

RADIATIVE EFFECTS IN EXTERNAL ELECTROMAGNETIC FIELD

V.N.Baier, V.M.Katkov, V.M.Strachovenko

Institute of Nuclear Physics, Novosibirsk

Using the operator quasiclassical method an expression for the mass operator of the electron in external field has been obtained. This permits to find an anomalous magnetic moment of the quasiclassical particle in external field.

$$\frac{\mu'}{\mu_0} = \frac{\alpha}{2\pi} \cdot \frac{2}{\chi} \int_0^{\infty} \frac{u du}{(1+u)^3} \int_0^{\infty} \sin \frac{u}{\chi} \left(y + \frac{y^3}{3} \right) dy$$

where

$$\chi = \frac{e\hbar}{m^2 c^4} \sqrt{|(F_{\mu\nu} p^\nu)^2|}, \quad \mu_0 = \frac{e\hbar}{2mc}$$

Our results are in agreement with those obtained in the crossed field /1/ and in disagreement with /2/. In the last paper approximation used in evaluation of integrals is not correct.

It is shown that in quasiclassical equation for the electron spin in external field rotational terms contain dependence on χ only through anomalous magnetic moment.

It is possible to reconstruct transverse part of the susceptibility tensor $\epsilon_{ij} - \delta_{ij}$ using dispersion relation and probability of pair creation by photon in external field. It is appeared that external classical field possesses properties of medium with dispersion and absorption.

References.

1. Ritus, V. JETP 57, 2176, 1969.
2. Ternon, I., Bagrov, V., Bordovitsin, B., Dorofeev, O., JETP 55, 2273, 1968.