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Dissipative Floquet Topological Systems[1] HOSSEIN DEHGHANI, New York Univ NYU, TAKASHI OKA, University of Tokyo, ADITI MITRA, New York Univ NYU — Motivated by recent pump-probe spectroscopies, we study the effect of phonon dissipation and potential cooling on the nonequilibrium distribution function in a Floquet topological state. To this end, we apply a Floquet kinetic equation approach to study two dimensional Dirac fermions irradiated by a circularly polarized laser, a system which is predicted to be in a laser induced quantum Hall state. We find that the initial electron distribution shows an anisotropy with momentum dependent spin textures whose properties are controlled by the switching-on protocol of the laser. The phonons then smoothen this out leading to a non-trivial isotropic nonequilibrium distribution which has no memory of the initial state and initial switch-on protocol, and yet is distinct from a thermal state. An analytical expression for the distribution at the Dirac point is obtained that is relevant for observing quantized transport.

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