Arnaud Triay

Title: Derivation of the Gross-Pitaevskii energy

Abstract: We consider N trapped bosons in $\mathbb{R}^3$ interacting via a pair potential w which has a long range of dipolar type. We show the convergence of the energy and of the minimizers for the many-body problem towards those of the dipolar Gross-Pitaevskii functional, when N tends to infinity. In addition to the usual cubic interaction term, the latter has the long range dipolar interaction. The results hold under the assumption that the two-particle interaction is scaled in the form $N^{3\beta-1}w(N^\beta x)$ for some $0 \leq \beta < \beta_{\max}$ with $\beta_{\max} = 1/3 + s/(45+42s)$ where s is related to the growth of the trapping potential.