Jean Dalibard, Laboratoire Kastler Brossel

Fast rotation of an atomic Bose-Einstein condensate

I will present some recent experimental results obtained with rapidly rotating trapped condensates. One observes in this regime a regular Abrikosov lattice of quantized vortices. I will connect this problem to that of a gas of charged particles in a uniform magnetic field and I will show how the regime of fast rotation can be linked to the physics of the Lowest Landau Level. I will also briefly review some theoretical work addressing the regime where the mean field approximation breaks down and where a new regime, connected to fractional Quantum Hall physics, may occur.
References:V. Bretin, S. Stock, Y. Seurin, and J. Dalibard, Phys. Rev. Lett. 050403, vol. 92 (2004)
S. Stock, V. Bretin, F. Chevy, and J. Dalibard, cond-mat, 0311099, to appear in Europhys. Lett.