



Spectroscopy of neutron deficient actinium isotopes

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Prompt and delayed spectroscopy of neutron deficient actinium isotopes was performed at JYFL-ACCLAB. Recoils produced in fusion-evaporation reactions were separated from the beam and unwanted products using MARA vacuum mode recoil separator and subsequently tagged at focal plane using recoil- α decay method. In-beam γ -ray spectroscopy could then be performed for selected recoils by looking back at events seen in JUROGAM III spectrometer. Possible delayed γ -rays were detected by focal plane HPGe-detectors. Excited states in trans-lead nuclei offer an important experimental fingerprint about the onset of nuclear deformation. Past studies have shown that many nuclei in this region exhibit longer living isomers as well as shears bands [1][2]. These were also expected to be present in actiniums, but no supporting evidence was found in this experiment. However, it was confirmed that a more established phenomenon seen in the spherical and nearly spherical astatine and francium nuclei, in which the low-lying negative parity states follow the systematics of the 2^+ , 4^+ and 6^+ states of the respective even-even isotone core, also applies to actiniums.

References

- [1] G. D. Dracoulis *et al.*, Rep. Prog. Phys. **79**, 076301 (2016).
- [2] R. M. Clark and A. O. Macchiavelli, Annu. Rev. Nucl. Part. Sci. **50**, 1 (2000).