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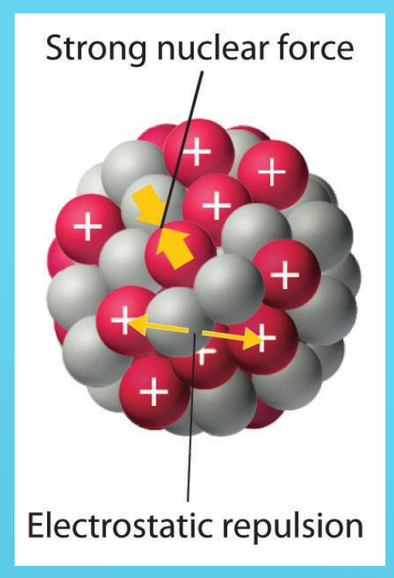

Nuclear Physics

« Electromagnetic and exotic characteristics of atomic nuclei »

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Electromagnetic interactions serve as essential probes for studying and testing our understanding of the atomic nucleus, as they reveal emergent properties across the nuclear chart. I will discuss the corresponding observables, which relate to charge and current distributions in nuclei, expressed through their multipole components, with a focus on theoretical results obtained within nuclear density functional theory (DFT). These are derived by determining self-consistent, symmetry-restored nuclear wave functions, along with their spectroscopic multipole moments. I will also discuss potential improvements in the formulation of magnetic dipole operators by including two-body meson-exchange contributions. Discussions of exotic symmetry-breaking moments will emphasize their importance for understanding fine details of fundamental nuclear interactions.

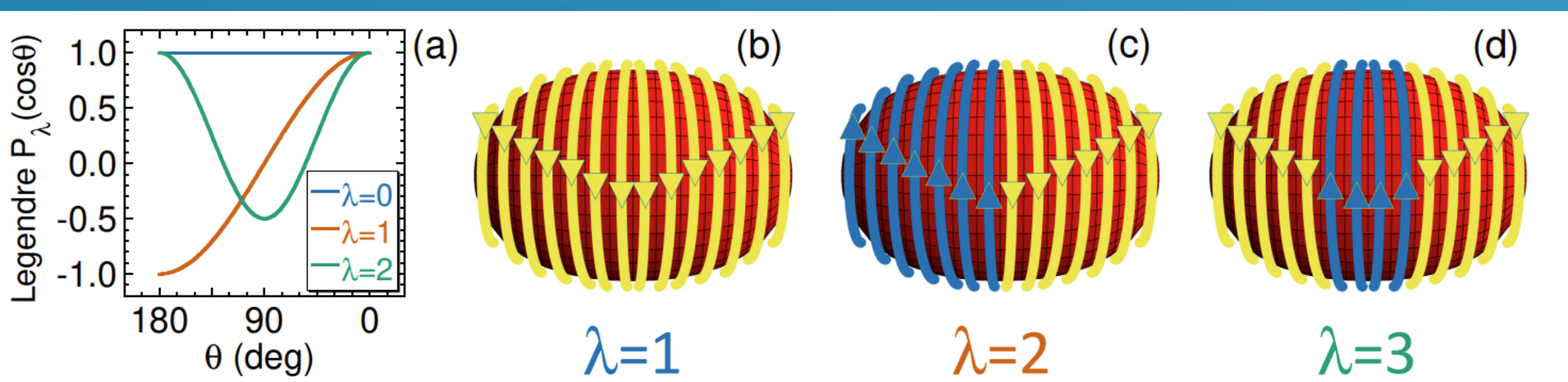

Figure 1: Legendre polynomials, $P_\lambda(\cos\theta)$ for $\lambda = 0, 1, 2$, (a), and the patterns of the current flows for the magnetic dipole (b), quadrupole (c), and octupole (d) moments of symmetry-broken aligned ground states of odd nuclei.

J. Dobaczewski et al., arXiv:2511.04632

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