

Experimental studies of key resonances for explosive hydrogen and helium burning

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An experimental program to address uncertainties in the thermonuclear rates of proton and alpha induced reactions with the greatest influence on the modeling of astronomical observables from transient events including classical novae and X-ray bursts will be described. The goal is to discover and characterize key resonances in reactions on unstable reactants by measuring their energies and strengths. Resonances are populated using positron and electron-capture decays of nuclides at the proton drip line provided by the Facility for Rare Isotope Beams (FRIB), and their radiations measured using the Gaseous Detector with Germanium Tagging (GADGET) and the new Particle X-ray Coincidence Technique (PXCT) setup. Complementary data is obtained by measuring nuclear reactions with stable beams at TRIUMF and the recently upgraded Doppler Shift Lifetimes (DSL2) setup. Recent results, ongoing work, and plans for the near future will be presented.

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