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Linking fundamental interactions and nuclear structure via spectroscopy

Over the past several decades, the spectroscopy of atomic nuclei provided invaluable information towards our current understanding of nature at the most fundamental level. More recent state-of-the-art experiments have placed critical bounds on beyond the standard model (BSM) physics, while also offering important benchmarks for related theoretical calculations.

This work presents recent spectroscopic studies related to the above. These include experiments to perform precision tests of isospin-symmetry-breaking in the sd-shell [1] and to benchmark ^{136}Xe neutrinoless double beta decay ($0\nu\beta\beta$) matrix element calculations [2,3]. The latter studies were extended to ^{136}Cs [4], whose nuclear structure is also important for the detection of solar/supernova neutrinos and dark-matter events in large-scale xenon detector experiments.

- [1] M. Kamil, et al., Phys. Rev. C. 104, L061303 (2021).
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- [3] J. C. Nzobadila Ondze, et al., Phys. Rev. C. 103, 034329 (2021).
- [4] B. Rebeiro, et al., arXiv:2301.11371 (2023).

Primary author: TRIAMBAK, Smarajit

Presenter: TRIAMBAK, Smarajit

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