## Inhomogeneities and temperature effects in Bose-Einstein condensates

We will review in this talk some mathematical results concerning stochastic models used by physicist to describe BEC in the presence of fluctuations (that may arise from inhomogeneities in the confinement parameters), or BEC at finite temperature. In the first case, the model is a NLS equation with random fluctuations in time in the harmonic potential. In the finite temperature case, the model is a Ginzburg-Landau type equation, still with a harmonic potential.

For the first equation, we will describe the effect of those fluctuations on the structures e.g. vortices which are present in the deterministic model. For the second equation, we will concentrate on the convergence to equilibrium, and the global existence of solutions a.s. with respect to the Gibbs Measure. We will also describe the numerical methods which have been developed for those models in the framework of the ANR project Becasim. These are joint works with Reika Fukuizumi, Arnaud Debussche, and Romain Poncet.