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Stochastic webs and quantum transport in superlattices: an introductory review

S.M. Soskin, P.V.E. McClintock, T.M. Fromhold, I.A. Khovanov, R. Mannella

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Stochastic webs were discovered, first by Arnold for multi-dimensional Hamiltonian systems, and later by Chernikov et al. for the low-dimensional case. Generated by weak perturbations, they consist of thread-like regions of chaotic dynamics in phase space. Their importance is that, in principle, they enable transport from small energies to high energies. In this introductory review, we concentrate on low-dimensional stochastic webs and on their applications to quantum transport in semiconductor superlattices subject to electric and magnetic fields. We also describe a recently-suggested modification of the stochastic web to enhance chaotic transport through it and we discuss its possible applications to superlattices. keywords: stochastic webs; quantum transport; superlattices; separatrix chaos

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