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Samuel Cogar* (cogar@udel.edu), **David Colton** and **Peter Monk**. *Using eigenvalues to detect anomalies in the exterior of a cavity.*

We use modified near field operators and a nonsymmetric version of the generalized linear sampling method to investigate an inverse scattering problem for anisotropic media with data measured inside a cavity. The aim is to determine information on possible changes in the material properties of the medium surrounding the cavity, and to this end we introduce a new class of eigenvalue problems for which the eigenvalues can be determined from the measured scattering data. We augment our analysis with numerical testing of both the computation of eigenvalues from near field data and the behavior of the eigenvalues following changes in the material properties of the medium. (Received June 07, 2018)