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Fast rotating Bose–Einstein condensates in an asymmetric trap

A trapped rotating Bose–Einstein condensate is described by minimizing the Gross–Pitaevskii energy with an angular momentum term. In the fast rotating regime, one can restrict the minimization space to the lowest Landau level (LLL), which is the first eigenspace of the linear part of the Hamiltonian of the system. In the case of a symmetric harmonic trap, this framework allows to recover, both analytically and numerically, the lattice of vortices of experiments. In the case of an asymmetric trap, an LLL can still be defined, but the behaviour is drastically different: the condensate has no vortex. Furthermore, contrary to the symmetric case, convergence of minimizers can be proved, and a limit profile can be computed.