

# Manipulation of quantum particles in rapidly oscillating potentials by inducing phase hops

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Analytical calculations show that the mean-motion of a quantum particle trapped by a rapidly oscillating potential can be significantly manipulated by inducing phase hops, i.e., by instantaneously changing the potential's phase. A phase hop can be visualized as being the result of a collision with an imaginary particle which can be controlled. Several phase hops can have accumulating effects on the particle's mean-motion, even if they transform the particle's Hamiltonian into its initial one. The theoretical predictions are verified by numerical simulations for the one-dimensional Paul-trap.

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