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Three-Dimensional General Relativistic Simulations of Core-Collapse Supernovae ERNAZAR ABDIKAMALOV, CHRISTIAN D. OTT, PHILIPP MOESTA, ROLAND HAAS, Caltech, STEVE DRASCO, Grinnell College, EVAN O'CONNOR, CITA, CHRISTIAN REISSWIG, Caltech, CASEY MEAKIN, Theoretical division, LANL, ERIK SCHNETTER, Perimeter Institute — Despite decades of effort, the explosion mechanism of core-collapse supernovae is still not well understood. Spherically-symmetric models fail to explode, suggesting that multi-dimensional effects are of crucial importance. Studies in axisymmetry (2D) reveal that the standing accretion shock instability (SASI) and neutrino-driven convection are pivotal ingredients for successful explosions. Axisymmetry, however, is a rather poor approximation of this scenario. 3D studies, on the other hand, are still in their infancy and employ crude approximations. As a result, the exact role of the SASI and convection is still not well established. In this talk, I will present our study of the 3D hydrodynamics of the post-bounce phase of the collapse of a 27 solar-mass star. We perform 3D general-relativistic simulations with a neutrino leakage/heating scheme. In our simulations, neutrino-driven convection becomes the dominant instability and leads to large-scale non-oscillatory deformations of the shock front, resulting in strongly aspherical explosions. Low-l-mode SASI oscillations are present in our models, but saturate at small amplitudes.

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