Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Searching for the Origin of Symplectic Symmetry Within the Chiral Effective Potential[1] KEVIN BECKER, KRISTINA LAUNEY, Louisiana State University, ANDREAS EKSTROM, Chalmers University of Technology — Nuclei have been known to exhibit remarkable features, such as rotational structure and enhanced deformation, that have been shown through first-principles structure calculations to be tied to almost perfect symplectic symmetry in nuclear dynamics [1]. We aim to understand the origins of these features by examining the underlying chiral potentials in the framework of the symmetry-adapted no-core shell model. As a first step, we compute the wavefunctions of light nuclei using a subset of the diagrams up to next-to-next-to-leading order, to gain insight into which parts of the chiral nucleon-nucleon forces respect symplectic symmetry, and which of them break it. This allows one to examine how collective modes in nuclei emerge from the chiral nucleon-nucleon forces, and provide complementary information to the recent global sensitivity analysis of the binding energy and charge radius of ^{16}O [2]. [1] T. Dytrych, K. D. Launey, J. P. Draayer, et al., Phys. Rev. Lett. 124, 042501 (2020) [2] A. Ekström and G. Hagen, Phys. Rev. Lett. 123, 252501 (2019)

[1]Searching for the Origin of Symplectic Symmetry Within the Chiral Effective Potential

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Date submitted: 29 Jun 2020 Electronic form version 1.4