Expanding the reach of Coulomb excitation experiments*

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Atomic nuclei provide a unique ground for investigating complex quantum phenomena. They are governed by interactions involving single-particle motion, the collective behaviour of nucleons and nucleon pairing. A combination of these can give rise to the coexistence of different nuclear shapes [1]. One of the richest regions is formed by very neutron-deficient nuclei with the proton number Z close to the magic 82 and the neutron number N close to 104 [2]. The task of nuclear structure physics is to unravel the myriad of quantum structure and to find the ordering principles governing nuclei. In this endeavour, versatile set of tools, both theoretical and experimental, are required to advance our understanding of this diverse field.

The advent of radioactive ion-beam facilities has allowed for performing Coulomb excitation experiments with exotic nuclei [3]. While these data can be used to assess the diagonal and transitional matrix elements [4], the analysis often requires complementary data obtained with stable-ion beams. In this presentation, recent efforts for studies of shape coexistence in the neutron-deficient lead region will be presented [5].

[1] K. Heyde and J. L. Wood, Rev. Mod. Phys. **83** (2011) 1467.
[2] P. E. Garrett, M. Zielińska and E. Clément, Prog. Part. Nucl. Phys, **124** (2022) 103931.
[3] M. Zielińska *et al.*, Eur. Phys. J. A **52** (2016) 99.
[4] P. Reiter and N. Warr, Prog. Part. Nucl. Phys, **113** (2020) 103767.
[5] P. Papadakis *et al.*, Eur. Phys. J. A **58** (2018) 42.

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