EQUATIONS OF COUPLED CONDENSATE AND NON-CONDENSATE DYNAMICS IN A TRAPPED BOSE GAS

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S u m m a r y

We constructed equations of the condensed Bose gas dynamics at nonzero temperatures on the bases of the first principles of statistical mechanics. We derived the equation of motion for the condensate wavefunction and the quantum kinetic equation for the distribution function of excited atoms. The obtained generalized Gross–Pitaevskii equation for a condensate includes the effect of collisions with thermal cloud atoms (non-condensate). The Boltzmann quantum kinetic equation for a non-condensate was obtained by means of Zubarev's method of nonequilibrium statistical operator.