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Influence of a Parallel Magnetic Field on Microwave-Induced Oscillatory and Zero-Resistance States C.L. YANG, Z.Q. YUAN, R.R. DU, Dept. of Physics, University of Utah; Dept. of Physics and Astronomy, Rice University, L.N. PFEIFFER, K.W. WEST, Bell Laboratories, Lucent Technologies — We have studied experimentally the influence of a parallel magnetic field on microwave-induced resistance oscillations and the subsequent zero-resistance states (ZRS) previously discovered in a high-quality two-dimensional electron gas. Our experiments were performed in a frequency range from 25 to 150 GHz and at temperatures from 0.5 to 8 K; samples were Hall bars of GaAs/$Al_xGa_{1-x}As$ heterojunctions and quantum wells having low temperature mobility as high as 2 x 10^7 cm^2/Vs. A two-axis superconducting magnet was employed to facilitate the experiment. We have observed pronounced suppression of oscillations/ZRS by a parallel magnetic field ($B_{//}$). In contrast, resistance peaks associated with magnetoplasmon resonance become stronger in $B_{//}$. We discuss possible explanations for the observations.

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