Abstract Submitted
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Correlated Jumps in Magnetotransport of Imbalanced Bilayer Two Dimensional Hole Systems NATHANIEL C. BISHOP, Princeton University, SHASHANK MISRA, Princeton University, EMANUEL TUTUC, IBM/ T.J. Watson Research Center, MANSOUR SHAYEGAN, Princeton University — A pair of dilute two-dimensional hole layers can interact to produce correlated electronic states unique to the bilayer geometry. Here, we examine the nonequilibrium resistivity of one layer when the other layer is tuned to the $\nu = 1$ quantum Hall state. Previous studies have shown that the longitudinal resistivity of the detuned layer jumps with a slow ($\tau \approx 100s$) relaxation.[1] Surprisingly, we find that both the longitudinal and Hall resistivities of the detuned layer jump at the same time for contacts located hundreds of microns apart. This suggests either that the instabilities in charge distribution of the two layers occur over domains of macroscopic size, or that some novel quantum correlation manifests itself over similarly large length scales.

[1] E. Tutuc *et al.*, PRB **68**, 201308 (2003).

Nathaniel C. Bishop
Princeton University

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