O 27: Poster Session - Graphene: Electronic Structure, Excitations, etc.

Time: Monday 18:15–20:00 Location: P1A

O 27.1 Mon 18:15 P1A

Anisotropic Carrier Dynamics in HOPG — •Hauke Beyer, Tim Jacobsen, Gerald Rohde, Kai Rossnagel, and Michael Bauer — Institute of Experimental and Applied Physics, Kiel University, 24098 Kiel, Germany

Time- and angle-resolved photoelectron spectroscopy is employed to study the decay of an anisotropic momentum distribution generated in the Dirac-cone of HOPG upon excitation with linearly polarized light. At the primary excitation energy the transient population within the probed momentum cut shows distinct delays of up to $\sim$ 10 fs for indirect excitations in comparison to the direct photoexcitation channel. The observed delay times are associated with momentum isotropization processes and show a good qualitative agreement with calculations based on a model introduced in Ref. [1]. As excited carriers are redistributed towards the Dirac-point via electron-electron and electron-phonon scattering we furthermore observe that the momentum anisotropy gets gradually weaker. In contrast to previous quasistatic studies [2, 3], our results allow also capturing the temporal evolution of momentum redistribution processes driven by fundamental interactions in graphitic materials.

[1] E. Malic *et al.*, Phys. Rev. B **84**, 205406 (2011).
[2] S. Aeschlimann *et al.*, Phys. Rev. B **96**, 020301(R) (2017).
[3] M. Mittendorff *et al.*, Nano Letters **12**, 1504 (2014).

O 27.2 Mon 18:15 P1A

Spatial Variations in the Electronic Structure of Twisted Bilayer Graphene on HOPG — •Birce Sena Tömekce[1], Dilek Yildiz[1,2], and Oguzhan Gürlü[1] — [1]Department of Physics, Istanbul Technical University, 34460, Istanbul, Turkey — [2]Department of Physics, Harvard University, Cambridge, MA 02138, USA

Twist of a bilayer graphene generates moiré superlattices with a periodicity that depends on the twist angle. Such periodic pattern arises due to modulation of local density of states (LDOS) along the surface which can be detected by scanning tunneling microscopy (STM). It is known that the electronic properties of twisted bilayer graphene vary with the twist angle. Cyclohexane dropcasting on highly oriented pyrolytic graphite (HOPG) induces twist between graphene layers. Hence, we used this method to form moiré zones on HOPG. In this study, we investigated the electronic properties of moiré patterns with various periodicities and their boundaries on HOPG surface by STM and scanning tunneling spectroscopy (STS) together with lock-in technique. We studied spatial distribution of charge density of the surface by differential conductance (dI/dV) mapping. For most of the observed moiré patterns, charge density modulation tends to decrease and becomes homogenous with increasing magnitude of bias voltage, while moiré boundaries might show arbitrary changes. In addition, we obtained dI/dV spectra on different positions on moiré regions, their boundaries and HOPG surface adjacent to the moiré regions. In this presentation, we will report on bias dependent dI/dV maps and discuss conducting behaviors of the encountered moiré zones.