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Stochasticity and efficiency of convection-dominated vs. SASI-dominated supernova explosions CHRISTIAN CARDALL, Oak Ridge National Lab, REUBEN BUDIARDJA, University of Tennessee — We present an initial report on 160 simulations of a highly simplified model of the post-bounce core-collapse supernova environment in three spatial dimensions (3D). We set different values of a parameter characterizing the impact of nuclear dissociation at the stalled shock in order to regulate the post-shock fluid velocity, thereby determining the relative importance of convection and the stationary accretion shock instability (SASI). While our convection-dominated runs comport with the paradigmatic notion of a 'critical neutrino luminosity' for explosion at a given mass accretion rate (albeit with a nontrivial spread in explosion times just above threshold), the outcomes of our SASI-dominated runs are much more stochastic: a sharp threshold critical luminosity is 'smeared out' into a rising probability of explosion over a $\sim 20\%$ range of luminosity. We also find that the SASI-dominated models are able to explode with 3 to 4 times less efficient neutrino heating, indicating that progenitor properties, and fluid and neutrino microphysics, conducive to the SASI would make the neutrino-driven explosion mechanism more robust.

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