

Abstract Submitted
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Microscopic theory of Bose-Einstein condensation in an interacting gas VITALY KOCHAROVSKY¹, Department of Physics and Astronomy, Texas A&M University, VLADIMIR KOCHAROVSKY², Institute of Applied Physics, Russian Academy of Science — We find, for the first time, a microscopic theory of Bose-Einstein condensation in an interacting gas, which is valid both inside and outside a critical region. The derived exact fundamental equations for the condensate wave function and the Green's functions allow one to describe critical fluctuations and formation of an ordered condensate phase from a disordered phase across the entire critical region continuously. These equations asymptotically turn into the usual Gross-Pitaevskii and Beliaev-Popov equations in a low-temperature limit outside the critical region. The theory is readily extendable to other phase transitions.

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