Existence results for the fractional Choquard equation

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Resumo

In the talk we present recent results on the following system involving the fractional Laplacian in the whole $\mathbb{R}^N, N \geq 3$:

$$(-\Delta)^s u + u = (\mathcal{K}_\alpha \star |u|^p)|u|^{p-2}u.$$

Here, $\mathcal{K}_\alpha = |x|^{\alpha-N}$, $s \in (0,1)$, $\alpha \in (0,N)$ and p varies in a suitable range. We look for solutions $u \in H^s(\mathbb{R}^N)$ by using variational methods; indeed weak solutions (which are shown to be regular) to the above problem can be characterized as critical points of a functional. By exploiting the property of this functional, positive ground state and also infinitely many (possible changing sign) solutions are found. These results are obtained in collaboration with P. d´Avenia (Politecnico di Bari, IT) and M. Squassina (Univ. di Verona, IT).