

Title: Quantum information theory in curved spacetime

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Abstract: Maki Takahashi

We present a formalism describing the transport of the quantum spin state of massive fermions in curved space-time for the purpose of studying relativistic quantum information phenomena such as entanglement and teleportation. We are concerned with answering the elementary question of how the state of a qubit transforms as it moves through a curved space-time manifold. This transport equation takes the form of the Fermi-Walker transport of a two component spinor, which will be shown to be unitary in the spinor's rest frame. The talk will summarise key results and highlight foundational issues such as the absence of global parallelism and conceptual issues/difficulties regarding entanglement and teleportation.

