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Strain variation in corrugated graphene XUANYE WANG, KHWANCHAI TANTIWANICHAPAN, Department of Electrical and Computer Engineering, Boston University, JASON CHRISTOPHER, Department of Physics, Boston University, ROBERTO PAIELLA, ANNA SWAN, Department of Electrical and Computer Engineering, Boston University — Raman spectroscopy is a powerful non-destructive technique for analyzing strain in graphene. Recently there has been interest in making corrugated graphene devices with varying spatial wavelengths Λ for plasmonic and THz applications. Transferring graphene onto corrugated substrates introduces strain, which if there was perfect clamping (high fraction) would cause a periodic strain variation. However, the strain variation for pattern size smaller than the diffraction limit λ makes it hard to precisely model the strain distribution. Here we present a detailed study on how strain varies in corrugated graphene with sub-diffraction limit periodicity $\Lambda<\lambda$. Mechanically exfoliated graphene was deposited onto sinusoidal shape silicon dioxide gratings with Λ=400 nm period using the pick and place transfer technique. We observed that the graphene is not rigidly clamped, but partially slides to relieve the strain. We model the linewidth variation to extract the local strain variation as well as the sliding in the presence of charge puddling in graphene. The method gives us a better understanding on graphene slippage and strain distribution in graphene on a corrugated substrate with sub-diffraction limit spatial period.

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