Nuclear Seminar

Exotic nuclear structure and origin of the heavy nuclei with covariant density functional theory

Prof. Jie Meng, School of Physics, Peking University

Monday, November 12 ❖ 4:00 P.M. ❖ 124 NSH

The density functional theory with a minimal number of parameters allows a very successful phenomenological description of nuclear ground state as well as excited state properties all over the nuclear chart. In this talk, two recent progresses, 1) the deformed relativistic Hartree-Bogoliubov theory in continuum, and 2) the fully self-consistent proton-neutron quasiparticle random phase approximation, which is newly developed based on the relativistic Hartree-Fock-Bogoliubov theory, are briefly reviewed. The halo phenomenon in deformed weakly bound nuclei and the beta-decay half-lives of the neutron-rich nuclei are discussed. With the beta-decay half-lives of the neutron-rich nuclei obtained, the speeding-up of the r-matter flow is suggested which thus produces higher r-process abundances of elements with A~140 and help us to understand the origin of heavy elements in the universe. The constraints of nuclear mass model and astrophysical condition by the observed Solar abundance are discussed.

Notre Dame Science
Department of Physics