Abstract Submitted
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Artificial Graphene in Nano-patterned Triangular Antidot Lattices on GaAs Heterostructures[1] LINGJIE DU, SHENG WANG, SHALOM WIND, Department of Applied Physics and Applied Mathematics, Columbia University, LOREN PFEIFFER, KEN WEST, Department of Electrical Engineering, Princeton University, SAEED FALLAHI, MICHAEL MANFRA, Department of Physics and Astronomy, Purdue University, VITTORIO PELLEGRINI, Istituto Italiano di Tecnologia, Graphene Labs, Italy, ARON PINCZUK, Department of Applied Physics and Department of Physics, Columbia University — Artificial graphene (AG) in semiconductors have recently been realized in honeycomb quantum dot lattices superimposed on a GaAs quantum well [1], serving as quantum simulators for probing novel electron behavior. Here we report the realization of AG in nano-patterned triangular antidot lattices on the GaAs quantum well [2]. Using cutting-edge fabrication technology we created small-period triangular antidot lattices reaching periods as small as 70 nm (equivalent to 40nm in a honeycomb lattice). The electron states were explored by resonant inelastic light scattering (RILS) at low temperature. Massless Dirac Fermions (MDF) are clearly revealed in RILS spectra due to low-lying transitions between AG bands and in spectra due to combined intersubband transitions. Control of the created MDF through tuning the antidot potential will be discussed. [1] S. Wang, et al., Nature Nanotechnology accepted for publication. [2] L. Du, et al., in preparation.

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