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## Thermalization of harmonic oscillator Unruh-DeWitt detectors

*Thursday, 8 July 2021 18:30 (20 minutes)*

We consider a particle detector interacting with a scalar quantum field through the Unruh-DeWitt interaction Hamiltonian. We model the detector as an harmonic oscillator of finite size. The detector-field system is shown to be mathematically equivalent to a quantum Brownian motion (QBM) model for an oscillator in an Ohmic environment, the role of which is played by the field. We evaluate the density matrix of an accelerated oscillator, identifying the regimes where non-Markovian effects become significant and discussing the effect of the detector's size to its response. We show that in the long-time limit the detector reaches a thermal equilibrium state at the Unruh temperature.

**Session Classification:** Quantum Fields

**Track Classification:** Early Universe: Quantum Fields