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Particle transport on periodic potential landscapes[1] ALOKE KUMAR, NUNG YIP, STEVE WERELEY, Purdue University — Particles in a periodic potential landscape and undergoing transport under the influence of an external force experience an overall deviation from the prescribed direction of the force. Such a deviation can vary as a function of particle size, resulting in effective sorting technique. We extend an earlier proposed physical model for such situation to show how time dependent lattice structures can act as an effective sorting mechanism. Transport behaviors in different, but easily realizable lattice structures, are studied. These behaviors can be sensitive to different parameters. Two separate regimes - one with particle inertia and one without are studied and effective parameters for both cases are established. Thermal fluctuations are also incorporated in the model due to the increased interests in such sorting procedures for colloidal microscale fluid flow. Numerical findings are compared to some recently reported experimental results, as well as our own data which are obtained using holographic optical traps. These traps are easily reconfigurable, which makes them ideal candidates for practical simulations of such physical phenomena.

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