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Driven Brownian transport through arrays of symmetric obstacles STEFFEN MARTENS, Humboldt-University Berlin, Department of Physics, Newtonstr. 15, 12489 Berlin, Germany, PULAK K. GHOSH, Advanced Science Institute, RIKEN, Wako-shi, Saitama, 351-0198, Japan, PETER HÄNGGI, University Augsburg, Department of Physics, Universitätsstr. 1, 86135 Augsburg, Germany, FABIO MARCHESONI, Università di Camerino,Dipartimento di Fisica, 62032 Camerino, Italy, FRANCO NORI, Advanced Science Institute, RIKEN, Wako-shi, Saitama, 351-0198, Japan, LUTZ SCHIMANSKY-GEIER, Humboldt-University Berlin, Department of Physics, Newtonstr. 15, 12489 Berlin, Germany, GERHARD SCHMID, University Augsburg, Department of Physics, Universitätsstr. 1, 86135 Augsburg, Germany — The transport of a suspended overdamped Brownian particle driven through a two-dimensional rectangular array of circular obstacles with finite radius is numerically investigated [P. K. Ghosh et. al., *Phys. Rev. E*, submitted (2011)]. Two limiting cases are considered in detail, namely, when the constant drive is parallel to the principal or the diagonal array axes. This corresponds to studying the Brownian transport in periodic channels with reflecting walls of different topologies. The mobility and diffusivity of the transported particle in such channels are determined as functions of the drive and the array geometric parameters. Prominent transport features, like negative differential mobilities, excess diffusion peaks, and unconventional asymptotic behaviors, are explained in terms of two distinct lengths, the size of single obstacles (trapping length) and the lattice constant of the array (local correlation length). Local correlation effects are further analyzed by continuously rotating the drive between the two limiting orientations.

Steffen Martens
Humboldt-University Berlin, Department of Physics,
Newtonstr. 15, 12489 Berlin, Germany

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