DAMOP12-2012-000621

Abstract for an Invited Paper
for the DAMOP12 Meeting of
the American Physical Society

Davisson-Germer Prize in Atomic or Surface Physics Lecture: Exploring Flatland with Cold Atoms

JEAN DALIBARD, CNRS and ENS

A two-dimensional Bose fluid is a remarkably rich many-body system, which allows one to revisit several features of quantum statistical physics. Firstly, the role of thermal fluctuations is enhanced compared to the 3D case, which destroys the ordered state associated with Bose-Einstein condensation. However interactions between particles can still cause a superfluid transition, thanks to the Berezinskii-Kosterlitz-Thouless mechanism. Secondly, a weakly interacting Bose fluid in 2D must be scale-invariant, a remarkable feature that manifests itself in the very simple form taken by the equation of state of the fluid. In this talk I will present recent experimental progress in the investigation of 2D atomic gases, which provide a nice illustration of the main features of low dimensional many-body physics.