ELECTRICAL PROPERTIES OF A BOSE-CONDENSATE

A.M. Kosevich

B.I. Verkin Institute for Low-Temperature Physics,
Nat. Acad. of Sci. of Ukraine
(*47, Lenin Ave., Kharkiv 61103, Ukraine*)

S u m m a r y

It is shown that the condensate of a degenerated Bose-gas has electric properties which are revealed in the condensate dynamics and are not limited by the trivial atomic polarization in an applied field. A new notion of the isotropic quadrupole moment of an atom is introduced. Its distribution generates the distribution of the macroscopic potential $\langle\varphi\rangle$ and the corresponding electric charge. The dynamics of $\langle\varphi\rangle$ allows one to describe electric effects. Small oscillations in a Bose-gas are considered, and corrections to the Bogolyubov spectrum of elementary excitations are found. For a degenerate Bose-gas, the corrections are proportional to $(ka)^4$, where k is the wavevector and a is the atomic radius.