Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

2D line enhancement by quantum interference in graphene superlattice ZHIHUA SU, YANAN WANG, Department of Electrical and Computer Engineering, University of Houston, Houston, TX 77204, USA, WEI WU, SIRUI XING, Department of Electrical and Computer Engineering & Center for Advanced Materials, University of Houston, Houston, TX 77204, USA, XIAOXIANG LU, Department of Electrical and Computer Engineering, University of Houston, Houston, TX 77204, USA, XINGHUA LU, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, SHIN-SHEM PEI, Department of Electrical and Computer Engineering & Center for Advanced Materials, University of Houston, Houston, TX 77204, USA, FRANCISCO ROBLES-HERNANDEZ, College of Engineering Technology, University of Houston, Houston, TX 77204, USA, VIKTOR G. HADJIEV, Texas Center for Superconductivity and Department of Mechanical Engineering, University of Houston, Houston, TX 77204, USA, JIMING BAO, Department of Electrical and Computer Engineering, University of Houston, Houston, TX 77204, USA — Raman scattering is used to study twisted bilayer graphene synthesized by chemical vapor deposition (CVD) method with rotation angle determined by relative edge misalignment. Degenerate Dirac band of twisted bilayer graphene is revealed by enhanced intensity of 2D line. This Raman signature is systematically studied and found to be correlated with G-line resonance and laser excitation energy. 2D enhancement only happens when the laser excitation energy is smaller than G-line resonance energy, while enhancement ratio increases as laser excitation energy decreases. The anomalous enhancement of 2D intensity is ascribed to the constructive quantum interference between two Raman paths enabled by degenerate Dirac cone.

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Date submitted: 17 Dec 2012 Electronic form version 1.4