Combined Conversion Electron and γ ray Spectroscopy of ^{250}Fm

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To date, models describing the complex behaviour of the many-body quantum system of the nucleus, predict a range of values for the next spherical shell closure. This shell closure is thought to be the central point on an 'island of stability' where superheavy elements can exist due solely to quantum stabilising effects. Production cross-sections for SHEs are of the order of picobarns, making them difficult to produce and study in-beam [4]. As such, the systematic study of lighter deformed nuclei in the region of $Z = 100$, with cross-sections several orders of magnitude greater, provides knowledge on single-particle states emanating from the next predicted spherical shell closure. These data will help to constrain theory and to provide a more detailed understanding of the 'north east' corner of the Segré chart.

Low energy transitions are highly converted in heavy nuclei, making conversion electron spectroscopy essential to gain a full understanding of their structure. The SAGE[1] spectrometer builds on experience gained from the SACRED[2] campaign to address this necessity through highly-efficient combined γ ray and conversion electron detection methods.

SAGE, coupled to the RITU gas-filled separator, and GREAT[3] focal plane spectrometer at the University of Jyväskylä, facilitates recoil decay- and recoil isomer-tagging methods for the study of heavy elements with unprecedented detail. ^{250}Fm has been produced in the $^{204}\mathrm{HgS}\,(^{48}\mathrm{Ca}, 2\mathrm{n})\ ^{250}\mathrm{Fm}$ fusion-evaporation reaction. By 'tagging' with a calorimetric electron signal at the focal plane of RITU, the structure built on top of the $K^{\pi} = 8^{-}$ isomer in ^{250}Fm can be studied through combined conversion-electron and γ-ray detection. Preliminary analysis will be presented.

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