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Rainer Verch (University of Leipzig)

Unruh effect and Tolman temperature

Abstract

It is a widely spread view that the Unruh effect can be thought of as if the accelerated detector is immersed in a thermal bath. On grounds of this picture, it is often suggested that the Tolman temperature of a medium in a homogeneous gravitational field can be equated with the Unruh temperature.

We show the inconsistency of that suggestion from a quantum field theoretical perspective. One of the key points is that the Unruh detector necessarily not only interchanges heat but also work with the quantum field. Therefore its temperature increases analogous to heating a material by friction, and indicates its own temperature rather than that of a purely thermally coupled medium.

The talk is based on published articles together with Detlev Buchholz.