On the consistent description of a kinetics and hydrodynamics of quantum Bose systems

P. Hlushak and M. Tokarchuk

Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine, 1 Svientsitskii Str., 79011 Lviv, Ukraine, E–mail: phl@icmp.lviv.ua

An important problem of the consistent description for the one-particle (kinetic) and collective (hydrodynamic) effects in excitation spectrum at intermediate values of a wave vector and frequency is still unresolved. In this investigation the generalized transport equations for Bose system are obtained using the method of Zubarev nonequlibrium statistical operator [1]. The time correlation functions and collective excitation spectrum with separate contributions from the kinetic and potential energies are obtained. In this way the relation between one-particle and many-particle correlations is traced. It can be actual in relationship with the studies of the kinetics of one-particle and pair-particle Bose condensates in superfluid helium [2].

References

[1] P.A. Hlushak, M.V. Tokarchuk, Cond. Matt. Phys., 2004, **7**, 639.

[2] E.A. Pashitsky, Low Temp. Phys., 1999, **25**, 81.