Magnetopolarons in wurtzite nitride materials

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Abstract

Magnetopolarons in wurtzite AlN, GaN, and InN are studied within the dielectric continuum description for the polar optical oscillation modes. Corrections to the unperturbed Landau levels are calculated through the use of a Green’s-function-based approach in which the electron-phonon self-energy is evaluated up to the second-order diagrams in the expansion. It is shown that in order to obtain correct results for the magnetic-field-dependent polaronic effective mass, these second-order terms are unavoidable.