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Spiral Disk Instability in Binary White Dwarf Mergers as a **Progenitor to Type Ia Supernovae¹** RAHUL KASHYAP, ROBERT FISHER, Univ of Mass - Dartmouth, ENRIQUE GARCIA-BERRO, GABRIELA AZNAR-SIGUAN, Departament de Fisica Aplicada, Universitat Politecnica de Catalunya, SUOQING JI, University of California Santa Barbara, PABLO LAREN-AGUILAR, School of Physics, University of Exeter — Type Ia supernovae (SNe Ia) provide us with the most precise cosmological tool currently available to study the nature of dark energy. However, the stellar progenitors which give rise to SNe Ia remain mysterious. A leading mechanism for normal SNe Ia is the merger of two white dwarfs in the double-degenerate (DD) channel. However, despite promising observational evidence in their support, until recently it was not clear how detonation conditions could be achieved in a self-consistent fashion during the merger of carbon-oxygen white dwarf binaries. In collaboration with European colleagues, in high-resolution threedimensional numerical simulations, we have recently found, for the first time, that gravitational instability in a merging white dwarf binary leads to a self-consistent detonation of a primary WD on a dynamical time scale. Further implications of this mechanism will be explored in the solution of the SN Ia progenitor problem.

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