Contribution ID: **31** Type: **Oral Contribution**

Nuclear isomerism in odd-Au isotopes

Thursday 27 October 2022 17:40 (15 minutes)

Decay studies are of high demand since they complement existing in-beam data and provide a valuable information about non-yrast states. These states are of particular interest since they carry an information on the nuclear deformation. Deformation parameters, both axial and triaxial can be deduced from the spectra of excited states of the odd-mass nuclei. The particle-core coupling models [1] suggest a very strong dependence of excitation energies of states with various spins. This allows to deduce the γ deformation parameter from measured spectra of the odd-mass isotopes. The non-yrast states can be accessed via the internal transition decay of isomers with high excitation energy.
Such isomer was very recently discovered in ^{179}Au [2]. The data were acquired at the RITU separator at JYFL. The decay path of the hitherto unknown isomer with 2.15 μs half-life has been investigated. The level scheme of the new isomer was constructed. Decays into known rotational bands [3] were observed. However, many more isomeric γ rays were observed but could not be unambiguously assigned. Strong signature of ^{179}Au is the internal transition decay of the 326 ns isomer with I^{π} = 3/2^{-} [4,5]. It emits low-energy γ rays with energies of 27, 62 and 89 keV. Several isomeric γ rays, observed in the data, are interpreted as decays of the isomeric state in ^{179}Au, and are found to feed the known 3/2^{-} isomer. One of the prominent γ rays is observed with the different half-life, thus suggesting existence of other isomers in this nucleus. Calculations based on the PTRM model [6] were performed to interpret the data. The analysis paved the road for the dedicated experiment.
Studies of these isomers provide not only a unique chance to investigate the K isomerism (or other types of isomerism) in odd-Au isotopes, but also to study non-yrast states in ^{179}Au. Isomeric states act as "feeders"of these states. It seems that presently, this is the only chance how to investigate them. It becomes even more evident in the heavier odd-Au isotopes. Therefore, these isomers allow us to extend our understanding of the nuclear structure of odd-Au isotopes.

References

[1] J. Meyer-ter-Vehn, Phys. Rev. Lett. **32**, 24 (1974).
[2] M. Balogh *et al.*, *submitted to Phys. Rev. C.*
[3] W. F. Mueller *et al.*, Phys. Rev. C **69**, 064315 (2004).
[4] M. Venhart *et al.*, Phys. Lett. B **695**, 82 (2011).
[5] M. Venhart *et al.*, Phys. Lett. B **806**, 135488 (2020).
[6] S. E. Larsson, G. Leander, and I. Ragnarsson, Nucl. Phys. A **307**, 189 (1978).

Primary author: Dr HERZÁŇ, Andrej (Institute of Physics, Slovak Academy of Sciences)

Presenter: Dr HERZÁŇ, Andrej (Institute of Physics, Slovak Academy of Sciences)

Session Classification: P2 Nuclear Structure, Spectroscopy, and Dynamics

Track Classification: P2 Nuclear Structure, Spectroscopy, and Dynamics