APR10-2009-000143

Abstract for an Invited Paper
for the APR10 Meeting of
the American Physical Society

Algebraic methods for the nuclear geometric description

M.A. CAPRIO, University of Notre Dame

The geometric description of nuclear collective structure, consisting of the Bohr Hamiltonian and its generalizations, is based on the assumption that the dynamics of nuclear quadrupole excitations can be formulated in terms of collective deformation coordinates. The qualitative ideas arising from the approach (*e.g.*, β and γ vibrations) have been foundational to the interpretation of nuclear collective structure. An efficient and tractable scheme for numerical diagonalization of the geometric Hamiltonian, based on $\mathrm{SU}(1,1) \otimes \mathrm{SO}(5)$ algebraic methods, has recently been developed, allowing quantitative application to the full range of nuclear quadrupole rotational-vibrational structure, from spherical oscillator to axial rotor to triaxial rotor, without the need for approximations. In this talk, the algebraic approach will be described, and results and implications will be explored. Supported by the US DOE under grant DE-FG02-95ER-40934.