**Abstract: F13.00005 : Direct growth of mm-size twisted bilayer graphene (tBLG) by plasma enhanced chemical vapor deposition (PECVD)**

12:27 PM–12:39 PM

**Presenter:**

Yen-Chun Chen, (Physics, National Tsing-Hua University, Hsinchu, Taiwan)

**Authors:**

Yen-Chun Chen, (Physics, National Tsing-Hua University, Hsinchu, Taiwan)

Wei-Hsiang Lin, (Applied Physics, Caltech, Pasadena, CA 91125, USA)

Wei-Shiuan Tseng, (Physics, Caltech, Pasadena, CA 91125, USA)

Chien-Chang Chen, (Physics, Caltech, Pasadena, CA 91125, USA)

George R Rossman, (Geological and Planetary Science, Caltech, Pasadena, CA 91125, USA)

Yu-Shu Wu, (Physics, National Tsing-Hua University, Hsinchu, Taiwan)

ChiiDong Chen, (Physics, Academia Sinica, Taiwan)

Nai-Chang Yeh, (Physics, Caltech, Pasadena, CA 91125, USA)

PECVD techniques have been shown to be an efficient method to achieve single-step synthesis of high-quality monolayer graphene without the need of active heating. Here we report our progress in PECVD-growth of single-crystal hexagonal bilayer graphene (BLG) flakes and mm-size BLG films, both with the interlayer twisted angle controlled by the PECVD growth parameters. The twisted angle between stacked bilayer is determined by a combination of three experimental approaches, which include: 1) directly measuring the orientation of edges between two stacked layers by scanning electron microscopy, 2) evaluating the twisted angle-dependent Raman spectral characteristics of the G-, 2D- and R¢-modes of graphene, and 3) analyzing the Moiré period captured by scanning tunneling microscopy. We find that the average twisted angle of BLG samples can be controlled from 0°(for perfect AB stacking) to ~ 20°, and the spread of twisted-angles for a given growth condition can be reduced to less than 7° over mm-size tBLG films. More comprehensive studies of various properties of PECVD grown-tBLG will be reported in this talk.

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