Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Measuring Fractional Charge and Statistics in fractional quantum Hall Jain States** EUN-AH KIM, UIUC, SMITHA VISHVESHWARA, UIUC, MICHAEL LAWLER, UIUC, EDUARDO FRADKIN, UIUC — We study quantum noise in a multiple lead setup of a 2DEG in the FQH regime as a means of capturing clear signatures of fractional statistics and fractional charge in Jain states. Quasiparticles in FQH systems are predicted to have fractional charge and statistics. While the fractional charge for Laughlin states was observed recently through shot noise measurements, and found to be consistent with predictions, a clear signature of fractional statistics has yet to be seen. Here we propose an experiment involving the tunneling of quasiparticles in a multiple lead setup, that can unmistakably capture fractional statistics . Of particular interest are non-Laughlin states since in these states charge $Q$ and statistical angle $\theta$ are different fractions (e.g., $\nu = 2/5$, $Q = e/5$, $\theta = 3\pi/5$) and in principle, one should be able to tell how each contributes to measured correlations of tunneling currents between different leads. By analyzing finite-temperature cross correlations between tunneling currents, we find more boson-like (bunching) or more fermion-like (anti-bunching) statistical behavior of quasi particles depending on their filling fraction $\nu$ and related statistical angle $\theta$. Furthermore we are able to distinguish contributions coming from the fractional charge and fractional statistics.

Eun-Ah Kim
UIUC

Date submitted: 01 Dec 2004 Electronic form version 1.4