Nuclear Physics Seminar

MONDAY

NOVEMBER 30

4:00 P.M.

RM 124 NSH

Excited state lifetimes for A=109 nuclei via electronic timing with LaBr3(Ce) detectors

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The evolution of nuclear structure across isotopic and isobaric chains is of great interest to nuclear structure and for structure applications to nuclear astrophysics. A particularly interesting region are the neutron-rich nuclei around A~110 region, which is characterized by rapid the onset of deformation. Shape-phase transitions, triaxial deformations, shape coexistence and oblate configurations have all been reported within a small window of the nuclear landscape.

In this talk, I will describe our studies of the A=109 β-decay chain including 109Tc, 109Pd, and 109Ru, produced from the fission of 238U at the University of Jyväskylä Ion Guide Isotope Separator Online (IGISOL) facility. Level lifetimes and gamma-ray transitions were measured with a multi-detector array consisting of two HPGe detectors, two LaBr3(Ce) scintillators and one NE111A plastic scintillator to detect β-decays. Triple coincidence β-γ-γ events were recorded and used to construct/check both level schemes, as well as extract level lifetimes via the fast-timing method pioneered by Henryk Mach. Results will be presented on the low energy structure of 109Ru, in context of the odd-Ru and odd-Pd isotopic chains, including our recent results in109Pd. In each case we have found new levels, placed new transitions, and measured level lifetimes for the first time: including 3 lifetimes in 109Tc; 5 levels, 22 transitions and 8 lifetimes in109Pd; and in 109Ru, 3 levels, 28 transitions, and 7 level lifetimes. Interpretation of the evolution of structure in this region is ongoing.