NONLOCAL SCALAR FIELD EQUATIONS

MOUSOMI BHAKTA

In this talk I will discuss the nonlocal scalar field equations with a vanishing parameter ϵ. More precisely,

$$(\mathcal{P}_\epsilon) \qquad \begin{cases} (-\Delta)^s u + \epsilon u = |u|^{p-2}u - |u|^{q-2}u \quad \text{in} \quad \mathbb{R}^N \\ \quad u > 0, \quad u \in H^s(\mathbb{R}^N), \end{cases}$$

where $s \in (0,1)$, $N > 2s$, $q > p > 2$ are fixed parameters and $\epsilon > 0$ is a vanishing parameter. For $\epsilon > 0$ small, we show the existence of a ground state solution and prove that any positive solution is a classical solution and radially symmetric and symmetric decreasing. We also obtain the decay rate of solution at infinity. Next, we discuss the asymptotic behavior of ground state solutions in the case p is subcritical, supercritical or critical Sobolev exponent $2^* = \frac{2N}{N-2s}$. Furthermore, using these asymptotic profile of solutions, we prove the *local uniqueness* of solution in the case $p \leq 2^*$.