Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Collapse of Composite Fermion Spin-Flip Roton at Filling Factor Below $\nu = 2/5$ THOMAS KIRSCHENMANN, YANN GALLAIS, IRENE DUJOVNE, CYRUS HIRJIBEHEDIN, Columbia University, BRIAN DENNIS, Bell Labs, Lucent Technologies, ARON PINCZUK, Columbia University and Bell Labs, Lucent Technologies, LOREN PFEIFFER, KEN WEST, Bell Labs, Lucent Technologies — Composite fermions (CF) consisting of an electron with attached even numbers of magnetic flux quanta are formed in the fractional quantum Hall regime. In this work resonant inelastic light scattering methods are used to study low energy excitations at electron Landau level filling factors close to $\nu = 2/5$ and at cold finger temperatures below 40mK. Our measurements focus on low lying spin excitations in which quasiparticles change CF Landau level and reverse spin orientation. The evolution of the roton in the dispersion curve of spin-flip modes is measured as a function of changes in filling factors near $\nu < 2/5$. These experiments probe CF properties in the range of filling factor close to $\nu = 5/13$ in which the population of the excited CF Landau level is close to 2/3 and CF's that are composed of electrons with two attached flux quanta are expected to condense into higher order quasiparticles. This work is supported by the NSF under Award Number DMR-03- 52738 and by the DoE award DE-AIO2-04ER46133. It is also supported by a research grant of the W. M. Keck Foundation.

Thomas Kirschenmann

Date submitted: 01 Dec 2004 Electronic form version 1.4