Contribution ID: **211** Type: **Invited talk in the parallel session**

The Sub-Chandrasekhar Mass Pathway to Type Ia Supernovae

Monday, 5 July 2021 18:15 (20 minutes)

Type Ia supernovae (SNe) are some of the most common cosmic transients, yet their progenitors are still not known. I will discuss the sub-Chandrasekhar mass pathway to these explosions, known as the double detonation scenario, where a White Dwarf (WD) is able to explode below the Chandrasekhar mass limit through the aid of an accreted helium shell. An ignition of this helium can send a shock wave into the center of the WD which, upon convergence, can ignite the core causing a thermonuclear runaway resulting in a Type Ia-like explosion. I will describe the hydrodynamic techniques I use to simulate these explosions as well as the radiation transport methods I use to translate the hydrodynamical output into synthetic light curves and spectra. Using these methods, I have calculated some distinct observational signatures that should be exhibited by double detonation explosions in both the photospheric and nebular phase. I will discuss the populations of SNe Type Ia which are consistent with these features. Lastly, I will present the first observed supernova, SN 2018byg, that exhibits the "smoking gun" signatures predicted, establishing the most direct evidence to date that there are multiple pathways through which WDs explode.

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