SÉMINAIRE du GROUPE THÉORIE

INSTITUT DE PHYSIQUE NUCLÉAIRE
Groupe de Physique Théorique
Bât. 100, F-91406 ORSAY CEDEX
Tél (33)-(0)1-6915-7330 - Fax (33)-(0)1-6915-7748

Jérémy Bonnard
IPN Orsay

Constrained-Path Quantum Monte-Carlo Approach for the Nuclear Shell Model

The interacting shell model is a powerful theoretical framework for studying the nuclear structure. Unfortunately, the combinatorial scaling of the many-body space with the number of valence nucleons or the size of the single-particle basis strongly restricts its applicability. Quantum Monte-Carlo (QMC) methods may then be considered as attractive techniques to overcome such limitations by offering an alternative to the diagonalization of the Hamiltonian. In this context, I will present a new QMC approach for the shell model yielding nearly exact spectroscopies of nuclei. The originality of the formalism lies in the use of a variational symmetry-restored wave function to 'guide' the Brownian motion, as well as to control the sign/phase problem that generally makes the traditional QMC samplings totally ineffective by causing a prohibitive growth of the statistical errors.

[1] J. Bonnard & O. Juillet, *Phys. Rev. Lett.* 111, 012502 (2013).
[2] J. Bonnard & O. Juillet, *Eur. Phys. J. A* 52, 110 (2016).
[3] O. Juillet, A. Leprévost, J. Bonnard, & R. Frésard, cond-mat/1610.08022 (2016).

Mercredi 08 mars 2017, 11h30
IPN, Bât. 100, Salle A015