Speaker: Alex Wiedemann

Title: Approach to Equilibrium for Completely Positive Quantum Dynamical Semigroups of N–level systems.

Abstract: If a quantum mechanical system is coupled to a reservoir, one can describe, under certain limiting conditions, the time evolution of the system alone by a quantum dynamical semigroup T_t. The generator of this semigroup can be cast using the GKLS master equation:

$$\mathcal{L}(\rho) = -i[H, \rho] + \frac{1}{2} \sum_{i,j=1}^{N^2-1} c_{i,j}([F_i, \rho F_j^*] + [F_i \rho, F_j^*]),$$

where the $(c_{i,j})$ form a complex positive $(N^2 - 1) \times (N^2 - 1)$ matrix. A question of obvious physical interest is to delimit those generators for which the corresponding semigroup has a unique invariant state (=equilibrium state) and for which every initial state tends to this equilibrium state as $t \to \infty$. In this talk, we follow a proof of Spohn to show that if the matrix $(c_{i,j})$ has a p–fold degenerate eigenvalue zero with $p < N/2$, then such an equilibrium state exists.