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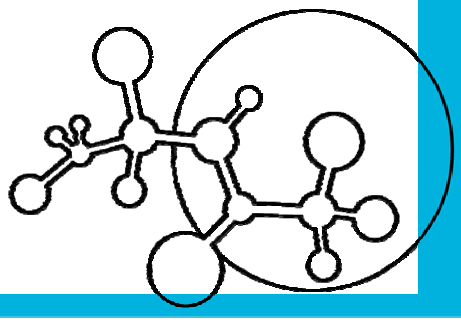

Quantum Efficiency
Seminar and Colloquium

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Essential concepts of Anderson localization

Transport of electrons in a regular lattice can be described by the well-known Bloch waves which are extended over the whole lattice. The electrons experience a periodic potential. If one introduces some weak disorder to the potential one might expect a weak perturbation of the Bloch waves. Instead, however, the disorder induces localized eigenstates, with an exponential tail and a characteristic localization length. This phenomenon is known as *Anderson* or *strong Localization* (AL).

In this talk I will elaborate on the conditions which need to be fulfilled by the system and the disorder so that AL occurs. Furthermore, AL depends strongly on the dimensionality. To uncover this dependence I will introduce the scaling theory of localization. This concept also predicts a metal-insulator phase transition in a three dimensional system. Relevant statements about transport in disordered systems are those which are robust under sampling over different realizations of the potential. Therefore a statistical modelling of the characteristic disorder-induced fluctuations of most transport observables (such as conductance) is in need. In the last part of my talk I would like to briefly touch upon the relation between AL and interactions (alike electron-electron interaction).

Date: **Tuesday, February 1st, 2011 2:15 pm**
Location: **FRIAS Seminar Room, Albertstr. 19, Freiburg**

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