

Abstract Submitted  
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**Response of the Cyclotron Harmonic Spike to an In-Plane Magnetic Field**<sup>1</sup> YANHUA DAI, R.R. DU, Rice University, L.N. PFEIFFER, K.W. WEST, Princeton University — Microwave-induced resistance oscillations (MIRO) have been commonly observed in high-mobility GaAs/AlGaAs two-dimensional electrons systems (2DES) under microwave irradiations. In ultraclean GaAs/AlGaAs quantum wells (mobility  $\sim 3.0 \times 10^7 \text{ cm}^2/\text{Vs}$ ) we have recently observed an extraordinary resistance spike at the second harmonic of cyclotron resonance. In order to elucidate its origin, we have studied the response of microwave photoresistances in a two-axis magnetic field configuration, where the perpendicular ( $B_{\text{perp}}$ ) and the in-plane ( $B_{\text{//}}$ ) components can be independently applied to the sample. The experiments reveal a distinctive response of the spike to the  $B_{\text{//}}$  as compared with that of the MIRO. While the major MIRO peaks show an increasing phase-shift towards 0.25 in increasing  $B_{\text{//}}$ , the spike position shows an essentially zero shift. This finding lends additional support for the notion that the spike is a new effect in the microwave-driven 2DES.

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