**Mergers and Collisions of White Dwarfs on Adaptive Meshes**

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**Abstract**

Collisions and mergers of white dwarf stars are an exciting avenue for theoretical research into progenitors for explosive astrophysical events like Type Ia supernovae. I use the compressible hydrodynamics code CASTRO to study these events and understand under what conditions these binary star systems can generate a thermonuclear runaway that results in a detonation. CASTRO is built on the BoxLib framework (developed at Lawrence Berkeley Lab) for adaptive mesh refinement, which allows me to zoom in on interesting features like nuclear burning regions. I have implemented a number of code advances to make this study possible, both on the macroscopic side (gravity, rotation, and hydrodynamics) and the microphysical side (equation of state and nuclear reaction networks). I have also explored the difficulties involved with the length-scale and time-scale disparities involved in nuclear burning in stellar systems and what attempts I have made to get around this to obtain meaningful results in our simulations. My poster gives some preliminary results on these topics.