On non-overdetermined inverse scattering at zero energy in three dimensions

ROMAN G. NOVIKOV

Abstract. We develop the $\bar{\partial}$-approach to inverse scattering at zero energy in dimensions $d \geq 3$ of [Beals, Coifman 1985], [Henkin, Novikov 1987] and [Novikov 2002]. As a result we give, in particular, uniqueness theorem, precise reconstruction procedure, stability estimate and approximate reconstruction for the problem of finding a sufficiently small potential v in the Schrödinger equation from a fixed non-overdetermined ("backscattering" type) restriction $h\big|_\Gamma$ of the Faddeev generalized scattering amplitude h in the complex domain at zero energy in dimension $d = 3$. For sufficiently small potentials v we formulate also a characterization theorem for the aforementioned restriction $h\big|_\Gamma$ and a new characterization theorem for the full Faddeev function h in the complex domain at zero energy in dimension $d = 3$. We show that the results of the present work have direct applications to the electrical impedance tomography via a reduction given first in [Novikov, 1987, 1988].

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