Intraband carrier dynamics in Landau-quantized multilayer epitaxial graphene

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Abstract

We investigate the low-energy carrier dynamics in Landau quantized multilayer epitaxial graphene on (000 (1) over bar) SiC, using 14 meV photons. The THz absorption is dominated by Landau-level transitions within the conduction bands of several graphene layers with different doping. Varying the magnetic field allows us to tune the THz-induced response from induced transmission around B=0 to induced absorption at intermediate fields (1.5 T-3.3 T) and back to induced transmission at higher fields (3.3 T-7 T). The main features of this complex response are explained by a strong dependence of the absorption on the electron temperature. Furthermore a prolonged relaxation at high fields, which is attributed to reduced scattering via optical phonons, is observed.

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