Energy fluctuations in Driven, Thermalizing and Driven Dissipative Systems

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The talk will consider energy fluctuations of systems in three different settings (i) An isolated systems whose energy is changed by performing non-adiabatic work using a cyclic process (ii) Two systems which are brought in contact and are approaching thermal equilibrium (iii) A driven dissipative system which is driven by non-adiabatic work and coupled to a large bath. Expressions for the size of energy fluctuations as a function of time in all settings will be derived, assuming that the process is composed of many small steps of energy exchange. In all cases the results depend only on average energy flows in the system and densities of states, independent of any other microscopic detail. In the steady-state an expression relating three key properties: the relaxation time of the system, the energy injection rate, and the size of the fluctuations will be presented.