

On the scattering problem for the nonlinear Schrödinger equation with a potential in 2D

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This is a joint work with Vladimir Georgiev. We consider the scattering problem for the nonlinear Schrödinger equation with a potential in 2D. Appropriate resolvent estimates are proved and applied to estimate the operator $A(s)$ appearing in commutator relations. The equivalence between the operators $(-\Delta_V)^{\frac{s}{2}}$ and $(-\Delta)^{\frac{s}{2}}$ in L^2 norm sense for $0 \leq s < 1$ is investigated by using free resolvent estimates and Gaussian estimates for the heat kernel of the Schrödinger operator $-\Delta_V$. Our main result guarantees the global existence of solutions and time decay of the solutions assuming initial data have small weighted Sobolev norms. Moreover, the global solutions obtained in the main result scatter.