

Production-decay dynamics of Th-229 nuclear clock isomeric state in crystal

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“Thorium-229 has the lowest nuclear excited level (^{229m}Th), around 8 eV, which provides many applications from practical usage to fundamental research. In 2019, our group succeeded in producing ^{229m}Th states via X-ray pumping and in 2023, we observed the vacuum-ultraviolet (VUV) photons stemmed from the radiative decay of ^{229m}Th . The lifetime of ^{229m}Th is measured, by counting the VUV photons, to be around 10^3 seconds after pumping. On the other hand, the lifetime of ^{229m}Th seems quite reduced during the X-ray irradiation. Therefore, the accelerated decay channels of ^{229m}Th during X-ray irradiation exist; isomer quenching.”

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