. Spherically symmetric models with high physical fidelity generally fail to produce explosions, and it is widely accepted that CCSNe are inherently multi-dimensional. Progress in realistic modeling has occurred recently through the availability of petascale platforms and the increasing sophistication of supernova codes. We will discuss our most recent work on understanding neutrino-driven CCSN explosions employing multi-dimensional neutrino-radiation hydrodynamics simulations with the CHIMERA code. We discuss the inputs and resulting outputs from these simulations, the role of neutrino radiation transport, and the importance of multi-dimensional fluid flows in shaping the explosions.

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