Title: Sharp lower bounds on a resonance counting function in even-dimensional Euclidean scattering

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Mathematically, resonances may serve as a replacement for discrete spectral data for a class of operators with continuous spectrum. Physically, they correspond to decaying waves.

Motivated in part by the Weyl asymptotics of the eigenvalue counting function for the eigenvalues of the Laplacian on a compact manifold, we consider the large $r$ behavior of a resonance counting function. Restricting ourselves to even-dimensional Euclidean scattering, we count the number of resonances in a (certain) region which grows as a parameter $r \to \infty$. Upper bounds on this resonance counting function are due to Vodev and have been known for some time. We prove sharp lower bounds for obstacle scattering without a need for trapping assumptions. Similar lower bounds are proved for some other compactly supported perturbations of $-\Delta$ on $\mathbb{R}^d$, for example, for certain metric perturbations. Some of the tools used in the proof include a Poisson formula, bounds on the trace norm of the scattering matrix on the real axis and some consequences, and the behavior of the wave trace near $t = 0$.