CICLO DE SEMINARIOS 2012

SMAT-C Soft Matter Research and Technology Center

" Quantum and thermal density fluctuations in an ultracold 1D Bose gas"

Dr. JULIEN ARMIJO

Grupo de Optica No-Lineal, Departamento de Física, Facultad de Ciencias, Universidad de Chile

In this seminar, I will present recent results otained during my PhD thesis at Institut d'optique, Palaiseau, France.
Using micro-magetic traps on an "atom chip", we capture and cool 87Rb atoms to ultralow-temperatures (~10nK), and reach quantum degeneracy, when the de Broglie wavelength of atoms becomes larger than the interparticle distance. Then, we take absorption images of the "quantum gas" and, using hundred of pictures, we carefully analyse the fluctuations of atom number in each imaging pixel. Firstly, density fluctuations are a precise probe for the thermodynamics of the gas, and allow us to explore the rich phase diagram of repulsive 1D bosons, where statistical bosonic "bunching" (correlations in position due to quantum statistics) competes with interparticle repulsion, which tends to create anticorrelations. In particular we map out the "quasicondensation" transition, the analogue of Bose-Einstein Condensation in 1D. Secondly, at record low temperatures, we demonstrate the microscopic observation of quantum fluctuations, directly in each single image, for the first time in a continuous system.

Martes 12 JUNIO 2012, 13:00 horas

Sala de Conferencias, Tercer Piso, Departamento de Física
Universidad de Santiago de Chile

usach