An extension of maximum and antimaximum principle to a Schrödinger equation in $\mathbb{R}^2$

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Strong maximum and antimaximum principles are extended to weak solutions in $\mathbb{R}^2$ of the Schrödinger equation $Lu := -\Delta u + qu = \alpha u + f$ in $\mathbb{R}^2$. For positive potentials q, tending to $+\infty$ at infinity L is with discrete spectrum. Denote by (λ_1, φ_1) its principal eigenpair with $\varphi_1 > 0$. For a "nearly radial" potential, growing faster than $|x|^2$, we show that for $0 \leq f/\varphi_1 \leq C$ there exists a positive number δ such that, for every $\alpha \in (-\infty, \lambda_1 + \delta)$, the inequality $(\lambda_1 - \alpha)u \geq c\varphi_1)$ holds a.e. in $\mathbb{R}^2$.

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