Isomeric structures in the heavy nucleus ^{250}Fm

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In 2016, the S20 experiment was performed at the University of Jyväskylä, utilising the established JUROGAM and RITU [1] setup in conjunction with the SAGE electron spectrometer [2], to produce the isotope ^{250}Fm in the ^{204}HgS(^{48}Ca, 2n)^{250}Fm fusion-evaporation reaction with a beam energy of 209 MeV. ^{250}Fm has been previously studied at Jyväskylä [3,4] and has been observed to exhibit a rotational structure based on an isomeric state $K^{\pi}=8^{-}$ with a half-life of 1.92(5) s. Another isomer, with a half-life of 8(2) μs, has been suggested over a decade ago [5], however its configuration remains undetermined. The primary objective of this experiment was to further study the rotational structure of the $K^{\pi}=8^{-}$ isomer first identified by Ghiorso et al [6], and to unambiguously assign its configuration by implementing the recoil-electron tagging capability of SAGE, through the measurement of highly converted, low energy M1 transitions. Secondly, the goal was to determine the configuration of the suggested short-lived isomer, and study the states that feed into it. Analysis of isomeric states in lighter, deformed nuclei in close proximity to the superheavy elements is expected to provide a greater understanding of two-quasiparticle excitations in the region, informing systematic studies of collective properties, and allowing for the validity of theoretical models to be tested at the limits of mass and charge, leading to the island of stability. Work on the S20 dataset has recently commenced and is ongoing, experimental methods and the status of the analysis will be presented.

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