Contribution ID: **32** Type: **not specified**

Shapes and collectivity near magic nuclei: Coulomb excitation of 62Ni

Friday 11 July 2025 10:20 (20 minutes)

ABSTRACT:

In the proposed experiment, we plan to investigate the properties of nuclei close to the doubly-magic ^{56}Ni isotope (N = Z = 28) using the Coulomb-excitation method.
Specifically, we propose to study the electromagnetic structure of ^{62}Ni with the AGATA spectrometer coupled to the SPIDER (+DANTE) heavy-ion detector.

The results of the proposed experiment, along with those from the ^{58,60}Ni Coulomb-excitation experiments already performed at IJC Lab (Orsay, France) and INFN LNL (Legnaro, Italy) with the Nuball2+DSSD, GALILEO+SPIDER, and AGATA+SPIDER setups, will allow us to bring a crucial experimental input to investigate fundamental aspects of the structure of doubly-magic nuclei and in their vicinity. In particular, with the new Coulomb-excitation data set we will provide further inputs to discuss some open questions, such as:

1. Are nuclei nearby doubly-magic isotopes spherical in their ground states?
2. What is the reason for the emergence of collectivity close to shell closures?
3. What is the potential role of triaxiality in forming deformed shapes in these regions? How “good”is the 28 magic number?

The full text of the presented LoI is attached in a separate PDF file.

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Session Classification: Session 2