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Inverse scattering for elastic plane cracks. (English) [Zbl 0929.35170]

The paper studies the scattering of elastic $P$- and $S$-waves by cracks $\Gamma$. Two main results concerning the inverse scattering problem are proven. In the first one, the authors show uniqueness: The set of far field patterns corresponding to all incident $P$- and $S$-waves uniquely determines the crack $\Gamma$. If $\Gamma$ is a priori known to be a plane crack (i.e. subset of the plane $x_3 = 0$) it can be identified by only one incident wave. In the second result it is shown that plane cracks are characterized by the vanishing of the horizontal component of the far field pattern along horizontal directions. The paper contains no numerical method.

Reviewer: A.Kirsch (Karlsruhe)

MSC:
35R30 Inverse problems for PDEs
74J25 Inverse problems for waves in solid mechanics

Keywords:
Navier’s equations; scattering of elastic $P$- and $S$-waves; uniqueness; far field patterns; plane cracks

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