ABSENCE OF POSITIVE EIGENVALUES FOR HARD-CORE 2-BODY SCHRÖDINGER OPERATORS.

Erik Skibsted
Aarhus University

Consider the N-body Schrödinger operator

$$H=\sum_{j=1}^{N}\Big(-\frac{1}{2m_j}\Delta_{x_j}+V_j^{\mathrm{ncl}}(x_j)\Big)+\sum_{1\le i<j\le N}V_{ij}^{\mathrm{elec}}(x_i-x_j)$$

on the exterior of a bounded strictly convex obstacle $\Omega\subset\mathbb{R}^n$. Whence H is an operator on the Hilbert space $L^2\big((\mathbb{R}^n\setminus\Omega)^N\big)$. It is defined more precisely by imposing the Dirichlet boundary condition. This operator models a system of N n-dimensional electrons interacting with a fixed nucleus of finite extent, for example ball-shaped. We address the problem of proving absence of positive eigenvalues. While this property is well-known for the one-body problem it is open for $N\geq 2$. We give an account of a general procedure involving high energy resolvent estimates for obstacle problems which can be implemented for the case $N=2$, [1].

Keywords: Schrödinger operator with obstacle, Mourre estimate, high-energy resolvent estimate

[1] K. Ito, E. Skibsted, *Absence of positive eigenvalues for hard-core many-body Schrödinger operators*, in preparation.