Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Incorporating 2D Materials with Micro-electromechanical Systems to Explore Strain Physics and Devices[1] JASON CHRISTOPHER, MOUNIKA VUTUKURU, TRAVIS KOHLER, DAVID BISHOP, ANNA SWAN, Boston University, BENNETT GOLDBERG, Northwestern University — 2D materials can withstand an order of magnitude more strain than their bulk counterparts which can be used to dramatically change electrical, thermal and optical properties or even cause unconventional behavior such as generating pseudo-magnetic fields. Here we present micro-electromechanical systems (MEMS) as a platform for straining 2D materials to make such novel phenomena accessible. Unlike other strain techniques, MEMS are capable of precisely controlling the magnitude and orientation of the strain field and are readily integrated with current technology facilitating a path from lab bench to application. In this study, we use graphene as our prototypical 2D material, and determine strain via micro-Raman spectroscopy making extensive use of graphenes well-characterized phonon strain response. We report on the strength of various techniques for affixing graphene to MEMS, and investigate the role of surface morphology and chemistry in creating a high friction interface capable of inducing large strain.

[1]This work is supported by NSF DMR grant 1411008, and author J. Christopher thanks the NDSEG program for its support.

Jason Christopher
Boston University

Date submitted: 11 Nov 2016 Electronic form version 1.4