Stekloff Eigenvalues in Inverse Scattering

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Abstract

We analyze a proposed method for non-destructive testing in which small changes in the (possibly complex valued) refractive index of an inhomogeneous medium of compact support are to be determined from changes in measured far field data due to incident plane waves. Discussing first the Helmholtz equation, the problem is studied by considering a modified far field operator whose kernel is the difference of the measured far field pattern due to the scattering object and the far field pattern of an auxiliary scattering problem with the Stekloff boundary condition imposed on the boundary of a domain containing the scattering object. It is shown that scattering data can be used to determine the Stekloff eigenvalues corresponding to this domain. Extensions to Maxwell's equations will also be presented.

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