Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Graphene electrically reconfigurable patterns for THz imaging applications BERARDI SENSALE-RODRIGUEZ, SUBRINA RAFIQUE, RUSEN YAN, MINGDA ZHU, VLADIMIR PROTASENKO, DEBDEEP JENA, LEI LIU, HUILI GRACE XING, Department of Electrical Engineering, University of Notre Dame — THz waves are attractive for several imaging applications, since they can propagate through non metallic media such as paper, cloth, plastics, and ceramics, and do not scatter over nano-scale defects or ionize the material under imaging -as might shorter wavelengths do- while offering an image resolution similar to that of the human eye. In this work we propose and experimentally demonstrate electrically reconfigurable patterns for single-pixel terahertz imaging based on arrays of graphene THz electro-absorption modulators. In an optical setup, in conjunction with mirrors, the modulator array can transform the output radiation from a CW THz source into a pixelated and collimated beam of illumination. Single-atom-thick graphene is employed as the active element of these modulators, achieving a modulation of the THz wave reflectance >50% with a potential modulation depth approaching 100% (i.e. each region of the pixelated collimated beam can be potentially completely turned-off). Although the proof-of-concept device here discussed only consists of 4x4 elements, we foresee that this technology can enable low-cost video rate THz imaging systems.

Berardi Sensale-Rodriguez
Department of Electrical Engineering, University of Notre Dame

Date submitted: 08 Nov 2012 Electronic form version 1.4