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The Evolution of Vibrational to Rotational Structure in Nuclei

JOE HANLEY, M.S. FETEA, V. NIKOLOVA, Department of Physics, University of Richmond — For more than 25 years, phase and shape evolution that are ultimately related to the mechanisms by which atomic nuclei generate angular momentum have been major themes in nuclear structure research. In certain circumstances, the motions of the individual protons and neutrons making up the nucleus couple, give rise to collective vibrations or rotations of the nucleus as a whole. This presentation focuses on a new method to discern the nuclear evolution from vibrational to rotational structure in nuclei, as a function of spin. The E-GOS (E-Gamma Over Spin) plot is an empirical approach that describes the structure of the nucleus circumventing all of the parameters and model dependencies that had to be assumed in past research. The work was completed in collaboration with groups from the Wright Nuclear Structure Laboratory at Yale University, and from the University of Surrey, Guildford, England and was supported by the NSF Grant No. PHY 0204811, Research Corporation Grant No. CC5494

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