

Probing the Unruh effect with an extended system

Prof. Daniel Vanzella (IFSC/USP)

It has been rigorously proved in the context of quantum field theory in Minkowski spacetime that the vacuum state, which represents absence of real particles according to inertial observers, is a thermal state (with nonzero temperature) according to uniformly accelerated observers. This result is known as the Unruh effect. Recent claims, however, have challenged the physical reality of this thermal character for extended observables. Here we investigate the behavior of a simple extended accelerated system coupled to a quantum field in its vacuum state. We show that the vacuum fluctuations induce thermalization on the extended accelerated system, which is all one can expect of a legitimate thermal reservoir. This vindicates the standard interpretation of the Unruh effect also for extended systems.