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Spontaneous Deflagration-to-Detonation Transition in Thermonuclear Supernovae ALEXEI POLUDNENKO, VADIM GAMEZO, ELAINE ORAN, Naval Research Laboratory — We present the analysis of the spontaneous deflagration-to-detonation transition (DDT) in turbulent thermonuclear flames in Type Ia supernovae - explosions of degenerate white dwarf stars in binary stellar systems. We show results of first-principles numerical calculations that are used to develop and validate a subgrid-scale model for predicting the onset of DDT in full-star calculations. We also discuss detailed properties of laminar thermonuclear deflagrations for compositions and densities, at which DDT is expected to occur.

Alexei Poludnenko
Naval Research Laboratory

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