

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Dynamical piezoelectric and magnetopiezoelectric effects in polar metals from Berry phases and orbital moments** DANIEL VARJAS, QuTech, TU Delft, The Netherlands, ADOLFO G. GRUSHIN, Department of Physics, University of California, Berkeley, RONI ILAN, Raymond and Beverly Sackler School of Physics and Astronomy, Tel Aviv University, Israel, JOEL E. MOORE, Department of Physics, University of California, Berkeley; Materials Sciences Division, Lawrence Berkeley National Laboratory — The polarization of a material and its response to applied electric and magnetic fields are key solid-state properties with a long history in insulators, although a satisfactory theory required new concepts such as Berry-phase gauge fields. In metals, quantities such as static polarization and magnetoelectric  $\theta$ -term cease to be well-defined. In polar metals there can be analogous dynamical current responses, which we study in a common theoretical framework. We find that current responses to dynamical strain in polar metals depend on both the first and second Chern forms, related to polarization and magnetoelectricity in insulators, as well as the orbital magnetization on the Fermi surface. We provide realistic estimates that predict that the latter contribution will dominate and investigate the feasibility of experimental detection of this effect.

Daniel Varjas  
Delft Univ of Tech

Date submitted: 09 Nov 2016

Electronic form version 1.4