Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Beyond the Plasma Analogy: Collective Field Theory for Quantum Hall States TANKUT CAN, State Univ of NY- Stony Brook, MICHAEL LASKIN, PAUL WIEGMANN, University of Chicago — We develop a quantum field theory of collective coordinates describing fractional quantum Hall (FQH) states. We show that the familiar properties of Laughlin states are captured by a Gaussian free field theory with a background charge. Gradient corrections to the Gaussian theory arise from ultraviolet regularization, and go beyond the celebrated plasma analogy. They give rise to a gravitational anomaly described by the Liouville theory of 2D quantum gravity. The field theory simplifies the computation of correlation functions in FQH states and makes manifest the effect of quantum anomalies. This talk is based on the preprint arXiv:1412.8716.

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Date submitted: 06 Nov 2015 Electronic form version 1.4