



Physics Division Seminar

Walter Reviol

Western University St. Louis

Direct-Reaction Studies Above ^{132}Sn using Heavy-Ion Induced Transfer and Particle-Gamma Correlations

Host: Filip Kondev

Monday, October 8, 2018 – 203, R150, 3:30 PM

In a series of transfer-reaction experiments with ^{136}Xe and ^{138}Ba beams from ATLAS and comparatively heavy targets, such as ^{10}B and ^{13}C , nuclei north-northeast of ^{132}Sn were studied with particle-gamma correlation techniques. The experimental setup included, as a crucial component, the Phoswich Wall, an auxiliary particle detector for GRETA and Gammasphere. The presentation is primarily concerned with the results obtained for the semi-magic ^{137}Cs nucleus and the $N = 83$ ^{139}Ba case. The study of the former allows for nearly complete observations of the single-proton states and the seniority-three proton $g_{7/2}$ multiplet. As for the latter, new information for the neutron $i_{13/2}$ intruder state (half-life of $13/2^+_{1}$, location of $13/2^+_{2}$ and possibly of $13/2^+_{3}$) is obtained and the implications are discussed. In addition, the opportunity of simultaneous save Coulomb-excitation measurements is presented, exemplified by an improved $B(E3; 3^- \rightarrow 0^+)$ value for the ^{136}Xe projectile. As an outlook, new studies will be addressed associated with expected changes in the proton single-particle structure of increasingly neutron-rich nuclei in the mass region. If time permits, some thoughts will be added about systematic studies of octupole collectivity within an isotopic chain like that of the heavy xenon nuclei.