

**Workshop in Stochastic Analysis and
Applications**

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**Long time behavior of the
Gross-Pitaevskii equation at positive
temperature**

Abstract

The modeling of cold atoms systems has known an increasing interest in the theoretical physics community, after the first experimental realizations of Bose Einstein condensates, some twenty years ago. In the recent years, mean field models taking account of thermal fluctuations, aiming to describe condensates close to critical condensation temperature have been introduced, as e.g. the so called Stochastic Projected Gross Pitaevskii equation. We will describe some mathematical results about the global existence of solutions and long time dynamics of a non-truncated version of the model which is a complex Ginzburg Landau equation with a confining harmonic potential and additive space-time white noise. We take advantage in particular of the fact that the Gibbs measure is invariant for both the reversible and non reversible dynamics. This is a joint work with A. Debussche and R. Fukuizumi.