

Systematic study of magnetic linear dichroism and birefringence in (Ga,Mn)As

Karel Výborný,¹ Naďa Tesařová,^{2,3} and Tomáš Ostatnický²

¹*Institute of Physics, ASCR, v. v. i.,
Čukrovarnická 10, CZ-16253 Praha 6, Czech Republic*

²*Faculty of Mathematics and Physics,
Charles University in Prague, Praha, CZ-121 16, Czech Republic*

³*Department of Physics, University at Buffalo–SUNY, Buffalo, New York 14260, USA*

Magnetic linear dichroism and birefringence in (Ga,Mn)As epitaxial layers are investigated by measuring the polarization plane rotation of reflected linearly polarized light when magnetization lies in the plane of the sample. We report on the spectral dependence of the rotation angle (together with ellipticity) in the very broad energy range of 0.12 – 2.7 eV for a sequence of optimized samples covering a wide range on Mn-dopings and Curie temperatures and find a clear blue shift of the dominant peak at energy exceeding the host material band gap. These results are discussed in the general context of the GaAs host band structure and also within the $k \cdot p$ and mean-field kinetic-exchange model of the (Ga,Mn)As band structure. We discuss the role of disorder-induced non-direct transitions on magneto-optical properties of (Ga,Mn)As.

References:

[1] N. Tesařová et al., Phys. Rev. B **89**, 085203 (2014).