Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Anapole Moments of Light Nuclei from Ab Initio Theory[1] PETR NAVRATIL, TRIUMF — Measurements of the nuclear spin dependent parity violating effects provide an opportunity to test nuclear models and to search for new physics beyond the Standard Model. Molecules possess closely spaced states with opposite parity which may be tuned to degeneracy to enhance the observed parity violating effects. An improved measurement of such effects with an unprecedented sensitivity using light triatomic molecules composed of light elements Be, Mg, N, and C is in preparation [1]. We applied the no-core shell model (NCSM) [2] to calculate anapole moments of ^{9}Be, ^{13}C, ^{14,15}N and ^{25}Mg needed for interpretation of this experiment. The only input for the NCSM calculations is the chiral Effective Field Theory two- and three-nucleon interaction and the parity-violating nucleon-nucleon interaction derived within the meson exchange theory [3]. The NCSM results differ from the predictions of the standard single-particle model and highlight the importance of including many-body effects in the calculations. [1] E. B. Norrgard *et al.*, Commun. Phys. **2**, 77 (2019). [2] B. R. Barrett, P. Navratil, and J. P. Vary, Progress in Particle and Nuclear Physics **69**, 131 (2013). [3] B. Desplanques, J. F. Donoghue, and B. R. Holstein, Annals of Physics **124**, 449 (1980).

[1]Supported by the NSERC Grant No. SAPIN-2016-00033. TRIUMF receives federal funding via a contribution agreement with the National Research Council of Canada. Computing support came from an INCITE Award on the Summit supercomputer of the Oak Ridge Leadership Computing Facility at ORNL and from Compute Canada.

Petr Navratil
TRIUMF

Date submitted: 08 Jul 2020 Electronic form version 1.4