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The impact of quantum signatures in quantum Thermodynamics close-to-equilibrium

Out-of-equilibrium processes describe a wide plethora of phenomena, from bio-molecular motors in our cells to financial markets and quantum computers. A first universal property they all share is that they necessarily entail a certain amount of dissipation, i.e. thermodynamic resources in the form of entropy production are irreversibly generated. Moreover, they display significant fluctuations, that ideally must be minimized for reliable outcomes but which stop being negligible at the microscopic scale. These fluctuations can be of thermal classical nature and also of
genuinely quantum origin. This raises the question: How do we identify genuinely quantum contributions to stochastic fluctuations and what are their thermodynamic implications? In this talk I will present a general answer to this question for processes that keep a system close to equilibrium, either by slow-driving or by external perturbation in linear response regime. Finally, I will present a recent experimental measurement of these quantum signatures in a trapped-ion experiment

Theme

Theme 2. Quantum effects in energy processes and materials

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