

# MICROSCOPIC DESCRIPTION OF THE PYGMY DIPOLE RESONANCE IN NEUTRON-RICH NUCLEI

N.N. Arsenyev\*, A.P. Severyukhin<sup>†</sup>, V.V. Voronov<sup>‡</sup> and Nguyen Van Giai<sup>§</sup>

## Abstract

We study the effects of the phonon-phonon coupling on the low-energy electric dipole response in a microscopic model based on an effective Skyrme interaction. The finite rank separable approach for the quasiparticle random phase approximation is used. Choosing as an example the calcium isotopic chain, we demonstrate the ability of the method to describe the properties of the low-energy  $E1$  strength distribution. Using the same set of parameters we describe available experimental data for  $^{40,44,48}\text{Ca}$  and we give predictions for  $^{50-58}\text{Ca}$ .

**keywords:** QRPA, Energy density functional, Pygmy resonance

---

\*arsenev@theor.jinr.ru Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow region, Russia;

<sup>†</sup>Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow region, Russia; Dubna State University, 141982 Dubna, Moscow region, Russia;

<sup>‡</sup>Bogoliubov Laboratory of Theoretical Physics, Joint Institute for Nuclear Research, 141980 Dubna, Moscow region, Russia;

<sup>§</sup>Institut de Physique Nucléaire, CNRS-IN2P3 and Univ. Paris-Sud, 91405 Orsay, France;