

Abstract Submitted
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Influence of electronic band topology on phonon properties in Dirac materials¹ ION GARATE, KUSH SAHA, KATHERINE LÉGARÉ, Université de Sherbrooke — In Dirac materials, the interaction between electrons and long-wavelength phonons has been shown to induce and stabilize topological insulation [1-2]. Here report on a theoretical study of the converse effect, namely the influence of band topology on phonon properties. We calculate how electron-phonon interactions change the bulk phonon dispersion as a function of pressure and temperature, in both trivial and topological phases. We find that (i) topological insulators are more prone to lattice instabilities than trivial insulators, and (ii) Raman and neutron scattering measurements can be used to determine the electronic band topology.

[1] I. Garate, PRL 110, 046402 (2013).

[2] K. Saha and I. Garate, PRB 89, 205103 (2014).

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