Nuclear DFT electromagnetic moments in heavy deformed open-shell odd nuclei*

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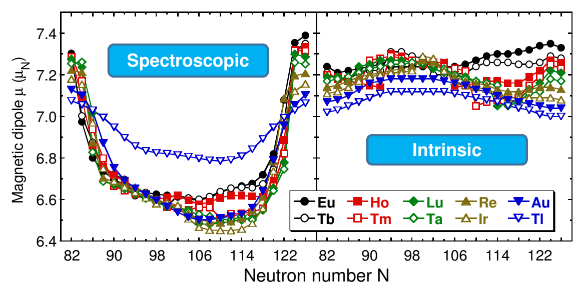
Nuclear electromagnetic moments provide essential information in our understanding of nuclear structure. Observables such as electric quadrupole moments are highly sensitive to collective nuclear phenomena, whereas magnetic dipole moments offer sensitive probes to test our description of microscopic properties such as those of valence nucleons. Although great progress was achieved in the description of electromagnetic properties of light nuclei and experimental trends in certain isotopic chains, a unified and consistent description across the Segré chart of nuclear electromagnetic properties remains an open challenge for nuclear theory.



In our nuclear-DFT methodology, we align angular momenta along the intrinsic axial-symmetry axis with broken spherical and time-reversal symmetries. We fully account for the self-consistent charge, spin, and current polarizations, in particular through the inclusion of the crucial time-odd mean-field components of the functional. Spectroscopic moments are then determined for symmetry-restored wave functions without using effective charges or effective g-factors and compared with available experimental data. We showed that the intrinsic magnetic dipole moments do not represent viable approximations of the spectroscopic ones, see the results plotted in the figure. In this talk, I will review the DFT description of nuclear electromagnetic moments and illustrate it with the results obtained in the unpaired odd near doubly magic nuclei [1], heavy paired odd open-shell nuclei [2,3], and in indium [4,5], silver [6], tin [7], and dysprosium [8] isotopes.

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* This work was partially supported by the STFC Grant Nos. ST/P003885/1 and ST/V001035/1, by the Polish National Science Centre under Contract No. 2018/31/B/ST2/02220, by a Leverhulme Trust Research Project Grant, and by the Academy of Finland under the Academy Project No. 339243. We acknowledge the CSC-IT Center for Science Ltd., Finland, for the allocation of computational resources. This project was partly undertaken on the Viking Cluster, which is a high performance compute facility provided by the University of York. We are grateful for computational support from the University of York High Performance Computing service, Viking and the Research Computing team.