Inverse problems of quantum and acoustic scattering at fixed frequency

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Abstract

We consider inverse problems of quantum and acoustic scattering at fixed frequency in dimension d=2 and d=3. These problems arise, in particular, in ultrasonic tomography and in tomographies using some elementary particles (for example, electrons) as incoming and outcoming waves. We present old and very recent results on these problems. In particular, we consider iterative and non-iterative reconstruction algorithms. The most efficient of our non-iterative reconstruction algorithms are based on the techniques of non-local Riemann-Hilbert problems of inverse scattering.