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Mathematical Physics

Localization for quasi-periodic Schrödinger operators with dynamics defined by the skew-shift and potential in a Gevrey-class

Silvius Klein

(Submitted on 13 Apr 2012)

We consider the discrete one-dimensional Schr\"{o}dinger operator with quasi-periodic potential $v_n := \lambda v (\shift^n \, \xx)$, where $\shift : \T^2 \rightarrow \T^2, \, \shift \xx := (x_1+x_2, x_2 + \om)$ is the skew-shift map. We assume that the frequency ω satisfies a Diophantine condition and that the potential function v belongs to a Gevrey class, and it satisfies a generic transversality condition. Under these assumptions, in the perturbative regime (i.e. large $\la$) and for most frequencies ω we prove that the operator satisfies Anderson localization. Moreover, we show that the associated Lyapunov exponent is positive for all energies, and that the Lyapunov exponent is a continuous functions with a certain modulus of continuity.

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