

Simulations on Phase Measurement and Superfluidity Suppressions of the Bose-Einstein Condensation

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In this thesis we investigate two important topics of the nature of the Bose-Einstein Condensation: Coherence and Superfluid. In the first topic, we simulate the interference phenomenon in order to extract a read-out phase accumulated via an adiabatic switch-on laser imposed on the condensate in one side of the double-well. In the second part, we study the instability of the condensate in an optical lattice. By k.p method, we simulate the dynamics of the condensate. We find in addition to the Landau instability, it is peculiar to the optical lattice system that Dynamical instability might occur as the condensate becomes unstable against the presence of a great amount of quasiparticles.