

Abstract

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Subexponential decay rates of atomic eigenfunctions at critical threshold

Joint with Dirk Hundertmark and Markus Lange

In the talk we present a new method for calculating the decay rates of eigenfunctions for eigenvalues below the threshold of the essential spectrum. Our method is applicable also for eigenvalues at the threshold provided that the eigenfunction exists. We apply our result to the ground states of N electron atoms. We show that the decay rate of an eigenfunction at the threshold of the essential spectrum behaves as $\exp(-C\sqrt{|x|_\infty})$, where $|x|_\infty = \max_j(\|x_j\|)$ is the maximal distance of electron coordinates at the given point. We also show the existence of the eigenstate at the threshold where it turns out that our uniform estimates play a crucial role.