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Local transport measurements at mesoscopic length scales on epitaxial graphene using scanning tunneling potentiometry WEIGANG WANG, KO MUNAKATA, MICHAEL ROZLER[1], FRANCOISE KIDWINGIRA[2], MALCOLM BEASLEY, Stanford University — By contrast to quantum transport measurements across nanostructures (single molecular, carbon nanotube, or lithographically manufactured), local transport measurements on macroscopic samples at mesoscopic length scales are relatively uncharted territory. Scanning tunneling potentiometry (STP) is the natural tool to perform such measurements. Due to its characteristic materials parameters, thin epitaxial graphene on silicon carbide is an attractive model system for search of quantum mechanical effects in local transport. We report results of STP measurements on epitaxial graphene at room temperature. In addition to the expected residual resistivity dipoles, we have observed features in the measured potential that are counter intuitive to classical diffusive considerations. Based on these results, we conclude that a more complete theoretical description of STP measurement is necessary. Work supported by AFOSR.

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