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Collectivity study in neutron-rich Indium and Silver isotopes via lifetime measurement

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Much attention has been attracted to the "Southwest" of the double-magic ^{132}Sn in the past 30 years. Even though the N = 82 shell closure is still robust from ^{132}Sn to ^{128}Pd, the evolution of proton and neutron orbitals has been discovered in this region. Our knowledge of the single particle orbitals can help to examine the nuclear force and constrain shell model parameters, which is the general way to explore the "terra incognita" region with a larger N/Z ratio. In the Indium isotopes around the neutron-mid shell, the np-nh excitation across the proton closed shell plays an important role in the low-lying states, resulting in the emergence of shape coexistence.

In this proposal, we aim to study the exotic region(N~74) in the "southwest" of doubly-magic ^{132}Sn with the most neutron-rich stable ^{124}Sn isotope via multinucleon transfer(MNT) reaction. To determine the single particle property of the $\pi p_{3/2}$ and $\pi p_{1/2}$ orbitals, how will the shape coexistence evolve towards N = 82, the lifetime measurement of $3/2^{-}$, $7/2^{+}$, $13/2^{+}$ and $11/2^{+}$ states will be performed for odd-A Indium isotopes based on the gamma lineshape analysis. Finally, the B(E2), B(M1) and mixing ratio will be deduced with the help of the large covering angle, highly segmented nature and high efficiency of AGATA. Several new levels, such as the yrast structure in odd-odd Indium isotopes around N = 74 and the intermediate states deexciting to the $1/2^{-}$ and $9/2^{+}$ states in ^{119,121}Ag will be established for the first time. In the meantime, as a byproduct, we will check if the MNT could serve as the appropriate reaction mechanism to produce the $M1$ scissors states in the ^{156}Gd.

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