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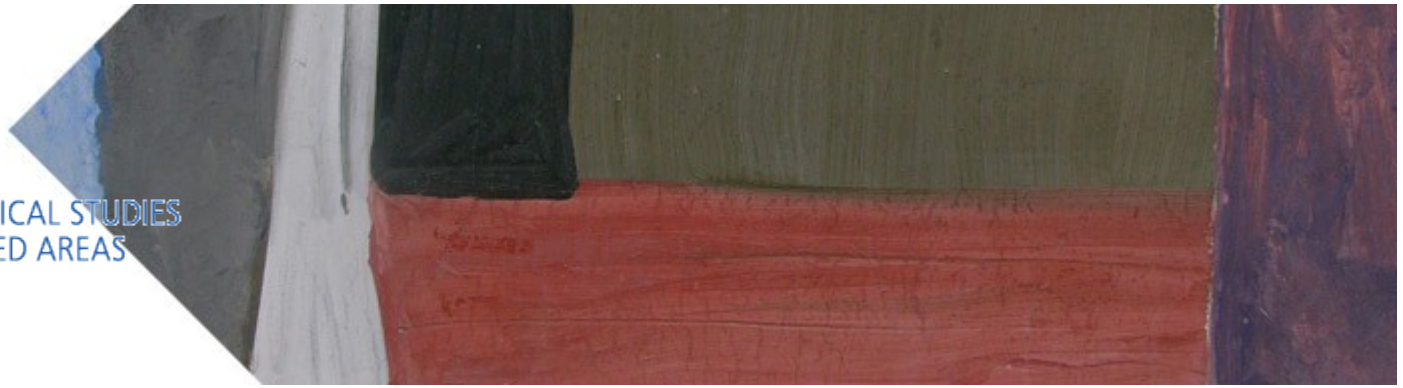
EUROPEAN CENTRE FOR THEORETICAL STUDIES
IN NUCLEAR PHYSICS AND RELATED AREAS



Prospects on the microscopic description of odd mass nuclei and other multi-quasiparticle excitations with beyond-mean-field and related methods

M. Bender, T. Rodriguez and L. M. Robledo

Motivation

Not everything is ground state properties and collective excitations in even-even nuclei

Odd-A and Odd-Odd represent ¾ of all possible nuclei in the nuclear chart

Two, Four, etc quasiparticle excitations built on the ground state make also a large fraction of the low energy nuclear spectrum

In spite of all that, theoretical calculations mostly focus on even-even collective excitations

- Less sensitive to interaction details
- In most of the cases no time reversal breaking and no time-odd fields required
- Less sensitive to details of the solution of the many-body problem

Motivation

- HFB to describe odd systems: blocking. Symmetries and connection with observables
- HFB to describe multi-quasiparticle excitations: high-K isomers as an example.
- Symmetry restoration: Cranking intrinsic states, odd systems, etc.
- Configuration mixing with the GCM: extension to odd mass systems and combined description of collective and single particle excitations.
- Large scale shell model approaches.
- Quasiparticle random phase approximation and PVC .
- Evaluation of collective inertias for fission and collective Hamiltonians.
- Nuclear reactions: β-decay and associated modes.
- Time odd sector of effective interactions
- Odd nuclei as a laboratory for tests of the standard model.
- Other approaches: the IBM for odd systems, ab-initio methods in medium mass odd-nuclei.

Motivation

Last but not least we wanted some insight from the experimental side

- Future perspectives
- Observables of interest (magnetic moments, tansition strengths, etc)

Goals and spirit

The goals of the workshop are

- Discuss the difficulties encountered in solving the many body problem
- Discuss ideas on how to overcome those difficulties
- Discuss ideas on how to define/fit the time-odd sector effective interactions

We want to achieve them by promoting discussions both during the talks and at the end of the day

Please, do not be shy, we are not here to show how clever we are but to discuss about common problems