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Theory of electromechanical coupling in dynamical graphene
MIRCEA TRIF, PRAMEY UPADHYAYA, YAROSLAV TSERKOVNYAK, University of California, Los Angeles — We study the coupling between mechanical motion and Dirac electrons in a dynamical sheet of graphene. We show that this coupling can be understood in terms of an effective gauge field acting on the electrons, which has two contributions: *quasistatic* and purely *dynamic* of the Berry-phase origin. As is well known, the static gauge potential is odd in the K and K' valley index, while we find the dynamic coupling to be even. In particular, the mechanical fluctuations can thus mediate an indirect coupling between charge and valley degrees of freedom.

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