Inverse scattering problem at fixed energy for the Schrödinger operator with external Yang-Mills potentials.

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December 17, 2001

Consider the Schrödinger equation of the form

$$(1)\qquad \left(-i\frac{\partial}{\partial x} + A(x)\right)^2 u(x) + V(x)u - k^2 u = 0, \qquad x \in \mathbb{R}^n,$$

where $n \geq 3$, $A(x) = (A_1(x), \dots, A_n(x))$, $A_j(x)$ and $V(x)$ are $m \times m$ matrices, $k > 0$. We assume that Yang-Mills potentials $A(x)$, $V(x)$ have compact support and $A(x)$ is smooth up to the order $n_0 \geq n + 3$.

Theorem 1. If two Schrodinger operators with potentials $(A(x), V(x))$ and $(A'(x), V'(x))$ respectively have the same scattering amplitude $a(\theta, \omega, k)$ for k fixed and all $\theta, \omega \in S^{n-1}$ then $(A(x), V(x))$ and $(A'(x), V'(x))$ are gauge equivalent.

To prove Theorem ?? we consider the inverse boundary value problem for (??) in a smooth bounded convex domain in $\mathbb{R}^n$. Then the well-known connection between the inverse scattering problem at fixed energy and the inverse boundary value problem gives Theorem ??.

References

[E] G.Eskin, Global uniqueness in the inverse scattering problem for the Schrödinger operator with external Yang-Mills potentials, to appear in Commun. Math. Phys.