INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

In recent years, the fascinating phenomenon of quantum entanglement has garnered significant interest in the scenarios of relativistic particles in flat and curved spacetimes. It is well known that the vacuum of a quantum field is an entangled state from a local observer's point of view. It is possible to transfer the vacuum entanglement into a pair of Unruh-DeWitt detectors through local interaction with background quantum field, which is known as entanglement harvesting. This thesis aims to understand the phenomenon of entanglement harvesting and leakage in various inertial and non-inertial systems by considering different field properties and boundary conditions. The thesis is divided into three parts, excluding introduction and conclusion. In the first part, we discuss the formalism of the study. In the second part, we study entanglement harvesting in accelerated systems in presence of thermal bath and reflecting boundaries to understand how they influence entanglement between the detectors. We also study how the entanglement harvesting between two inertial detectors will get affected if one considers a nonvacuum field state instead of vacuum. In the third part, we study another situation where two static detectors are initially entangled and how the interaction with quantum field influences the entanglement between the two detectors.