

Abstract Submitted
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Detonation of a White Dwarf Star: Simulations of the Sub-Chandra Type Ia Supernovae¹ MELISSA RASMUSSEN, Utah State University, MICHAEL ZINGALE, Stony Brook University — A type Ia supernova can result from the double detonation of a white dwarf star below the Chandrasekhar mass limit. Using the hydrodynamics code Castro, we simulate this detonation by perturbing a carbon/oxygen white dwarf with an accumulated shell of helium, with a small amount of nitrogen-14. In this work, we investigate the robustness of the model. Adjusting the location of the perturbation affects whether detonation occurs. Changing the composition of the helium shell affects the speed at which it burns. The size of the reaction network used affects whether the star's core burns immediately or from a shock wave from the shell. This last result is particularly notable, as it indicates that using reaction networks which leave out heavier elements may be an oversimplification, producing results with significant disparities from more thorough simulations.

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