Abstract Submitted
for the DNP07 Meeting of
The American Physical Society

Coupled SU(3) models of rotational states in nuclei and quasi-dynamical symmetry GABRIELA THIAMOVA, Department of Applied Mathematics, University of Waterloo,Waterloo, Ontario, Canada, DAVID JOHN ROWE, Department of Physics, University of Toronto, Toronto, Ontario, Canada — This work reports a first step towards the development of a model of low-lying nuclear collective states based on the progression from weak to strong coupling of a combination of systems in multiple SU(3) irreps. The motivation for such a model comes partly from the persistence of rotational structure observed experimentally and in many calculations. This work considers the spectra obtainable by coupling two SU(3) irreps via a qadr-qadr interaction. For a particular value of this interaction, the two irreps combine to form strongly-coupled irreps while for zero interaction the results are mixtures of many such strongly-coupled irreps. A notable result is the persistence of the rotor character of the low-energy states for a wide range of the interaction strength. Also notable is the fact that, for very weak interaction strengths, the energy levels of the yrast band resemble those of a vibrational sequence while the B(E2) transition strengths are close to those of an axially symmetric rotor, as observed in many nuclei. An application to shape coexistence in ^{16}O is considered to show that the model gives an indication of which *np-nh* states are likely to contribute to the low-energy states of nuclei.

Gabriela Thiamova
Department of Applied Mathematics, University of Waterloo,
Waterloo, Ontario, Canada

Date submitted: 25 Jun 2007 Electronic form version 1.4