

DISPERSION RELATIONS FOR WAVES IN PLASMA
AND BOGOLYUBOV IDEAS IN MANY-BODY
THEORY

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S u m m a r y

On the basis of Bogolyubov reduced description method and quasirelativistic quantum electrodynamics, the kinetics of an electromagnetic field in an equilibrium plasma has been constructed. The calculation is carried out in the Hamilton gauge up to the second order of a generalized perturbation theory in interaction. Following Bogolyubov in his theory of superfluidity, the leading contribution to the Hamilton operator of the field is chosen with an additional term depending on the interaction. This allows us to discuss the kinetics of the field in the terms of photons in the plasma and plasmons. On the basis of the obtained material equation supplementing the Maxwell equations, plane electromagnetic waves have been considered. For the case of the Maxwell plasma, the obtained spectra and the attenuation coefficients give results which coincide with those in the standard theory. However, the developed approach allows one to avoid some difficulties of that theory. The method of construction of an effective Hamilton operator of the electromagnetic field in the plasma is proposed. On this basis, we have performed the renormalization of quasiparticle spectra which coincide finally with the spectra of waves in the system.