TECHNISCHE UNIVERSITÄT CHEMNITZ

Institut für Physik
Physikalisches Kolloquium

Mittwoch, 17.01.2018, um **16:00 Uhr**

Ort: Reichenhainer Str. 90;
Zentrales Hörsaal- und Seminargebäude,
Raum 2/N013

Dr. Thomas Wellens

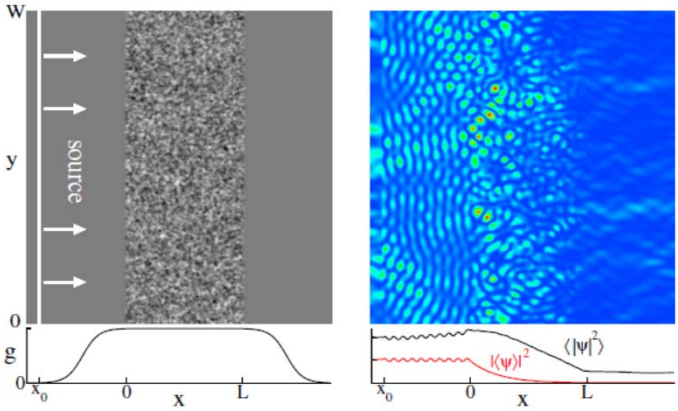
Albert Ludwigs University Freiburg i. Br.

Transport of waves in complex media: control by disorder and nonlinearity

Wave transport in complex or disordered media is an important subject of research in many areas of physics, ranging, e.g., from the conductance of electrons in disordered metals to multiple scattering of photons in turbid samples. In this talk, we address the regime of coherent transport, where interferences between multiply scattered wave amplitudes change the behaviour of transport as compared to a classical description. These interferences may be destructive, e.g., turn a metal into an insulator (Anderson localization), or constructive, e.g., increase the brightness of saturn's rings (coherent backscattering).

Depending on our knowledge or ability to control the scattering medium, we may either choose a statistical approach implying an average over many realizations, or seek to taylor the scattering medium with respect to specific desired properties. First, I will summarize the results of diagrammatic transport theories which we have developed in order to perform the ensemble average in case of random, weakly disordered media. These methods in particular allow us to describe the impact of nonlinearities or interactions between scattered particles on the mesoscopic interference effects mentioned above. In the second part, I will discuss different cases of specifically taylored, optimized configurations. For example, I will demonstrate how to arrange a collection of point scatterers such as to maximize their collective cross section and present an optimized multi-layered dielectric stack design to enhance the local irradiance for efficient photovoltaic upconversion materials.

Scattering geometry (left) and stationary scattering state (right) associated with a randomly generated disorder potential.



Alle Zuhörer sind ab 15:45 zu Kaffee und Tee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt: Prof. Dr. Ulrich T. Schwarz, Tel. 0371 531-30001

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