Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Negative Compressibility and External Electric Field Induce Charge Density Waves in Two-Dimensional Materials.[1] ERICA HROBLAK, Univ of Missouri - Columbia, ALESSANDRO PRINCIPI, Radboud University, institute for Molecules and Material, GIOVANNI VIGNALE, Univ of Missouri - Columbia — In the last few decades, experimental observations of negative compressibility in two-dimensional materials have been successfully realized in the form of a correction to the classical capacitance[1], electron transport in MoS_2[2] and angle-resolved photoemissions in WSe_2[3]. However, the possible applications of negative compressibility have not been explored fully. Here we demonstrate that in a low density, two-dimensional material, the presence of negative compressibility along with an applied electric field can induce charge density waves throughout the length of the material. This stands in contrast to the classical case where charge accumulates only on two opposite edges of the material. These results can be further exploited by changing the strength of the applied field and screening length of the material, which alters the amplitude and wavelength of the charge density waves respectively. REFERENCES: [1] Eisenstein, J. P., Pfeiffer, L. N., West, K. W. Physical review letters, 68(5), 674. (1992) [2] Larentis, S., Tolsma, J. R., Fallahazad, B., Dillen, D. C., Kim, K., MacDonald, A. H., Tutuc, E. Nano letters, 14(4), 2039-2045. (2014). [3] Riley, J. M., et al. Nature nanotechnology, 10(12), 1043-1047. (2015).

[1]We acknowledge support from NSF Grant DMR-1406568

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Date submitted: 10 Nov 2016 Electronic form version 1.4