



Quantum Efficiency Seminar und Colloquium

BORIS FINE

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Nonequilibrium properties of thermally isolated quantum systems

ABSTRACT: Linear character of quantum mechanics poses two difficulties for the foundations of quantum statistical physics: The first difficulty is how to assign statistical weight to quantum superpositions that are not allowed classically. The second difficulty is how to deal with the notion of microscopic chaos. This talk will consist of two parts touching the above two difficulties in their respective order. The first part is to be devoted to the so-called "quantum microcanonical ensemble", where all possible quantum superpositions with a given energy expectation value are allowed. This ensemble is not equivalent to the conventional microcanonical ensemble, because the latter limits the participating eigenstates to a narrow energy window. It is to be shown that, on the one hand, the quantum microcanonical ensemble does not lead to the conventional Boltzmann-Gibbs statistics, while on the other hand, it emerges in thermally isolated clusters of spins $1/2$ under multiple non-adiabatic perturbations. The second part of the talk will discuss the observable manifestations of chaos in the long-time behavior of nuclear spin decays in solids.

Date:

Tuesday, May 8th, 2012 14:15 pm

Location:

Lecture Hall 1, Hermann-Herder-Str. 3, Freiburg

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