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Magnetoelectric and thermoelectric transport in graphene and helical metal: Effect of applied electric field[1] SUNG-PO CHAO, HUAZHOU WEI, VIVEK AJI, University of California at Riverside — We report on the electrical and thermoelectric transport properties of the surface state of the 3D topological insulator (TI) and graphene in a quantizing magnetic field. An unique feature of these systems is the evolution of the Landau level spectrum as a function of applied in plane electric field. We bench mark out results at small fields by computing conductivity and thermopower within linear response. We find that the universal values of thermopower in the clean limit depend on the gyromagnetic ratio in TIs, providing a clear distinction from graphene. In large electric fields we find an oscillation of conductivity as a function of applied electric field for fixed chemical potential, but not for fixed particle density. Signatures of the Landau level dependence on electric fields are also found in thermopower. These results are suggested as possible probes, in transport measurements of topological surface states.

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