COMPREHENSIVE *AB INITIO* STUDY OF LIGHT NUCLEI WITH JISP16 *NN* INTERACTION

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We perform a detailed *ab initio* study of all known states in *s*- and *p*-shell nuclei with a width not exceeding 300 keV using a realistic JISP16 *NN* interaction [1]. This interaction was obtained in the *J*-matrix inverse scattering approach [2] and fitted by phase-equivalent transformations to reproduce properties of light nuclei without three-nucleon forces. The effect of three-nucleon interaction is mimicked by off-shell properties of JISP16.

The calculations of nuclear observables are performed in the No-core Shell Model [3] using modern supercomputers and largest attainable basis spaces. The results for energies of ground and excited states are extrapolated to the infinite basis space (the so-called No-core Full Configuration (NCFC) approach [3]) using various extrapolation techniques. The NCFC approach makes it possible to estimate the uncertainty of theoretical predictions for energies.

It is shown that the JISP16 *NN* interaction provides an accurate description of binding energies and spectra of nuclei with $A \leq 12$. The NCFC extrapolation technique and new generation of supercomputers which make it possible to increase basis spaces in NCSM calculations, reveals a drawback of JISP16 interaction: it overbinds nuclei at the end of *p* shell.

I discuss a recent progress in fully microscopic description of light nuclei and further development of *NN* interaction of JISP type.

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3. P.Maris, J.P.Vary, A.M.Shirokov // Phys. Rev. C. 2009. V.79. 014308.