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New methods in spectral theory of N-body Schrödinger operators

We develop a new scheme of proofs for spectral theory of the N-body Schrödinger operators, reproducing and extending a series of sharp results under minimum conditions. The main results include Rellich's theorem, limiting absorption principle bounds, microlocal resolvent bounds, Hölder continuity of the resolvent and a microlocal Sommerfeld uniqueness result. We present a new proof of Rellich's theorem which is unified with exponential decay estimates studied previously only for L^2-eigenfunctions. Each pair-potential is a sum of a long-range term with first order derivatives, a short-range term without derivatives and a singular term of operator- or form-bounded type. The setup can also include hard-core interactions. Our proofs consist of a systematic use of commutators with 'zeroth order' operator, not like the standard 'first order' conjugate operator in the Mourre theory. In particular, our proofs do not rely on Mourre's differential inequality technique. This talk is based on a recent joint work with T. Adachi, K. Itakura and E. Skibsted.