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Microwave Reflection Spectroscopy of a Two-Dimensional Electron Gas JIE ZHANG, RUIYUAN LIU, LINGJIE DU, RUI-RUI DU, Rice University, LOREN PFEIFFER, KEN WEST, Princeton University — Cyclotron resonance (CR) is a standard method to determine the carrier effective mass in two-dimensional electron systems, typically by measuring/analyzing the absorption or transmission signal. Here we report a microwave spectrometer utilizing the reflection signal. In our experiment setup based on a top-loading helium3 cryostat and a superconducting solenoid, the microwave (up to 40GHz) is sent down via a coax cable to the sample surface, and the reflection signal is then collected by the same cable and fed upward to a directional coupler, and being detected. We demonstrate the applicability of the spectrometer by measuring the CR of high-mobility electrons or holes in GaAs/AlGaAs quantum wells. The construction of spectrometer, preliminary data, and brief discussions will be presented. The work at Rice was supported by Welch Foundation grant C-1682.

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