Nonlinear Sciences > Chaotic Dynamics

Controlling Chaotic transport on Periodic Surfaces

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We uncover and characterize different chaotic transport scenarios on perfect periodic surfaces by controlling the chaotic dynamics of particles subjected to periodic external forces in the absence of a ratchet effect. After identifying relevant {\it symmetries} of chaotic solutions, analytical estimates in parameter space for the occurrence of different transport scenarios are provided and confirmed by numerical simulations. These scenarios are highly sensitive to variations of the system's asymmetry parameters, including the eccentricity of the periodic surface and the direction of dc and ac forces, which could be useful for particle sorting purposes in those cases where chaos is unavoidable.

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