

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Gap and mass measurements of composite fermions at  $\nu=5/3$  in a 2D electron system with tunable valley occupation** MEDINI PADMANABHAN, NATHANIEL BISHOP, YAKOV SHKOLNIKOV, ETIENNE DE POORTERE, MANSOUR SHAYEGAN, Department of Electrical Engineering, Princeton University — In the composite fermion (CF) picture, the fractional quantum Hall state appearing at the filling factor of  $5/3$  is analogous to the integer quantum Hall state at  $\nu=1$ . We report energy gap measurements at  $\nu=5/3$  in AlAs quantum wells which reveal a persistent gap even when the two anisotropic in-plane valleys are degenerate. This is reminiscent of the finite gap for the integer quantum effect for electron systems at  $\nu=1$  in the  $g^*=0$  limit. As a symmetry breaking strain is controllably applied to the system, we observe a linear increase of gap followed by saturation, both of which are qualitatively consistent with a simple CF fan diagram. We also report mass measurements for the same state which suggest a mass enhancement for CFs by a factor of three over the electron band mass at a magnetic field of about 15T.

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Date submitted: 20 Nov 2006

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