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Evolution of h11/2- orbital through new isomers near the 202Os

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We propose to measure the energies of the low-lying excited states of neutron-rich isotopes at N=126 202Os and below through decay spectroscopy of isomeric states. The primary motivation of the proposed experiment is to understand the shell evolution of π1h11/2 effective interactions. The evolution of the 1h11/2 orbital is crucial to study i) possible existence of Z=76 subshell closure and evolution of N=126 magicity ii) -decay lifetime prediction in the r-process through competition between first forbidden decay 1i13/2 1h11/2 and GT decay 1g9/2 1h11/2 [Moral14, Kuma24] iii) systematics study of NN interaction [Steer11, Yuan22].
The highlighted measurement case will be the measurement of i) the 2+ and 5-states in 202Os and ii) the search for the unknown 10+ isomeric state in 202Os and possibly 200W
In the measurements of the known even-A N=126 isotones, the known isomeric states are 5- and 10+ states, and the low-lying 2+ state will be populated by its decay. The configuration of the 5- and 10+state is dominated by the π(3s1/21h11/2) /(2d3/21h11/2) and π(1h11/2-2), respectively, which will be an ideal benchmark for the shell evolution of π1h11/2 orbitals and associated effective interactions. The measurement of 2+ energy in 202Os will provide strong evidence for the possible existence of subshell closure.
The isotope of interest will be populated through the fragmentation of the newly developed 208Pb beam on the 9Be target. The gamma rays from the isomeric states will be measured by the 8 Clover detectors and 16 DEGAS detectors with a high efficiency of ~16% @ 1MeV.

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Primary author(s) : Dr. KIM, Yung Hee (Center for Exotic Nuclear Studies, IBS)

Presenter(s) : Dr. KIM, Yung Hee (Center for Exotic Nuclear Studies, IBS)

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