

Abstract Submitted
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Measuring Exchange Interactions by Tunneling Deep Into the Quantum Hall Liquid O.E. DIAL, R.C. ASHOORI, Massachusetts Institute of Technology, Cambridge, MA 02139, L.N. PFIEFFER, K.W. WEST, Bell Laboratories, Lucent Technologies, Murray Hill, New Jersey 07974, USA — We present measurements of the tunneling density of states of a two dimensional electron gas (2DEG) in GaAs at energies up to 10 meV above and below the Fermi energy. Using time domain capacitance spectroscopy (TDCS), we determine the current-voltage (IV) characteristics for tunneling perpendicularly between a gated 2DEG and a 3D electron continuum separated by a thin tunneling barrier. In TDCS, sharp pulses are applied to the sample while measuring displacement currents from electrons entering or leaving the 2DEG, allowing tunneling IV measurements without direct electrical contact to the 2DEG. We observe changes in the Landau level structure far from the Fermi surface as we fill and empty individual Landau levels by varying the electron density and magnetic field. This provides a unique measurement of the exchange enhanced spin splitting of empty and filled Landau levels.

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