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Terahertz Spectroscopy of Large-Area Graphene L. REN, T. ARIKAWA, B.F. CRUZ, M.Z. JIN, J. KONO, ECE Dept., Rice University, Z. JIN, J.M. TOUR, Chemistry Dept., Rice University, A.K. WOJCIK, A.A. BELYANIN, Physics Dept., Texas A&M University, Y. TAKEMOTO, K. TAKEYA, I. KAWAYAMA, M. TONOUCHI, Inst. of Laser Eng., Osaka University — Graphene is predicted to possess exotic nonlinear electromagnetic properties, which may lead to novel terahertz (THz) applications. THz dynamic conductivity measurements allow us to probe the dynamics of such 2D quantum relativistic Dirac fermions (DF). Here, we used THz time-domain spectroscopy (TDS) to measure large-area graphene grown by chemical vapor deposition. Raman spectroscopy, as well as optical absorption spectroscopy from the ultraviolet to the far-infrared, was used to determine the number of layers and assess the sample quality. THz complex dynamic conductivity was extracted and exhibited a non-Drude frequency dependence between 0.2 and 2.0 THz, which will be discussed by taking into account both interband and intraband dynamics. Gate voltage will be further added to the graphene to tune its Fermi level. Also a magneto-THz-TDS setup with a wider frequency range of up to 6 THz will be used to study time-domain cyclotron resonance of DF.

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