Learning from Nucleosynthesis from Multi-dimensional simulations of Core-Collapse Supernovae

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For more that two decades, we have understood that the development of a successful core-collapse supernova is inextricably linked to neutrino heating and three dimensional fluid flows, with large scale hydrodynamic instabilities allowing successful explosions that spherical symmetry would prevent. Unfortunately, our understanding of the nucleosynthesis that occurs in these supernovae, and therefore the impact of supernovae on galactic chemical evolution, has generally ignored much that we have learned about the central engine of these supernovae over the past two decades. Now, with two and three dimensional simulations of core-collapse supernovae run to sufficient duration, we are learning how the multi-dimensional, neutrino-driven character of the explosions directly impacts the nucleosynthesis and other observables of core-collapse supernovae. I will present results for the nucleosynthesis calculated from simulations of a range of supernovae with our CHIMERA code, highlighting the ways that these results differ from the parameterized models that form the backbone of our understanding of supernova nucleosynthesis.