

Quantum invisible cloaks for nanoparticles

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Abstract

By applying the interplay among the nodal points of partial waves, along with the concept of streamline in fluid dynamics for the probability flux, a quantum invisible cloak to the electron transport in a host semiconductor is demonstrated by simultaneously guiding the probability flux outside the core region and keeping the total scattering cross section negligible. As the probability flux vanishes in the interior region, one can embed any material inside a multiple core-shell sphere without affecting physical observables from the outside. Our results reveal the possibility to design a protection shield layer for fragile interior parts from the impact of transports of electrons.