Abstract Submitted
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An Effective Field Theory Approach to Rotational Bands in Odd Mass Nuclei[1] IBRAHIM ALNAMLAH, Ohio University, EDUARDO ANTONIO COELLO PEREZ, Lawrence Livermore National Laboratory, DANIEL PHILLIPS, Ohio University — We present the low-energy rotational bands resulting from the coupling of a fermion to a deformed axially-symmetric nucleus within an effective field theory (EFT). The low-energy degrees of freedom of the deformed nucleus result from the breaking of rotational symmetry and enter the Lagrangian as time derivatives of the orientation angels of the symmetry axis. In the body-fixed frame they couple to the total angular momentum of the additional fermion. To first order in rotor angular velocity this coupling is the well-known Coriolis coupling. The resulting Hamiltonian is systematically improved to higher orders in rotor velocity. The result is a systematic organization of terms that appear in classic formulae of the particle-plus-rotor model [1]. (See also the recent [2].) We apply our organization of the problem in different nuclei, and assess its validity by examining the residuals at each order in the expansion and discuss how the breakdown scale of the EFT manifests itself in such an analysis. [1] A. Bohr and B. R. Mottelson.Nuclear Structure. Vol. II: Nuclear Deformation. (W. A. Benjamin, Read-ing, Massachusetts, USA, 1975). [2] T. Papenbrock and H.A. Weidenm uller. In:(May2020). arXiv:2005.11865 [nucl-th].

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