New mechanism of magneto-optic effect

A.V. Vedyayev,[1] M.Ye. Zhuravlev,[2] and A.V. Lobachev[1]

[1] *Faculty of Physics, Lomonosov Moscow State University, 119899 Moscow, Russia*
[2] *Faculty of Liberal Arts and Sciences,*
St Petersburg State University, 190000 St. Petersburg, Russia

We consider a new magneto-optic effect based upon spin-orbit interaction of the conducting electrons in ferromagnetic metal with the electric field of plane polarized light wave. We calculated off-diagonal components of conductivity tensor for this mechanism of a.c. conductivity. These components determine the current induced by the light wave in the direction perpendicular to the plane of the light polarization. Numerical evaluation shows that the conductivity for this new effect exceeds the off-diagonal components of conductivity tensor for ordinary magneto-optic effect [1]. The components appear to be still considerably smaller than the diagonal elements of the conductivity tensor.

References:

[1] Petros N. Argyres, Phys. Rev. 97, 334 (1955).