

Abstract Submitted  
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**Giant Flexoelectric Effect In Two-Dimensional Boron-Nitride Layers** IVAN NAUMOV, ALEXANDER BRATKOVSKY, Hewlett-Packard Labs, Palo Alto, VIVEK RANJAN, North Carolina State U, Raleigh — The direct conversion of ambient motion into electrical energy is a challenging fundamental and technological problem that is currently a focus of research. Boron-Nitride non-centrosymmetric monolayers are piezoelectrics that can sustain much larger structural and produce very large (a few Volts) voltage drop across flexed nanostrips. We show, by way of first-principles calculations, the existence of giant nonlinear flexoelectric effect in BN 2D strips. The induced polarization is quadratic in amplitude of atomic displacements  $A$ , yet the dipole moment per unit cell is about four times larger compared to PbZrTiO<sub>3</sub> [1]. The new effect may find a variety of practical applications and, in particular, as nanogenerators and tactile sensors powered by an ambient motion or agitation. BN material is inert and can be used in biological environment.

[1] I.Naumov, A.Bratkovsky, V.Ranjan, arXiv:0810.1775 (2008).

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