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Two Dimensional Simulations of Core-Collapse Supernovae with Neutrino Transport in FLASH EVAN O'CONNOR, North Carolina State University, SEAN COUCH, Michigan State University — Core-collapse supernovae are the end stage of massive star evolution and are central to many aspects of astrophysics. They are the birth site of both neutron stars and black holes and their shocks are responsible for spreading the products of stellar evolution throughout the Galaxy and regulating star formation. Despite their importance and decades of research, the precise mechanism that converts the initial implosion of the collapsing iron core to an explosion that unbinds the majority of the star is unknown. However, we know that the majority of the energy released is ultimately radiated in neutrinos and that the physics of neutrino transport and neutrino heating-among many other aspects-must be treated carefully when modelling the core-collapse supernova central engine. In this talk, I will present recent simulations of core-collapse supernovae from the FLASH hydrodynamics code. We perform two dimensional, neutrino transport simulations using several progenitors. We test the influence of general relativity by using a pseudorelativistic potential that effectively models GR. We show that the more compact protoneutron star predicted from GR increases the neutrino heating and can lead to explosions where the corresponding Newtonian simulations fail.

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