Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Strong electronic interaction and multiple quantum Hall ferromagnetic phases in trilayer graphene BISWAJIT DATTA, Department of Condensed Matter Physics and Materials Science (DCMPMS), Tata Institute of Fundamental Research (TIFR), Mumbai, India, SANTANU DEY, Department of Astronomy and Astrophysics ,TIFR, Mumbai, India, ABHISEK SAMANTA, Department of Theoretical Physics, TIFR, Mumbai, India, ABHINANDAN BORAH, DCMPMS, TIFR, Mumbai, India, HITESH AGARWAL, DCMPMS,TIFR, Mumbai, India, KENJI WATANABE, TAKASHI TANIGUCHI, Advanced Materials Laboratory, National Institute for Materials Science, Japan, RAJDEEP SENSARMA, Department of Theoretical Physics, TIFR, Mumbai, India, MANDAR DESHMUKH, DCMPMS,TIFR, Mumbai, India — There is an increasing interest in the electronic properties of few layer graphene as it offers a platform to study electronic interactions because the dispersion of bands can be tuned with number and stacking of layers in combination with electric field. Here, we report evidence of strong electronic interactions and quantum Hall ferromagnetism (QHF) seen in a dual gated ABA trilayer graphene sample. Due to high mobility (500,000 $cm^2V^{-1}s^{-1}$) in our device compared to previous studies, we find all symmetry broken states including ν =0 filling factor at relatively low magnetic field (6T). Activation measurements show that Landau Level (LL) gaps are enhanced by interactions. Moreover, we observe hysteresis as a function of filling factor and spikes in the longitudinal resistance which, together, signal the formation of QHF states at low magnetic field.

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Date submitted: 17 Nov 2016 Electronic form version 1.4