SOLUTIONS OF GROSS-PITAEVSKII EQUATION WITH PERIODIC POTENTIAL IN DIMENSION TWO.

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Abstract. Solutions of Gross-Pitaevskii equation with a periodic potential in dimension two are discussed. It is proven that there is an extensive "non-resonant" set $\mathcal{G} \subset \mathbb{R}^2$ such that for every $\vec{k} \in \mathcal{G}$ there exists a solution asymptotically close to a plane wave $Ae^{i\langle \vec{k}, \vec{x}\rangle}$ as $|\vec{k}| \to \infty$, given A is sufficiently small.