Mourre inequality for non-local Schödinger operators

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We consider the Mourre inequality for the following self-adjoint operator

$$H = \Psi(-\Delta/2) + V$$

acting on $L^2(\mathbb{R}^d)$, where $\Psi : [0, \infty) \to \mathbb{R}$ is an increasing function, Δ is Laplacian and $V : \mathbb{R}^d \to \mathbb{R}$ is an interaction potential. Mourre inequality immediately yields the discreteness and finite multiplicity of the eigenvalues. Moreover, Mourre inequality has the application to the absence of the singular continuous spectrum by combining the limiting absorption principle and, in addition, Mourre inequality is also used for proof of the minimal velocity estimate that plays an important role in the scattering theory.

In this talk, we report that Mourre inequality holds under the general Ψ and V by choosing the conjugate operator $A = (p \cdot x + x \cdot p)/2$ with $p = -\sqrt{-1}\nabla$, and that the discreteness and finite multiplicity of the eigenvalues hold. This talk is a joint work with J. Lőrinczi (Hungarian Academy of Sciences) and I. Sasaki (Shinshu University).

References.

[1] A. Ishida, J. Lőrinczi, I. Sasaki, Absence of embedded eigenvalues for non-Local Schrödinger operators. *arXiv*: 2109.01564.