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**Michael Victor Klivanov\***, Michael V. Klivanov, University of North Carolina at Charlotte, Charlotte, NC 28223. *Phaseless inverse scattering problems and Carleman weight functions for global convergence.*

Phaseless inverse scattering problems are common in: 1. Quantum inverse scattering theory, where only the differential cross-section can be measured outside the scatterer. 2. Lensless imaging of nanostructures. This imaging is vital for quality control of manufactured nanostructures.

The question about the investigation of #1 was posed by K. Chadan and P.C. Sabatier in their book of 1977 and was also posed implicitly by R.G. Newton in his book of 1989. However, no progress was achieved until a work of the author in 2014.

1. Uniqueness theorems. 2. Reconstructions methods.

This is closely linked with another topic: global convergence for Coefficient Inverse Problems (CIPs). We call a numerical method for a CIP "globally convergent" if there is a theorem which guarantees that this method delivers at least one point in a sufficiently small neighborhood of the correct solution without a priori knowledge of this neighborhood. This theorem must be confirmed numerically.

The only alternative to global convergence is the least squares minimization. However, there is no guarantee of convergence of this technique, unless a very good first guess about solution is known in advance.

We will present:

A globally convergent method based on Carleman Weight Functions. (Received September 02, 2016)