
Condensate-free superfluidity induced by frustrated proximity effect

Laflorencie Nicolas*¹ and Mila Frederic²

¹LPS Orsay LPT Toulouse – CNRS – France

²EPFL (Lausanne) – Suisse

Résumé

Since the discovery of superfluidity in He4 and Landau's phenomenological theory, the relationship between Bose condensation and superfluidity has been intensely debated. He4 is known by now to be both superfluid and condensed at low temperature, and more generally, in dimension $D \geq 2$, all superfluid bosonic models realized in experiments are condensed in their ground-state, the most recent example being provided by ultracold bosonic atoms trapped in an optical lattice. In this paper, it is shown that a 2D gas of bosons which is not condensed at $T=0$ can be achieved by populating a layer through a frustrated proximity effect from a superfluid reservoir. This condensate-free bosonic fluid is further shown to be a superfluid with incommensurate correlations.

Mots-Clés: superfluid, frustration, hard, core, bosons

*Intervenant