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Non equilibrium stationary states and transport phenomena

We consider a quantum dynamical system consisting of two reservoirs interacting through a local junction. The time-asymptotic state of the system is a non equilibrium stationary state (NESS) which is characterized by energy and particle currents through the junction. We present the C*-algebraic framework used to describes such systems, and we show how one can construct the NESS using the so-called Moller scattering morphism, an analogue of the usual wave operator. The algebraic scattering method allows us to determine energy and particle currents with the help of (rigorous) perturbation theory. This talk is of expository nature and is suited for everybody with a general mathematical background.