Mean-field derivation of the Interacting Boson Model for deformed nuclei KOSUKE NOMURA, LU GUO, NORITAKA SHIMIZU, Department of Physics, University of Tokyo, TAKAHARU OTSUKA, Department of Physics, University of Tokyo / Center for Nuclear Study, University of Tokyo / RIKEN Nishina Center / MSU — We propose a new scheme to determine a Hamiltonian of the Interacting Boson Model (IBM) microscopically, starting from the mean-field model with Skyrme-type interactions [PRL101, 142501 (2008)]. The multi-fermion dynamics of surface deformation and the effects of nuclear forces are simulated by bosonic degrees of freedom. By comparing the potential energy surface of the mean-field model with that of the IBM, the parameters of the IBM Hamiltonian can be obtained as functions of N and Z. One of the merits is being able to compute levels and wave functions of excited states precisely. By this method, existing cases of dynamical symmetries of the IBM and the critical-points of the quantum shape-phase transitions can be reproduced. Moreover, intriguing spectroscopic properties, e.g., unexpectedly large region of the E(5) symmetry, are predicted for experimentally unknown heavy exotic nuclei such as osmium and tungsten isotopes with $N > 126$. Finally, we would like to discuss more precise analysis on excited spectra of well-deformed samarium nuclei by making a minor correction for the present mapping procedure. The strategy and the preliminary results will be presented.

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Date submitted: 01 Jul 2009   Electronic form version 1.4