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Probing layer localization in twisted graphene bilayers via cyclotron resonance[1] CHI-KEN LU, National Taiwan Normal University, H.A. FERTIG, Indiana University Bloomington — Electron wave functions in twisted bilayer graphene may have a strong single-layer character or be intrinsically delocalized between layers, with their nature often determined by how energetically close they are to the Dirac point. We demonstrate that in magnetic fields, cyclotron resonance spectra contain signatures that may be used to distinguish the nature of these wave functions at low energies, as well as to locate low-energy critical points in the zero-field energy spectrum. Optical absorption for two different configurations–electric field parallel and perpendicular to the bilayer–is calculated, and the configurations are shown to have different selection rules with respect to which states are connected by the perturbation. Interlayer bias further distinguishes transitions involving states of a single-layer nature from those with support in both layers. For doped systems, a sharp increase in intra-Landau-level absorption occurs with increasing field as the level passes through the zero-field saddle-point energy, where the states change character from single layer to bilayer. The effects of impurity scattering will be discussed too.

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