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Multiple Phases with the Same Quantized Hall Conductance in a Two-Subband System XINCHANG ZHANG, DONALD RICHARD FAULHABER, HONGWEN JIANG, UCLA — In a GaAs/AlGaAs two-dimensional electron system with two occupied subbands, the experimentally determined phase diagram exhibits rich topological features. Ring-like structures are observed at even integer filling factors. Even with the identical quantized Hall resistance values as those given rise by the ordinary integer quantum Hall effect due to the Landau level quantization; the activation energies of these states within the rings are much smaller. These ring structures cannot account for by the simple single particle picture. We argue that ferromagnetic quantum Hall states, due to the interaction of two energy levels with opposite spin and different subband indices, are responsible for these unusual structures.

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