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MIZTLI YÉPEZ: Wave transport through disordered waveguides: the effective response and the statistics of the scattering matrix

Monday, 17 February 2020 18:00 (30 minutes)

We present theoretical and numerical results for the statistical averages of the scattered waves in disordered waveguides. The theoretical results, based on a perturbative method, show that the averages scattering amplitudes of the disordered region depend only on a few characteristic lengths related to microscopic details of the disorder: the mean free paths. Theoretical average amplitudes show an excellent agreement with numerical simulations. This comparison exhibits that the average transmission amplitude is described successfully by an effective medium response; in contrast, only when the recurrent scattering contributions can be neglected, the average reflection amplitude is described satisfactorily by an effective medium. These results for the average scattering amplitudes suggest that the statistical distribution of the scattering matrix of disordered waveguides, does not satisfy the isotropic hypothesis assumed in the DMPK (Dorokhov, Mello, Pereyra and Kumar) description, where the phases of the scattering matrix are assumed equally probable. Our numerical simulations confirm that the isotropic hypothesis is not valid in general, it is suitable only for systems with lengths larger than the mean free path.

Session Classification: SHORT TALKS

Track Classification: SYMPOSIUM ON SCATTERING, QUANTUM AND CLASSICAL TRANSPORT