

# MIT/HARVARD ANALYSIS SEMINAR

*Robert Seiringer*  
*Princeton University*

*will speak on:*

*"Derivation of the Gross-Pitaevskii Equation for Rotating Bose Gases"*

**Date :** *Friday, February 3, 2006*

**Time :** *4:15 pm*

**Location:** *Science Center, Room 222*

*Abstract:*

*We present a proof that the Gross-Pitaevskii (GP) equation correctly describes the ground state energy and corresponding one-particle density matrix of rotating, dilute, trapped Bose gases with repulsive two-body interactions. We also show that there is 100% Bose-Einstein condensation. While a proof that the GP equation correctly describes non-rotating or slowly rotating gases was known for some time, the rapidly rotating case was unclear mainly because the Bose (i.e., symmetric) ground state is not the lowest eigenstate of the Hamiltonian in this case. For the case of axially symmetric traps, our results show that the appearance of quantized vortices causes spontaneous symmetry breaking in the ground state. (Joint work with Elliott Lieb.)*