

Abstract Submitted  
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**Symplectic no-core configuration interaction framework for *ab initio* nuclear structure. II. Structure of rotational states<sup>1</sup>** MARK A. CAPRIO, ANNA E. MCCOY, University of Notre Dame, TOMAS DYTRYCH, Academy of Sciences of the Czech Republic — Rotational band structure is readily apparent as an emergent phenomenon in *ab initio* nuclear many-body calculations of light nuclei, despite the incompletely converged nature of most such calculations at present. Nuclear rotation in light nuclei can be analyzed in terms of approximate dynamical symmetries of the nuclear many-body problem: in particular, Elliott's SU(3) symmetry of the three-dimensional harmonic oscillator and the symplectic Sp(3, R) symmetry of three-dimensional phase space. Calculations for rotational band members in the *ab initio* symplectic no-core configuration interaction (Sp-NCCI) framework allow us to directly examine the SU(3) and Sp(3, R) nature of rotational states. We present results for rotational bands in *p*-shell nuclei.

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