

Report of FUSTIPEN visit to GANIL
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The main objective of the visit was to explore with Denis Lacroix the possibility for a collaboration on the dynamical theory of pairing phenomena. Lacroix has developed a code to numerically compute the time evolution of two-particle wave functions in the presence of a one-body potential field and a two-particle residual interaction. I have been interested in applying time-dependent Bogoliubov-de Gennes equations to questions of nuclear dynamics, particularly fission dynamics. It appears that there is enough common interest to begin a collaboration. The first phase would consider a simple Hamiltonian that can be treated by the numerical exact method as well as the TDBdG equations.

Lacroix and I also discussed ideas for going beyond the usual parameterizations of the induced three-body interaction. One certainly would like to avoid fractional powers of the density. Ideally one could find a form that could be expressed as a 3-body Hamiltonian in Fock space. The recently proposed parameterization using the full density matrix to the third power has good features but does not meet the last criterion.

A secondary objective of the visit was to find collaborative support for a proposed project to build a computational framework to calculate spectroscopic properties of odd-A nuclei starting from self-consistent mean field theory (including pairing). My principal collaborator on this project is L.M. Robledo (Madrid), but there are many threads for a larger effort. I had a number of interesting discussions on this subject in GANIL, with Lacroix, Goutte, and others. However, there were no plans agreed upon to go forward in a common effort.

My visit was also a good opportunity to participate in the FUSTIPEN workshop, "Neutron-proton pair correlations in N~Z nuclei", Feb. 3, 2011. There is now a high interest in studying neutron-proton correlations at high mass numbers on the N~Z line. P. Van Isacker gave an interesting interpretation of new spectroscopic data on ^{92}Pd using properties of shell configurations in high-J orbitals. Perhaps these ideas could be followed up in the self-consistent mean field approach, once the tools for projection of angular momentum and particle number are incorporated into the theory.

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