Octupole correlations in 224U

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The neutron-deficient Z = 92 uranium nuclei lie close to the centre of the light-actinide region of enhanced octupole correlations. Despite theoretical predictions of octupole de- formation (e.g. [1, 2]) giving clear motivation for experimental study, there is presently very little existing spectroscopic information concerning the structure of these nuclei. In- deed, at present, the only A < 230 uranium isotope with known excited states is 226U [3, 4] where a classic octupole-band structure has been observed. One of the challenges in the experimental study of these nuclei, is their small production cross sections, meaning that sensitive techniques of channel selection and identification must be used for in-beam spec- troscopy. In the present work, an experiment has been carried out at the Accelerator Lab- oratory at the University of Jyva skyl a in order to study the nucleus 224U using the method of recoil α -decay tagging. The reaction 208Pb(22Ne,4n)224U was used ($\sigma \boxtimes 500$ nb) to- gether with the SAGE ex spectrometer [5], the RITU recoil separator [6], and the GREAT focal-plane detectors [7]. Excited states have been observed in 224U for the first time. A number of y-ray and internalconversion electron transitions have been unambiguously assigned to 224U through correlations with the $224U \rightarrow 220$ Th $\rightarrow 216$ Ra $\rightarrow 212$ Rn decay chain. The excited states have been arranged into an alternating-parity band, characteristic of a nucleus with enhanced octupole correlations. B(E1)/B(E2) values suggest enhanced electric-dipole moments for several of the states. The new results will be presented and compared to recent theoretical predictions.

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