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**Quantum corrections to conductivity in topological insulator thin films: Weak localization and electron-electron interaction** ASHLEY DASILVA, JIAN WANG, Penn State University, CUI-ZU CHANG, Chinese Academy of Sciences and Tsinghua University, KE HE, XU-CUN MA, Chinese Academy of Sciences, QI-KUN XUE, Tsinghua University, JAINENDRA JAIN, NITIN SAMARTH, MOSES CHAN, Penn State University — We study quantum corrections to transport in topological insulator candidate  $\text{Bi}_2\text{Se}_3$ , with and without doping with Pb. We study thin films with the expectation that the topological surface states will have substantial contribution to transport. Our observations are not consistent with the theory of diffusive transport of noninteracting electrons, because while the temperature dependence is consistent with weak localization, the magnetoresistance is positive, suggestive of weak anti-localization. We show that the theory including quantum corrections from both electron-electron interaction and disorder is qualitatively correct in all magnetic field directions that we have studied. We mention the implications of our results to the possibility of conducting surface states.

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