Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Tunable phonon-indued transparency in bilayer graphene plasmonic structures HUGEN YAN, TONY LOW, IBM T. J. Watson Research Center, FRANCISCO GUINEA, Instituto de Ciencia de Materiales de Madrid. CSIC, FENGNIAN XIA, PHAEDON AVOURIS, IBM T. J. Watson Research Center — Electromagnetically induced transparency (EIT) has been extensively studied in atomic systems. EIT-like phenomena have also been demonstrated in classical systems, such as plasmonic and opto-mechanical systems. Here we present an EIT-like behavior in AB stacking bilayer graphene nanoribbons, where the destructive interference of an infrared active phonon mode and a plasmon mode induces an absorption transparency in the vicinity of the phonon frequency. More importantly, this phonon-induced transparency can be tuned by electrostatic or chemical doping. This kind of tunability is lacking in many of the systems with EIT-like property. The phonon-induced transparency is also accompanied by the slow light effect and a light group index as large as 500 has been inferred from our data. Bilayer graphene provides us a unique opportunity to explore EIT-like phenomena involving phonons and plasmons.

Hugen Yan
IBM T. J. Watson Research Center

Date submitted: 15 Nov 2013 Electronic form version 1.4