VORTEX–TYPE SOLUTIONS TO A MAGNETIC NONLINEAR CHOQUARD EQUATION

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ABSTRACT. We consider the stationary nonlinear magnetic Choquard equation

$$(-\mathrm{i}\nabla + A(x))^2 u + W(x)u = \left(\frac{1}{|x|^\alpha} * |u|^p\right)|u|^{p-2}u, \quad x \in \mathbb{R}^N,$$

where $N \geq 3$, $\alpha \in (0, N)$, $p \in \left[2, \frac{2N-\alpha}{N-2}\right)$, $A : \mathbb{R}^N \to \mathbb{R}^N$ is a magnetic potential and $W : \mathbb{R}^N \to \mathbb{R}$ is a bounded electric potential. We assume that both A and W are compatible with the action of some group Γ of linear isometries of $\mathbb{R}^N$.

We shall give an overview and present some recent results on the existence of vortex-type solutions to this equation which satisfy the symmetry condition

$$u(\gamma x) = \phi(\gamma)u(x) \quad \text{for all } \gamma \in \Gamma,\ x \in \mathbb{R}^N,$$

where $\phi : \Gamma \to \mathbb{S}^1$ is a given continuous group homomorphism into the unit complex numbers.

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