Contribution ID: **249** Type: **Poster**

Preliminary Results on the Gamma-Spectroscopy of 229Ac Following the Beta Decay of 229Ra

The isotope ^{229}Th is of particular interest due to its exceptionally low-energy isomeric state ($\sim$ 8.2 eV), which can be studied via vacuum ultraviolet (VUV) spectroscopy, and holds great potential for the development of a nuclear clock [1,2].
Understanding this isomer's properties, including its excitation and decay modes, is hereby essential and involves investigating the nuclear structure in the actinide region. In recent work at ISOLDE the isomer was populated via the beta-decay of ^{229}Ac and allowed to observe its radiative decay [2,3]. The odd-even nucleus ^{229}Ac, as the part of the beta-decay chain from ^{229}Ra to ^{229}Th, is directly linked to the population and depopulation of nuclear states that influence the feeding of the isomer. However, despite its relevance, the structure of ^{229}Ac remains poorly studied, with little experimental data available.

To address this, we have performed a gamma-spectroscopy study of ^{229}Ac following the beta-decay of ^{229}Ra. The data were collected at the ISOLDE facility at CERN using the ISOLDE Decay Station (IDS) [4], which provides high-resolution gamma-ray detection capabilities. This study aims to refine the level scheme of ^{229}Ac, identify key transitions, and improve our understanding of the nuclear structure in this region. The preliminary results presented in this work, aim to contribute to a more comprehensive picture of the nuclear properties of the actinide region of the nuclear chart.

[1] C.Zhang, T.Ooi, J.S.Higgins et al., Frequency ratio of the ^{229m}Th nuclear isomeric transition and the ^{87}Sr atomic clock, Nature 633, 63–70 (2024).

[2] S.Kraemer, J.Moens, M.Athanasakis-Kaklamanakis et al., Observation of the radiative decay of the ^{229m}Th nuclear clock isomer, Nature 617, 706–710 (2023).

[3] S.V.Pineda, P.Chhetri, S.Bara, Y.Elskens et al., Radiative decay of the ^{229}Th nuclear clock isomer in different host materials, Phys. Rev. Research 7, 013052 (2024).

[4] ISOLDE Decay Station (IDS), http://isolde-ids.web.cern.ch/

Author: Dr SATRAZANI, Magda (KU Leuven)

Presenter: Dr SATRAZANI, Magda (KU Leuven)

Session Classification: Poster session

Track Classification: Nuclear Structure, Spectroscopy and Dynamics