

Abstract Submitted
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Nonadiabatic Ponderomotive Barriers¹ ILYA DODIN, NATHANIEL FISCH, Princeton University — Ponderomotive, or wave barriers produced by stationary high-frequency radiation are most often viewed as potential barriers conserving the particle energy. This conservation property is only approximate though, and we show that its violation renders a remarkable and previously unexplored flexibility for manipulating particles by electromagnetic fields. We show that irreversible wave barriers can exhibit features of a Maxwell demon and can be employed for current drive, selective confinement, cooling, and separation of constituents in gases and plasmas. While being of immediate applied interest, these possibilities as well entail fundamental questions about striking quantum-like nonlinear dynamics, which we show classical particles to exhibit in high-frequency fields.

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