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Decay spectroscopy of a high-spin long-lived isomer in ^{187}Ta using KISS facility

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^{187}Ta ($Z = 73$, $N = 114$) is located in the neutron-rich $A \approx 190$ region where a prolate-to-oblate shape transition via triaxial softness is predicted to take place. Using high mass resolving power at the Experimental Storage Ring at GSI, the ground state and two long-lived isomers in ^{187}Ta were previously identified with their masses, which were translated into excitation energies of 1789(13) keV and 2933(14) keV for the first and second isomers, respectively [1]. In our work, the ^{187}Ta isomers have been populated by a multi-nucleon transfer reaction with a ^{136}Xe primary beam incident on a natural tungsten target using the KEK Isotope Separation System (KISS) [2] at RIKEN. A preceding analysis on the first isomer and a rotational band to which the isomer decays revealed that the isomer has $K^\pi = (25/2^-)$ and axial symmetry is slightly violated in this nucleus [3]. In this presentation, we will focus on new experimental findings obtained for the second isomer, such as the internal γ - and external β -decay branches and a neutral-atom half-life of 136(24) s [4]. The spin-parity assignment constrained by the evaluated hindrances for K-forbidden transitions and its interpretation based on configuration-constrained potential-energy surface calculations will be discussed.

Reference:

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- [3] P. M. Walker et al., Phys. Rev. Lett. 125(2020) 192505.
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