Partial ground states for the logarithmic Choquard equation in $\mathbb{R}^2$

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In this talk we will discuss some recent existence results for the logarithmic Choquard equation in dimension 2

$$-\varepsilon^2 \Delta u + u + \gamma(\log|\cdot| * |u|^2)u = |u|^{p-2}u \qquad \text{in } \mathbb{R}^2,$$

where $\varepsilon, \gamma > 0$ and $p > 2$. Compared to the higher dimensional version of this equation, the planar case has considerably less results available and some interesting questions in this setting remain open. Inspired by the work of Cingolani & Weth (2016) and Du & Weth (2017) we will explore the role that the exponent p plays and the different variational techniques used to derive solutions to this equation. We will focus in particular on the somewhat more complicated functional geometry of the case $2 < p < 3$ and some new results in this direction.

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