A Quantum Wire in a Magnetic Field Due to a Superconductor
Attapon Amthong

Abstract
A quantum wire in an inhomogeneous magnetic field due to a superconducting stripe in a Meissner state is investigated. In our study, the field is assumed to be zero in the region beneath the stripe and be constant in the other region. Quantum states of a single electron in the wire is studied. We calculate classical trajectories of each state and use them to classify these states into three kinds: normal skipping states, cyclotron states, and special skipping states. The last one is the new kind of states that form under the stripe. We find that their group velocities are greater than those of standard skipping states. It is possible that the new kind of states may result in higher conductivity, compared with that due to the normal states.

Keywords: Quantum wire, Superconductor