

Meeting: 1003, Atlanta, Georgia, SS 4A, AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, I

1003-35-126 **Xiaosheng Li*** (xli@math.ucla.edu), Department of Mathematics, UCLA, Los Angeles, CA 90095-1555. *Inverse Scattering Problem for the Schrödinger Operator with External Yang-Mills Potentials in Two Dimensions.*

We study the inverse problem of recovering information about the Yang-Mills potentials in the Schrödinger equation from the scattering amplitude at fixed energy. It is known that the gauge equivalent potentials have the same scattering amplitudes, so one can only hope to determine the potentials uniquely, modulo a gauge transformation. Previous work has been done in this direction by R. Novikov and G. Khenkin, and then by G. Eskin and J. Ralston. In 2001, G. Eskin proved a global uniqueness result for compact supported potentials for dimensions $n \geq 3$. The two dimensional case is especially difficult because in this case the inverse problem is formally determined. The only known results are when the scattering amplitude is given for all energies (D. Finch and G. Uhlmann, G. Eskin). We establish a local uniqueness result in two dimensions: If the Yang-Mills potentials are exponentially decaying and small, then they can be determined from the scattering amplitude at fixed energy, modulo a gauge transformation. (Received August 09, 2004)