

Gamma Spectroscopy of the superdeformed shape isomers in ^{237}Pu

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While so far spectroscopic studies of fission isomers concentrated on even-even nuclei, high-resolution spectroscopy of odd-N fission isomers will allow to identify Nilsson orbitals in heavy actinide nuclei. As the first case ever studied for odd-N nuclei, the fission isomer in ^{237}Pu ($t_{1/2} = 110\text{ns}/1.1\text{ ?s}$) was investigated using the $^{235}\text{U}(\alpha,2n)$ reaction with a pulsed alpha beam ($E_{\alpha} = 24\text{ MeV}$, pulse distance 400 ns) from the Cologne Tandem accelerator. A self-supporting thick metallic ^{235}U target (3.7 mg/cm²) was used, where the ^{237}Pu reaction products were stopped and fission products were emitted in opposite directions. The rare γ -rays from the second potential well in delayed coincidence with fission products were measured with the MINIBALL spectrometer. Due to the small population cross section of about 2 ?b a large solid angle coverage both for the γ -rays as well as for the fission fragments was required. A very compact 4 π parallel plate detector array (diameter ca. 15 cm) was used for the fission fragment detection, allowing for a discrimination between the dominant prompt fission products and the rare isomeric fission events. Results, such as the identification of rotational bands, isomeric lifetimes and angular distributions etc., will be presented. *Supported by DFG under contract no. HA1101/12-1

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