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Scanning Tunneling Microscopy and Spectroscopy of Twisted Bilayer Graphene with Small Twist Angles SHENGQIANG HUANG, The University of Arizona, KYOUNGHWAN KIM, ASHLEY DASILVA, The University of Texas at Austin, TAKASHI TANIGUCHI, KENJI WATANABE, National Institute for Materials Science, Japan, ALLAN H. MACDONALD, EMANUEL TUTUC, The University of Texas at Austin, BRIAN J. LEROY, The University of Arizona — The electronic band structure of twisted bilayer graphene (tBLG) depends on the twist angle between the two layers. Distinct electronic features emerge when the twist angle becomes smaller than 1 degree. Here we use low temperature scanning tunneling microscopy and spectroscopy to investigate the electronic properties of tBLG for twist angles below 2 degrees. The twist angle is determined from the wavelength of the moiré pattern. Density of states measurements are performed as a function of charge density which is controlled by the back gate. Different charge density dependences are observed for twist angles above and below a critical angle of about 1 degree. Moreover, spatially resolved spectroscopy mapping shows that electrons at the Fermi level become localized on the AA sites for small twist angles.

Shengqiang Huang
The University of Arizona

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