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3D simulations of supernovae: a systematic investigation of neutron star properties

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Systematic studies of core-collapse supernovae (CCSNe) have been conducted based on hundreds of one-dimensional artificial models (O'Connor & Ott 2011,2013; Ugliano et al. 2013, Ertl et al. 2015) and two-dimensional self-consistent simulations (Nakamura et al. 2015;2019, Burrows & Vartanyan 2020). We have performed three-dimensional magnetohydrodynamic simulations for the core-collapse of 16 progenitor models covering ZAMS mass between 9 and 24 solar masses (Nakamura et al. 2024, MNRAS accepted, arXiv:2405.08367). Our CCSN models show a wide variety of shock evolution, explosion energy, as well as the properties of the central remnants including their mass and spin. We present the dependence of these explosion properties on the progenitor structure.

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