CENTRE D'ETUDES NUCLÉAIRES DE BORDEAUX-GRADIGNAN

Vendredi 16 Janvier 2015

à

11H00

Un café sera servi à partir de 10h45

Kosuke NOMURA

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Microscopic and algebraic theory for nuclear collective structure

The nuclear shapes and the corresponding collective excitations present one of the most intriguing themes of nuclear physics. The energy density functional (EDF) framework makes possible a global and reasonable description of ground-state properties and collective excitations over the whole nuclide chart. On the other hand, the algebraic theories of interacting bosons, e.g., the interacting boson model (IBM), has been successful in the description of low-energy collective structure in medium-heavy and heavy nuclei.

To describe spectroscopic properties of nuclei based on a global theory, we have developed a robust framework constructed by linking microscopic EDF framework to the IBM. The principal idea is to establish an appropriate mapping between nucleon and boson systems, and thereby the Hamiltonian of the IBM, that is used for calculating excitation spectra and transition rates, can be determined for various situations of low-energy quadrupole and octupole collective states and shape coexistence without invoking phenomenological adjustment to experiment. In this way, bridge is made over the gap between the EDF and IBM, implying that the two methodologies can develop collaboratively. This also points to a microscopic formulation of the IBM for general cases and, in particular, the IBM gains the capability of predicting spectroscopy of heavy exotic nuclei, which is one of the declared objectives of radioactive-ion-beam facilities.

This seminar will address the basic notions and the relevant examples resulting from this approach.

Salle des Séminaires du CENBG

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