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Spin polarization at fractional filling factors JAVIER GROSHAUS[1], P. PLOCHOCKA, M. RAPPAPORT, I. BAR-JOSEPH, Weizmann Inst., B. DENNIS, L. PFEIFFER, K. WEST, Bell Labs, A. PINCZUK, Columbia U. & Bell Labs
— We measure the spin polarization of a two-dimensional electron system (2DES) in the Quantum Hall regime by photocurrent interband absorption spectroscopy. The sample is a single GaAs quantum well that is placed in a dilution fridge with optical windows at low temperatures down to 70 mK. The 2DES density is tuned by a back-gate. We illuminate with circularly polarized light. This allows us to discriminate optical transitions into each electronic spin level. We show that the spectra consist of many-body electron-hole complexes. The lowest in energy is a singlet trion-like transition T (J.G. Groshaus *et.al.*, *Phys. Rev. Lett.* **93**, 96802, 2004). In the T-absorption process, the photocreated electron- hole pair binds to an electron from the 2DES with spin that is opposite to that of the photocreated one. We model this process taking into account correlations and phase space considerations. Using this model and measurements of the T-absorption, we obtain the spin polarization of the 2DES. We find that at $\nu = 1/3$ the 2DES is fully polarized. As ν is increased there is loss of spin polarization. Around $\nu = 2/3$ the 2DES is half polarized. At this ν, the 2DES remains half polarized for the relatively wide range of magnetic fields of 2 Tesla. This points to the existence of spatial magnetic domains, as proposed by G. Murthy (*Phys. Rev. Lett.* **84**, 350, 2000).

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