

Cyclotron Colloquium, Tuesday, April 24, 2012, at 2:00 pm
Refreshment will be served at 1:45 pm

Beta-decay Studies for Nova Nucleosynthesis

Dr. Antti Saastamoinen

University of Jyväskylä / TAMU

Abstract

Classical novae occur in interacting binary systems, where hydrogen-rich material accretes on a white dwarf from its low-mass main-sequence companion. Eventually, the accretion of the hydrogen-rich matter leads to a thermonuclear runaway (TNR). Understanding the dynamics of the nova outbursts and the nucleosynthesis fueling it can be used testing our knowledge of stellar events in general. As relatively frequent phenomena in our galaxy, classical novae offer an opportunity to test our models more easily with observations. The TNR in novae proceeds through proton-rich nuclei and many of the radiative proton capture reactions (p,g) involving sd -shell nuclei close to the dripline are dominated by resonant capture. Therefore, the key parameters in understanding the astrophysical reaction rates are the energies, decay widths and spins of these resonances. These properties can be studied indirectly e.g. through beta-decay. In this presentation, recent experimental results from studies of beta-decay of ^{23}Al and ^{31}Cl are presented and the relevance for nova nucleosynthesis discussed.