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# Entanglement spectra and forces in simple driven systems

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## Abstract

We discuss simple systems driven out of thermal equilibrium by external forces. The first example is provided by two coupled oscillators, each linked to a thermal bath at a different temperature. The quantum Langevin equations are solved for the correlations between the oscillators [Ghesquiere & al 2012] [Dorofeyev 2013]. A spectral representation of non-classical correlations (entanglement) arises naturally. In the second example, the force on a particle moving at constant velocity parallel to a surface is analyzed [Barton 2010] [Intravaia & al 2014]. The generation of photons is one way to characterize the continuous entropy production in this system. We outline the challenges to characterize the stationary state and comment on the success of master equations to describe driven processes in quantum optics.

Barton 2010

G. Barton, *New J. Phys.* **12** (2010) 113045

Dorofeyev 2013

I. Dorofeyev, *Can. J. Phys.* **91** (2013) 537

Ghesquiere & al 2012

A. Ghesquière, I. Sinayskiy, and F. Petruccione, *Phys. Scr.* **2012** (2012) 014017

travaia & al 2014

F. Intravaia, R. O. Behunin, and D. A. R. Dalvit, *Phys. Rev. A* **89** (2014) 050101(R)

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