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Correlated prompt-delayed gamma spectroscopy for nuclear structure studies: isomers in the neutron-rich Kr isotopes approaching N=60

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Nuclear isomers often possess a unique configuration or shape that allows testing nuclear models and advancing the understanding of nuclear structure. In addition, in many cases isomers allow for an easier experimental identification and/or correlated and background-reduced data analysis. Our recent nuclear structure studies of neutron-rich Kr isotopes using prompt and delayed gamma spectroscopy discovered new gamma-transitions feeding, depopulating and bypassing a new short-lived nanosecond isomer in ^{94}Kr[1] and new transitions feeding and bypassing the known microsecond isomer in ^{95}Kr[2,3].
These Kr isotopes were studied during the second SEASTAR campaign [4] at the RI Beam Factory[5] at the RIKEN Nishina Center and during the NuBall campaign [6] at the ALTO facility at the IPN Orsay. While the former experiment populated the isotopes of interest via nucleon knockout reactions of a relativistic radioactive beam on a liquid-hydrogen target [7], the latter used a pulsed ^{7}Li beam together with the fast-neutron source LICORNE [8] to induce pulsed fission of a ^{238}U stacked-target. In the measurement at RIKEN, prompt gamma-rays after the knockout were detected by the DALI2 NaI array [9] and, after the subsequent flight of the exotic ions through the ZeroDegree spectrometer, delayed gamma-rays were detected by the EURICA HPGe array [10]. At the IPN Orsay, the NuBall hybrid array [11] consisting of HPGe and LaBr gamma-ray detectors surrounded the fission target and a triggerless data acquisition collected all data.
The experimental results will be presented and compared to known data in neighbouring isotones and theoretical models. Aspects of nuclear structure like single-particle and quasiparticle states, onset of deformation and shape-coexistence in the neutron-rich Kr isotopes approaching N=60 will be discussed. *Supported by the DFG under Grant No. BL 1513/1-1 .

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