Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Local Compressibility of the Fractional Quantum Hall State at Filling Factor 5/2 VIVEK VENKATACHALAM, AMIR YACOBY, Harvard University, LOREN PFEIFER, KEN WEST, Princeton University — Understanding the ground state and excitations of the quantum Hall state at filling factor 5/2 is a subject of great interest due to the possibility of realizing non-abelian braiding statistics. All previous experimental probes of the state have relied on transport, and have therefore only accessed the chiral edges of the system. Here we present the first thermodynamic measurements of bulk properties at $\nu = 5/2$. By measuring the local compressibility, $\left(\frac{\partial \mu}{\partial n}\right)^{-1}$, of states in the second Landau level, we can monitor the charging of individual localized states in the bulk. Comparing charging spectra at $\nu = 7/3$ and $\nu = 5/2$, we are able to extract the ratio of local charges in the bulk at these filling factors. Averaged over several disorder configurations and samples, we find this ratio to be 4/3, suggesting that the local charges for these states are $e^*_{7/3} = e/3$ and $e^*_{5/2} = e/4$. Further, by integrating $\frac{\partial \mu}{\partial n}$, we obtain a value for the thermodynamic gap $\Delta_{5/2}$ without relying on activated transport.

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Date submitted: 20 Nov 2009 Electronic form version 1.4