



Contribution ID: 40

Type: **Talk (20 min + 5 min discussion)**

## **Two step gamma cascade method for study of nuclear structure parameters**

*Monday, 4 December 2023 14:05 (25 minutes)*

Investigating nuclear structure parameters is a crucial in low-energy nuclear physics. The comprehension of gamma transitions, level schemes, nuclear level density, and radiative strength functions is necessary for both fundamental and applied research. To this end, the two-step gamma cascades method, involving the detection of gamma coincidences subsequent to neutron capture, specifically the  $(n,2\gamma)$  reaction, has emerged as a robust approach for obtaining spectroscopic data and insights into level density and radiative strength functions. This method facilitates an in-depth exploration of the complex dynamics governing interactions and transitions between Fermi- and Bose-states of the nucleus, particularly in proximity to the neutron binding energy. These intranuclear processes substantially differ from their counterparts in classical and high-temperature superfluidity. These distinctions arise from the unique characteristics of the investigated nucleus, including its shape, nucleon parity, and the presence of diverse nucleon types, such as protons and neutrons. Thus, the two-step gamma cascades technique has been successfully employed in the examination of 45 nuclei within the mass range of  $28 < A < 200$ . This talk will provide a concise overview of the method, supplemented by illustrative examples drawn from recent research.

**Primary authors:** JOVANCEVIC, Nikola (University of Novi Sad); KNEŽEVIĆ, David (Technische Universität München, Heinz Maier Leibnitz Zentrum (MLZ), Lichtenbergstr. 1, D-85747 Garching, Germany); Dr REVAY, Zsolt (PGAA); Dr STIEGHORST, Christian (TUM / FRM II); Dr SZENTMIKLÓSI, László (Nuclear Analysis and Radiography Department, Centre for Energy Research, Budapest, Hungary); Dr BELGYA, Tamas (Nuclear Analysis and Radiography Department, Centre for Energy Research, Budapest, Hungary)

**Presenter:** JOVANCEVIC, Nikola (University of Novi Sad)

**Session Classification:** Nuclear, Particle, and Astrophysics