The Beginnings and Ends of Double White Dwarfs

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Runaway White Dwarfs after Shocks from Supernova Ejecta

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In the D6 scenario for Type Ia supernovae, the lower mass white dwarf is in a close orbit while donating material to its companion that explodes as a supernova. This orbit leads to the high velocities of runaway stars thought to be candidate white dwarf donor remnants from D6 systems. It also implies that the donor star should experience significant interaction with the supernova ejecta, which may be necessary to explain the brightness and expanded radius of candidate remnant objects. We explore the long-term consequences of such interaction using MESA models. After injecting an entropy profile based on hydrodynamical Athena++ models, we follow the subsequent hydrostatic evolution of these models over longer timescales to explore whether this entropy can explain current observed states of candidate objects.

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