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Title: On nonlinear perturbations of a periodic fractional Schrödinger equation with critical exponential growth

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Abstract: In this paper we study the existence of solutions for fractional Schrödinger equations of the form

$$(-\Delta)^{1/2}u + V(x)u = f(x,u) \quad \textbf{in} \quad \mathbb{R},$$

where V is a bounded potential and the nonlinear term $f(x,u)$ has the critical exponential growth. We prove the existence of at least one weak solution by combining the mountain-pass theorem with Trudinger-Moser inequality and a version of a result due to Lions for critical growth in $\mathbb{R}$.