Quasi-Dynamical Symmetries in Ab Initio Beryllium Nuclei

Recent advancements in supercomputers has provided researchers the ability to compute nuclear many-body wave functions with tens of billions of components. To digest this vast numerical information, we decompose nuclear wave functions according to symmetry groups. This gives rise to recognizable and persistent patterns over many states. These quasi-dynamical symmetries are especially pronounced along rotational bands. I apply these decompositions to ab initio calculations of Beryllium nuclei.

These observations suggest group theoretical decompositions represent an additional means of characterizing nuclear wave functions, expanding understanding of nuclear anatomy, and the possibility of compact symmetry-adapted many-body bases for future calculations.

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