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The Evolution of Carbon Burning Flames Inside Super-Asymptotic Giant Branch Stars CARL FIELDS, ROBERT FARMER, FRANCIS TIMMES, Arizona State University, SPIDER COLLABORATION — We explore how carbon burning impacts the bifurcation region separating stars whose final fate is a massive white dwarf from stars whose final fate is a massive star supernova. A dense grid of models with initial mass (M_{ini}) from $6.0M_{\odot}$ to $11.0M_{\odot}$ are evolved from pre main-sequence to the end of nuclear burning using the open-source toolkit, Modules for Experiments in Stellar Astrophysics (MESA). For stars between $7.0M_{\odot}$ $\leq M_{ini} \leq 9.0M_{\odot}$, energy losses at the center of the core due to neutrino cooling causes a temperature inversion resulting in off-center ignition. First ignition occurs where the minimum temperature of $7{\cdot}10^8$ K, and a density (ρ_{crit}) of $2{\cdot}10^6$ g/cm^3 is met. We conclude that for stars within this range, the location of first ignition decreases as a function of initial mass. Moreover, we show that there exist a unique ignition density of $2{\cdot}10^6$ g/cm^3.

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