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Nuclear physics challenges and opportunities for nova nucleosynthesis¹

D.W. BARDAYAN, University of Notre Dame

Nuclear physics determines the properties of a variety of astrophysics events from the relatively constant and unchanging night sky to the cataclysmic explosions that enrich the Cosmos with their ashes. Owing to their relatively high frequency (~ 25 in our Galaxy per year), novae provide a prime opportunity to study nucleosynthesis under extreme conditions. This nucleosynthesis is largely determined by the properties and reactions on proton-rich radioactive nuclei from roughly carbon to calcium. In fact, novae are probably the only explosive astrophysics events for which there is a reasonable opportunity to study all of the reactions of interest within our lifetimes. This talk will explore the nuclear physics needs and challenges that must be met in order to accurately model nova nucleosynthesis with a focus on those nuclear reactions that strongly impact observables upon which we benchmark nova models. Emerging frontiers and opportunities for experimental advances will also be presented.

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