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Fabrication of nanometer-scale suspended graphene transistors VAHID TAYARI, JOSHUA O. ISLAND, SERAP YİĞEN, JAMES PORTER, A.R. CHAMPAGNE, Department of Physics, Concordia University, Montreal, Quebec, Canada — We present a method to fabricate suspended ultra-short graphene transistors. We define narrow bowtie gold junctions on exfoliated graphene, and then use an oxygen plasma to etch away the graphene except under the gold junctions. The next step is to wet etch the SiO₂ under the junctions to suspend the devices. Finally, we use a feedback-control electromigration procedure to break the gold junctions and expose sections of graphene which are 100 to 300 nm wide and as short as ≈ 10 nm. Using electron transport, we show that these suspended graphene nanocrystals form ballistic two-dimensional Dirac electron gas systems. We study them as a function of temperature and charge carrier density. These ultra-short NEMS transistors offer the prospect of exploring the coupling between flexural vibrons and charge carriers in graphene.

Prefer Oral Session

Prefer Poster Session

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