Invariant graphs and spectral properties of certain Schrödinger operators

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In a joint work with Kostya Khanin, we investigate the connections between action-minimizing Aubry Mather sets of certain twist maps of the cylinder and the spectrum of associate Schrödinger operators. In particular, when the twist map has an analytic invariant graph whose rotation number satisfies the Brjuno condition, we show the existence of a component of absolutely continuous spectrum. On the other hand, we show that eigenfunctions of certain dual Schrödinger operators can be used to construct invariant graphs for associate twist maps. We will also illustrate our result in the case of small analytic perturbations of integrable twist maps and Schrödinger operators with small analytic potential.

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