

ERROR ANALYSIS OF NUCLEAR MATRIX ELEMENTS

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We have recently made an error analysis of nuclear two-body forces [1–7] which lie at the heart of nuclear structure calculations based on a suitable coarse graining of the unknown short range part of the NN interaction that allows to quantify the uncertainties in the potential parameters. Most modern Nuclear Structure calculations are carried out by diagonalization of the many body nuclear Hamiltonian within the harmonic oscillator shell model basis. However, very little is actually known about the expected accuracy of those calculations based on our lack of knowledge of the NN interaction. This may help to set up a priori the needed accuracy to solve the many body problem. Previous estimates indicate that in many cases numerical precision in the solution is larger than the theoretical uncertainties [3,5,7]. Therefore errors are mostly determined from the input NN interaction. The impact of chiral Two Pion Exchange interactions [2] in the evaluation of nuclear matrix elements based on our error analysis both OPE and TPE description of np and pp scattering data is analyzed.

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