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INTERNAL LIFSHITS TAILS FOR RANDOM PERTURBATIONS OF PERIODIC SCHRÖDINGER OPERATORS

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Contents

0. Introduction. This paper is devoted to the study of Lifshits tails for random perturbations of periodic Schrödinger operators. We prove that, at the edge of a gap, a true Lifshits tail for the random operator occurs if and only if the density of states of the background periodic operator has a nondegenerate behavior.

To be more precise, let us state our main result in a restricted setting. Consider W a bounded, $\mathbb{Z}^d$-periodic, real-valued potential on $\mathbb{R}^d$ and define $H=-\Delta+W$ to be a periodic Schrödinger operator acting on $L^2(\mathbb{R}^d)$. It is selfadjoint with domain $H^2(\mathbb{R}^d)$. Let $\sigma=\sigma(H)$ be the spectrum of H, and assume that σ has a gap below

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