Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Current and Noise Saturation in Graphene Superlattice.[1] WEI YANG, Laboratoire Pierre Aigrain, ENS-CNRS, XIAOBO LU, Institute of Physics, Chinese Academy of Sciences, SIMON BERTHOU, QUENTIN WILMART, MOHAMED BOUKHICHA, CHRISTOPHE VOISIN, Laboratoire Pierre Aigrain, ENS-CNRS, GUANGYU ZHANG, Institute of Physics, Chinese Academy of Sciences, BERNARD PLACAIS, Laboratoire Pierre Aigrain, ENS-CNRS — One of the merits of graphene is that the Fermi level can be easily tuned by electrical gating, which render charge carriers n type or p type, or even insulating around the Dirac point (DP). By aligning graphene on top of Boron Nitride (BN), the presence of graphene superlattice makes transport properties even more versatile owning to the emergence of secondary Dirac points (SDPs). Here we present a study of high electric field performance of graphene superlattice obtained from epitaxial approach. By using microwave cavity, noise produced from graphene by joule heating is recorded up to 5GHz. Current and noise saturation are observed and investigated. Depending on Fermi energy, saturation can be attributed to intrinsic optical or remote surface polar phonon scattering at a doping far away from DP, while no saturation are found around DP. Moreover, noise saturation is identified around Fermi energy between DP and SDP, which can be attributed to the influence of van Hove singularity arising from the superlattice. Lastly, saturation due to the bias induced shift of DP, or so called Dirac fermion pinch-off, is well observed by local top gate technique.

[1]EU Graphene flagship project (contract no. 604391)

Wei Yang
Laboratoire Pierre Aigrain, ENS-CNRS

Date submitted: 28 Oct 2015 Electronic form version 1.4