Contribution ID: **82** Type: **Invited talk**

Restoration of the natural E(1/2+) -E(3/2+) energy splitting in odd-K isotopes towards N= 40 (ZOOM)

Tuesday, 1 August 2023 14:30 (25 minutes)

I will report on the first γ-ray spectroscopy of ^{51,53}K produced from ^{52,54}Ca(p,2p) reactions at ~250 MeV/nucleon at RIBF at RIKEN. The $1/2^+_1 \rightarrow 3/2^+_1$ transitions in ^{51,53}K were clearly observed [1], providing important information to understand the monopole drift effect of the proton $1d_{3/2}$ and $2s_{1/2}$ orbitals along the odd-K isotopic chain. Thanks to the MINOS setup based on reaction vertex tracking combined with a thick-hydrogen target [2], the final-state angular-momentum of ^{51,53}K were determined unambiguously by comparing the shapes of the experimental exclusive parallel momentum distributions to distorted-wave impulse approximation calculations. 3/2+ ground states and 1/2+ first excited states in ^{51,53}K were established quantifying the natural ordering of the $1d_{3/2}$ and $2s_{1/2}$ proton-hole states that are restored at N = 32 and 34. State-of-the-art ab initio calculations and shell-model calculations with improved phenomenological effective interactions reproduce the present data and predict consistently the increase of the E($1/2^+_1$) - E($3/2^+_1$) energy differences towards N = 40.

[1] Y. L. Sun et al., Phys. Lett. B 802, 135215 (2020).
[2] A. Obertelli et al., Eur. Phys. J. A 50, 8 (2014).

Primary author: Dr SUN, Yelei (Technische Universität Darmstadt)

Presenter: Dr SUN, Yelei (Technische Universität Darmstadt)

Session Classification: Island of inversion at N=40