

On uniqueness in inverse elastic scattering

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The inverse scattering problem of determining a bounded obstacle by its far field patterns is fundamental for exploring bodies by acoustic, electromagnetic or elastic waves, and its uniqueness presents important and challenging open questions since many years. The talk starts with an overview on recent uniqueness results, due to Alessandrini and Rondi [1], Liu and Zou [3], Yamamoto and the speaker [2], for the problem of determining sound-soft and sound-hard polyhedral obstacles by a finite number of incident waves. The proof of these results relies essentially on the reflection principle for the Helmholtz equation.

Then we consider the third and fourth exterior boundary value problems of linear elasticity and present new uniqueness results for the corresponding inverse scattering problems with polyhedral elastic obstacles and a finite number of incident plane waves. This is joint work with M. Yamamoto, and the approach is based on a reflection principle for the Navier equation.

References

- [1] G. Alessandrini and L. Rondi, Determining a sound-soft polyhedral scatterer by a single far-field measurement, *Proc. Amer. Math. Soc.* **133** (2005), 1685-1691.
- [2] J. Elschner and M. Yamamoto, Uniqueness in determining polyhedral sound-hard obstacles with a single incoming wave, *Inverse Problems* **24** (2008), 035004.
- [3] H. Liu and J. Zou, Uniqueness in an inverse acoustic obstacle scattering problem for both sound-hard and sound-soft polyhedral scatterers, *Inverse Problems* **22** (2006), 515-524.