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08854. *Eigenvalue Problems is Inverse Scattering Theory.*

Spectral properties of operators associated with scattering phenomena carry essential information about the scattering media. The theory of scattering resonances is a rich and beautiful part of scattering theory, and although the notion of resonances is intrinsically dynamical, an elegant mathematical formulation comes from considering them as the poles of meromorphic extension of the scattering operator. These scattering poles capture the physical information by identifying the rate of oscillations with the real part of a pole and the rate of decay with its imaginary part. On the other hand, the transmission eigenvalue problem, is inherent to the scattering phenomena for the inhomogeneous media, and hence it plays an important role in understanding the corresponding inverse problem. Transmission eigenvalues are related to those wave numbers for which one is able to construct an incident field that does not scatterer by a given media. We will discuss some new results on the transmission eigenvalue problem at the level of partial differential equations as well as its profound relation with the scattering operator. (Received February 04, 2018)