

Temperature effects in the model of superfluidity

Reika Fukuizumi

Research Center for Pure and Applied Mathematics,
Graduate School of Information Sciences,
Tohoku University, Japan

Abstract

The stochastic Gross-Pitaevskii equation is used as a model of Bose-Einstein condensation (BEC) at positive temperature. The equation is a complex Ginzburg-Landau equation with a trapping potential and an additive space-time white noise. A positive temperature effect, for example, the spontaneous vortex formation by a sudden quench in BEC (seen as a phase transition) is of great interest in Physics, and the Gibbs equilibrium is the key ingredient in the analysis from the point of view in statistical physics. In this talk we will first give some recent results on the 2D stochastic Gross-Pitaevskii equation, where a Wick *inhomogeneous* renormalization is required to give a sense to the nonlinearity. We will refer to another result on a closely related, but another model described by a stochastic damped nonlinear wave equation too if time permitting. This talk will be based on joint works with Anne de Bouard (Ecole polytechnique), Arnaud Debussche (ENS Rennes), and Masato Hoshino (Kyushu University).