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Single-Channel Scattering from Disordered Samples: a sensitive probe of the eigenfunctions behavior

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The goal of the talk is to demonstrate that statistics of waves reflected from a disordered sample via a single open channel can serve as a sensitive probe of the eigenfunctions behaviour inside the sample in all regimes: localized, extended, and critical (multifractal). In particular, it allows one to understand the anomalous scaling exponents governing the multifractal behavior of the moments of the Wigner time delay at the point of the Anderson localization transition. The method also reveals some nontrivial exact symmetry relations which must be satisfied by the anomalous exponents and multifractality spectra. These predictions were recently verified in accurate numerical simulations.