Abstract Submitted
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A Novel Method for Analyzing Low Doping in Graphene[1] XUANYE WANG, Department of Electrical anc Computer Engineering, Boston University, ANNA SWAN, Department of Electrical Engineering, Boston University — Raman spectroscopy provides a non-destructive method for analyzing graphenes properties. For example, graphenes Raman response of the G peak and 2D peak to strain and charge has been effectively used for optically characterizing the strain and charge state [1]. The Raman peaks shift nearly linearly with strain and doping following different correlations for strain and positive and negative charge. However, this rule is no longer valid in the low doping regime within the Kohn anomaly. Here we present a method for probing graphenes doping level down to sub-Kohn anomaly scale using the Raman peak charge evolution on suspended graphene and graphene encapsulated in hexagonal boron nitride. By analyzing samples with low accidental doping, we obtain statistical behavior of how the Raman peaks evolve in this regime as a function of doping caused by charge puddles. This method allows doping analysis to orders of magnitude lower charge density than traditional ω_{2D} v.s. ω_G Raman shift study. This highly sensitive method could be used to correlate with graphenes electrical transport properties. [1]Lee, J. E.; Ahn, G.; Shim, J.; Lee, Y. S.; Ryu, S. Nat. Commun. 2012, 3, 1024

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