

Ground state phase transition in the Nilsson mean-field plus pairing model

Friday, 20 October 2017 17:00 (20 minutes)

Nuclear pairing correlation, as an important part of the residual interactions necessary to augment any nuclear mean-field theory, represents one of the main and longstanding pillars of current understanding of nuclear structure. Particularly, the pairing interaction in the nuclear shell model plays a key role to reproduce ground state properties of nuclei, such as binding energies, two-neutron (proton) separation energies, odd-even effects, and excitation spectra, etc. In this presentation, I will briefly review the exact solutions of mean-field plus pairing models which works well for the ground states of spherical nuclei as well as well-deformed heavy nuclei. They are also successfully applied to describe the ground state phase transitions in some isotopes. The results may provide a microscopic insight of the ground state phase transitional behaviors in which the competition between the Nilsson mean-field and the pairing interaction may be the driven force based on the present model.

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Track Classification: SFS - KF