Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin-related origin of the magnetotransport feature at filling factor 7/11 GERARDO GAMEZ, KOJI MURAKI, NTT Basic Research Laboratories — Experiments by Pan et al. disclosed quantum Hall (QH) effect-like features at unconventional filling fractions, such as 4/11 and 7/11, not included in the Jain sequence [1]. These features were considered as evidence for a new class of fractional quantum Hall (FQH) states whose origin, unlike ordinary FQH states, is linked to interactions between composite fermions (CFs). However, the exact origin of these features is not well established yet. Here we focus on 7/11, where a minimum in the longitudinal resistance and a plateau-like structure in the Hall resistance are observed at a much higher field, 11.4 T, in a 30-nm quantum well (QW). Our density-dependent studies show that at this field, the FQH states flanking 7/11, viz. the 2/3 and 3/5 states, are both fully spin polarized. Despite of this fact, tilted-field experiments reveal that the 7/11 feature weakens and then disappears upon tilting. Using a CF model, we show that the spin degree of freedom may not be completely frozen in the region between the 2/3 and 3/5 states even when both states are fully polarized. Systematic studies unveil that the exact location of the 7/11 feature depends on the electron density and the QW width, in accordance with the model. Our model can also account for the reported contrasting behavior upon tilting of 7/11 and its electron-hole counterpart 4/11. [1] Pan et al., Phys. Rev. Lett. 90, 016801 (2003).

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Date submitted: 20 Nov 2009 Electronic form version 1.4