

ISORESONANT POTENTIALS

T. J. CHRISTIANSEN

Consider the Schrödinger operator $-\Delta + V$ on \mathbb{R}^d , where the potential $V \in L_0^\infty(\mathbb{R}^d)$. If $V \in C_c^\infty(\mathbb{R}^d; \mathbb{R})$, then if V is non-trivial the Schrödinger operator has infinitely many resonances. However, if $d \geq 2$ there are non-trivial complex-valued potentials $V \in C_c^\infty(\mathbb{R}^d)$ for which the corresponding Schrödinger operator has no resonances. More generally, one can explicitly construct families of isoresonant, compactly supported complex-valued potentials in dimensions at least 2.

Open problems: Is there some other data related in some way to spectral or pseudo spectral properties of the operators that distinguish elements (potentials) in these sets? There are related families of isospectral Schrödinger operators in other settings— on the unit circle, for example. One can ask the same question there.