Contribution ID: **3** Type: **not specified**

Properties of the fermionic vacuum in Rindler spacetime with a compactified subspace

The local properties of the fermionic vacuum are investigated for Rindler spacetime with a spatial subspace compactified to a torus. It is assumed that the field is prepared in the Fulling-Rindler vacuum state. The expression for corresponding Hadamard function is given and the renormalized current density, fermionic condensate and the vacuum expectation value of the energy-momentum tensor are investigated. The near-horizon and large-distance asymptotics are discussed for the expectation values around cylindrical black holes. In the near-horizon approximation the lengths of compact dimensions are determined by the horizon radius. At large distances from the horizon the geometry is approximated by a locally anti-de Sitter spacetime with toroidally compact dimensions and the lengths of compact dimensions are determined by negative cosmological constant.

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