Contribution ID: **33** Type: **not specified**

Octupole correlations in 224U

Tuesday, July 23, 2024 4:30 PM (20 minutes)

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 Jyvaskyla in order to study the nucleus 224U using the method of recoil α-decay tagging. The reaction 208Pb(22Ne,4n)224U was used (σ ≈ 500 nb) to- gether with the SAGE eγ 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 γ-ray and internal-conversion electron transitions have been unambiguously assigned to 224U through correlations with the 224U→220Th→216Ra→212Rn 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.
This work is supported by the STFC (UK), under grants numbered ST/P005101/1, ST/V001124/1, and ST/L005670/1, and by the Academy of Finland.

[1] L. M. Robledo and G. F. Bertsch, Phys. Rev. C 84, 054302 (2011) [2] K. Nomura et al., Phys. Rev. C 102, 064326 (2020)
[3] P. T. Greenlees et al., J. Phys. G 24, L63 (1998)
[4] R. D. Humphreys et al., Phys. Rev. C 69, 064324 (2004)
[5] J. Pakarinen et al., E. Phys. J. A 50, 53 (2014)
[6] M. Leino et al., Nucl. Instrum. Meth. 99, 653 (1995)
[7] R. D. Page et al., Nucl. Instrum. Meth. 204, 634 (2003)

Presenter: SMITH, John (University of the West of Scotland)

Session Classification: Heavy Nuclei and Super Heavy Elements - Part 1