

Thomas-Fermi profile of a fast rotating Bose-Einstein condensate

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We study the minimizers of a magnetic 2D non-linear Schrödinger energy functional in a quadratic trapping potential, describing a rotating Bose-Einstein condensate. We derive an effective Thomas-Fermi-like model in the rapidly rotating limit where the centrifugal force compensates the confinement, and available states are restricted to the lowest Landau level. The coupling constant of the effective Thomas-Fermi functional is linked to the emergence of vortex lattices (the Abrikosov problem). We define it via a low density expansion of the energy of the corresponding homogeneous gas in the thermodynamic limit.