

EFFECTIVE FIELD THEORY ANALYSIS OF POLYELECTRONS TO HIGH NUMERICAL PRECISION*

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We apply an effective field theory to analyze polyelectron systems numerically with high precision. By introducing an energy cutoff to kill the divergence of the Coulomb interaction we construct a Hamiltonian for the system that is easier to work with. Details of the short-range interactions can be accounted for by including as many terms as needed from a series of corrections. Furthermore, we choose to work in a non-orthogonal basis that simplifies the calculation of matrix elements. The final step involves solving a generalized eigenvalue problem and we discuss how one can do this to high numerical precision efficiently. It should be noted that, although we use the polyelectron systems as an example, all techniques applied are quite general.

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