SEMINÁŘ OTF ÚJF, ŘEŽ

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Ab initio structure of light nuclei with a natural orbital basis

Abstrakt

Ab initio calculations of nuclear structure face the challenge of describing a complex multiscale quantum many-body system. The nuclear wave function has both strong short-range correlations and long-range contributions.

Natural orbitals provide the means of adapting the single-particle basis for ab initio nuclear no-core configuration interaction (NCCI) calculations to better match the many-body wave function. Natural orbitals are obtained by diagonalizing the one-body density matrix from a calculation using an initial single-particle reference basis, such as the traditional harmonic oscillator basis. A natural orbital basis builds in contributions from high-lying oscillator shells, accelerating convergence of wave functions, energies, and other observables.

This talk will provide an introduction to the use of natural orbitals in NCCI calculations. We will explore the convergence of calculated energies, radii, and electromagnetic observables in p-shell nuclei.

Seminář se koná v pátek 9. 9. 2016 v 10:30 hod.
v seminární místnosti OTF ÚJF v Řeži

A. Cieplý/otf