

Abstract Submitted  
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**A Semi-Analytic Model of Type Ia Supernova Turbulent Deflagration** KEVIN JUMPER, ROBERT FISHER, University of Massachusetts Dartmouth — The detonation mechanism of Type Ia supernovae, which are believed to originate from the detonation of a near-Chandrasekhar mass white dwarf in a binary system, is not fully understood. Consequently, scientists must simulate their hypotheses to validate their models against observation. The deflagration phase, which occurs prior to detonation, determines many properties of the supernova. A successful deflagration model must describe both the evolution of the flame bubble and the nuclear energy release during the deflagration phase, which in turn governs the nucleosynthetic yield of both iron-peak and intermediate mass isotopes. We construct a semi-analytic model of burning within a flame bubble ignited at a single off-centered ignition point. We model the buoyant rise of the bubble upon a cold white dwarf background. The results of this model can be both verified and validated by comparison against observations and previous three-dimensional simulations, and help shed light on the essential physical processes involved during this complex phenomenon.

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