

Bubbling solutions for nonlocal elliptic problems

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We investigate bubbling solutions for the nonlocal equation

$$A_{\Omega}^s u = u^p, u > 0 \text{ in } \Omega,$$

under homogeneous Dirichlet conditions, where Ω is a bounded and smooth domain. The operator A_{Ω}^s , $s \in (0, 1)$, stands for two types of nonlocal operators: the spectral fractional Laplacian and the restricted fractional Laplacian. We construct solutions when the exponent $p = (n + 2s)/(n - 2s) \pm \varepsilon$ is close to the critical one, concentrating as $\varepsilon \rightarrow 0^+$ near critical points of a reduced function involving the Green and Robin functions of the domain. We provide also in both sub and supercritical case a precise asymptotic profile of the blow up of these solutions as $\varepsilon \rightarrow 0^+$. This is a joint work with Y. Sire (Marseille) and J. Davila (Santiago).