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A robust ratio for light ellipticity in magneto-optical Kerr effect

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In this paper we developed a unified equations describing ellipticity of reflected light as a function of off-diagonal dielectric tensor components in magneto-optical Kerr effect. The approach allowed us unifying numerous published results which introduced equations for experimental data analysis having different signs and absence/presence of imaginary unit at complex refractive index. The experimental dependences of the off-diagonal components of the optical conductivity tensor in the spectral region 1.25-5.06 eV were theoretically analyzed for alloys on the basis of cobalt, iron, and boron also applying different equations from the literature. Depending on positive or negative imaginary part of the complex refractive index and the Kerr angle taken in the equations, the resulted non-diagonal components of the optical conductivity tensor dispersion dependences had divergent character. Also the classical free electrons theory of metals also has been applied to evaluate typical numbers of off-diagonal tensor elements which appeared to be a few order magnitudes less comparing to dielectric tensor eigenvalues.

Topics

Session A. Physics of condensed matter and spectroscopy

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