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Eigenfunction Decay Rates for Eigenvalues at Threshold of Essential Spectrum

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In the talk we present a new method for calculating 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. In fact, our a-priori bounds are the crucial first step in the proof that bound states at thresholds exist. We apply our result to ground states of Helium atom and bipolaron. We show that the decay rate of an eigenfunction at the threshold of the essential spectrum behaves as $\exp\left(-C\sqrt{|x|_\infty}\right)$, where $|x|_\infty = \max_j(|x_j|)$ is the maximum of electron coordinates.