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Magneto-optical properties of graphene on polar substrates[1]
BENEDIKT SCHARF, Department of Physics, University at Buffalo, State University of New York, Buffalo, NY 14260, USA, VASILI PEREBEINOS, IBM T. J. Watson Research Center, Yorktown Heights, NY 10598, USA, JAROSLAV FABIAN, Institute for Theoretical Physics, University of Regensburg, 93040 Regensburg, Germany, IGOR ŽUTIĆ, Department of Physics, University at Buffalo, State University of New York, Buffalo, NY 14260, USA — We theoretically study the effect of polar substrates on the magneto-optical conductivity of doped monolayer graphene, where we particularly focus on the role played by surface polar phonons (SPPs). Our calculations suggest that polaronic shifts of the intra- and interband absorption peaks and the loss of spectral weight at these peaks due to electron-SPP scattering can be significantly larger for polar substrates than in graphene on nonpolar substrates, where only intrinsic graphene optical phonons with much higher energies contribute. These effects can be strongly temperature dependent, most noticeably in polar substrates with small SPP energies such as HfO_2.

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Benedikt Scharf
State Univ of NY - Buffalo

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