FIAS Seminar

Thursday, February 4, 2010, 14:30
FIAS, Ruth-Moufang-Str. 1, 60438 Frankfurt am Main
Lecture Hall 0.100

Speaker:  Prof. Dr. Xavier Viñas, Physics Faculty, University of Barcelona

Title:  Finite nuclei description based on microscopic Brueckner-Hartree-Fock calculations

Abstract: Recently we have presented a new non-relativistic nuclear energy density functional which is constructed, not as usual, from an effective density dependent nucleon-nucleon force but directly introducing in the functional results from microscopic nuclear and neutron matter Bruckner G-matrix calculations at various densities. We add a purely phenomenological finite range part to account for surface properties. We take from the literature a density dependent zero range force to describe the pairing correlations. We find that only four to five adjustable parameters, spin-orbit included, suffice to reproduce nuclear binding energies and radii with the same quality as obtained with the most performant effective forces. We also explore the deformation properties of this new functional finding an excellent agreement with the results computed using the Gogny D1S force. As an astrophysical application, we use this new functional to study the inner crust of the neutron stars.