

# A near-field inverse scattering problem for a thermoelastic ellipsoid

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## Abstract

In this work the scattering problem of time-harmonic thermoelastic waves from an ellipsoidal obstacle is considered. The direct scattering problem using low-frequency approximation is formulated. We study a new method using near-field data for solving the corresponding inverse scattering problem determining the size and the orientation of the ellipsoid. A finite number of measurements of the leading order terms of the scattered field in the low-frequency approximation leads to specify the semi-axes of the ellipsoid. The orientation of the ellipsoid is obtained by using a rotation matrix whose elements are in terms of the Euler angles. Corresponding results for geometrically degenerate cases of the ellipsoid such as spheroids, spheres, needles and discs are obtained for appropriate values of the physical and geometrical parameters.

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