

Decay Spectroscopy of the Proton Rich thallium Isotopes $^{176,177}\text{Tl}$

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Measurements of proton-decay properties provide an important source of spectroscopic information at the limits of known nuclei. Spherical proton emitters are important for testing models of proton emission. The most nearly spherical cases are expected to be the Ta nuclei closest to $N = 82$ and the proton-emitting isotopes $^{176,177}\text{Tl}$ that lie just one proton below the $Z = 82$ shell closure. These nuclei are the focus of this study which was performed at the Accelerator Laboratory of the University of Jyväskylä. The $^{176,177}\text{Tl}$ nuclei were produced in fusion-evaporation reactions induced by a beam of ^{78}Kr ions bombarding a ^{102}Pd target at energies of 397 MeV and 376 MeV. The fusion products were separated in flight using the newly commissioned recoil mass separator MARA and implanted into a double-sided silicon strip detector. The proton and alpha decays of the ground and isomeric states of ^{177}Tl were remeasured and found to be consistent with previous studies [1, 2]. In addition, proton emission from the ground state of ^{176}Tl was confirmed [1]. The previously unobserved α decay from this state was identified through correlations with α decays of ^{172}Au . The decays of the isomeric state in ^{176}Tl were also observed for the first time.

References

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