ID de Contribution: **50** Type: **Non spécifié**

Fragmentation, resonances and vortices in critically and sub-critically rotated Bose-Einstein condensates

mercredi 15 octobre 2014 12:20 (40 minutes)

Superfluids are distinguished from ordinary fluids by the quantized manner the rotation is manifested in them. Precisely, quantized vortices are known to appear in the bulk of a superfluid subject to external rotation, beyond a critical velocity. In most of the studies so far the quantum fluids are considered to be coherent and condensed at all times. In this work I present two examples of rotating ultracold Bose gases that show how fragmentation, i.e. loss of coherence, evolves in time. In specific, a trapped ultracold Bose gas of N=100 atoms in two spatial dimensions is studied, that is either stirred or rotated by an external field. I use and briefly present the multiconfigurational time dependent Hartree method for bosons (MCTDHB), that extends the mainstream mean-field theory, to calculate the dynamics of the gas in real time. As the gas is rotated the wavefunction of the system changes symmetry and topology. The gas gradually fragments over various orbitals and angular momentum is absorbed by forming 'phantom vortices'. We see a series of resonant rotations as the stirring frequency is increased, that are almost always accompanied by fragmentation.

Author: Dr TSATSOS, Marios (Instiitute of Physics Sao Carlos, University of Sao Paulo)

Orateur: Dr TSATSOS, Marios (Instiitute of Physics Sao Carlos, University of Sao Paulo)

Classification de Session: Cold Atoms, Few- and Many-Body Physics