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Infrared magnetospectroscopy study of InAs/GaSb quantum wells from normal to inverted region YUXUAN JIANG, Georgia Institute of Technology, JONATHAN LUDWIG, Florida State University and National High Magnetic Field Laboratory, ZEV J. GREENBERG, Georgia Institute of Technology, WENKAI LOU, KAI CHANG, SKLSM, Institute of Semiconductors,Chinese Academy of Sciences, DMITRY SMIRNOV, National High Magnetic Field Laboratory, ZHIGANG JIANG, Georgia Institute of Technology, SAMUEL D. HAWKINS, JOHN F. KLEM, WEI PAN, Sandia National Laboratories — Inverted InAs/GaSb quantum well bilayers have been theoretically predicted and experimentally confirmed as a quantum spin Hall insulator (a two-dimensional topological insulator) when the conduction band of InAs anti-crosses the valence band of GaSb. In this work, we study the cyclotron resonance in InAs/GaSb quantum wells in Faraday configuration and in magnetic fields up to 17 T. By changing the relative thickness of each quantum well layer, we are able to band-engineer the material from the normal region to the inverted region (quantum spin Hall region) through a phase transition (critical region). We show that in the normal and critical region only single cyclotron resonance can be observed, while in the inverted region multiple cyclotron resonances, as well as anti-crossing behavior, occur. We compare our experimental results with predictions of eight-band k·p calculation.

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