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Anisotropic optical properties of Fe/GaAs nanolayers from first principles[1] SEBASTIAN PUTZ, MARTIN GMITRA, JAROSLAV FABIAN, University of Regensburg — We investigate the anisotropy of the optical properties of few-monolayer Fe films on GaAs from first principles calculations. Both intrinsic and magnetization-induced anisotropy are covered by studying the systems in the absence or presence of external magnetic fields. We use the linearized augmented plane wave (LAPW) method, as implemented in the WIEN2k density functional theory code, to show that the C_{2v} symmetric anisotropy of the spin-orbit coupling fields at the Fe/GaAs interface manifests itself in an analogous anisotropy of the optical properties of the system, such as its optical conductivity and its reflectivity. We find that the optical properties vary significantly when the direction of the external magnetic field is changed. This suggests that the anisotropic spin-orbit coupling fields in experimentally relevant Fe/GaAs slabs can be studied by purely optical means.

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