

Rindler quench in curved spacetime and in the laboratory

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Abstract

Ultracold fermionic atoms in an optical lattice, with a sudden position-dependent change (a quench) in the effective dispersion relation, have been proposed by Rodríguez-Laguna et al (2017) as an analogue spacetime test of the Unruh effect. We provide support for this analogue by studying the energetic and thermal properties of a similar quench for a continuum quantum field on a simplified, $(1 + 1)$ -dimensional spacetime, in a fully analytically solvable treatment. We further introduce a laboratory implementation of the underlying classical dispersion relation change in an experiment with liquid surface waves, involving controlled nonlinearities.

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