Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Evidence for pairing fluctuations in the Coulomb drag resistance of a GaAs/Graphene electron-hole bilayer DAVIDE SPIRITO, ANDREA GAMUCCI, MATTEO CARREGA, BISWAJIT KARMAKAR, NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, Pisa, Italy, ANTONIO LOMBARDO, MATTEO BRUNA, ANDREA C. FERRARI, Cambridge Graphene Center and Engineering Department, University of Cambridge, Cambridge, UK, ARON PINCZUK, Department of Applied Physics and Applied Mathematics and Department of Physics, Columbia University, New York NY, USA, LOREN N. PFEIFFER, KEN W. WEST, Department of Electrical Engineering, Princeton University, Princeton, NJ, USA, MARCO POLINI, NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, Pisa, Italy, VITTORIO PELLEGRINI, Istituto Italiano di Tecnologia (IIT), Genova, and NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, Pisa, Italy — We report on experiments in a novel double-layer system composed by an ordinary two-dimensional electron gas (2DEG) in a GaAs heterostructure and a two-dimensional hole gas in a graphene monolayer placed on top of GaAs. Owing to the relatively short distance between the two layers we were able to measure the Coulomb drag in both the graphene and 2DEG layers. We discuss, in particular, the temperature evolution of the measured drag resistivity in the 2DEG. While the drag follows the expected quadratic temperature dependence at values above $T \approx 8K$, at lower temperature it displays a remarkable logarithmic increase. These data suggests the occurrence of electron-hole excitonic fluctuations as the double layer approaches the condensation temperature.

Davide Spirito
NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, Pisa, Italy

Date submitted: 13 Nov 2013 Electronic form version 1.4