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Seminaires du LPTM , Universite de Cergy Pontoise

Mardi 28 Fevrier 2017, 11 :00
LPTM, 554 St Martin II
Domaines : cond-mat

Titre : *Connecting Berezinskii-Kosterlitz-Thouless and BEC Phase Transitions by Tuning Interactions in a Trapped 2D Gas*

Orateur : **Martin Robert De Saint-Vincent (LPL Universite Paris XIII)**

Résumé : *Extended coherence in quantum fluids can arise, typically in association with superfluidity, from a variety of mechanisms. Finite size two-dimensional (2d) Bose gases present a subtle interplay between Bose-Einstein Condensation, driven by quantum statistics, and the interaction-driven Berezinskii-Kosterlitz-Thouless (BKT) phase transition, at which free vortices become suppressed and quasi-long range order emerges.*

To explore the respective roles of quantum statistics and interactions, we study experimentally the critical point for the emergence of coherence in a harmonically trapped 2d Bose gas with tunable interactions. Over a wide range of interaction strengths we find excellent agreement with predictions based on the BKT theory of 2d superfluidity. This allows us to quantitatively show, without any free parameters, that the interaction-driven BKT transition smoothly converges onto the purely statistical Bose-Einstein condensation (BEC) transition in the limit of vanishing interactions.