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Spin-orbit torque in two dimensional antiferromagnetic topological insulators[1] SUMIT GHOSH, AURELIEN MANCHON, King Abdullah Univ of Sci Tech (KAUST) — Topological insulators (TI) have been found to be a source of huge spin-orbit torque (SOT) [2] that originates from their surface states. However, the proximity of a ferromagnetic layer can destroy the surface states which makes the exact nature of the SOT quite argumentative. Recently it has been found that in presence of an antiferromagnetic magnetization, a TI can preserve its gapless states [3]. We conduct a systematic study [4] on two-dimensional antiferromagnetic TI and find that they are more robust compared to a ferromagnetic TI against impurity scattering. It can facilitate a field like SOT due to the intrinsic spin-orbit coupling and an antidamping SOT via scattering by scalar impurity. Interestingly, a moderate amount of impurity enhances the staggered spin density at the edges resulting in a uniform antidamping torque with the conductance remaining finite. It is, therefore, possible to manipulate the magnetization either by using a pulse [5] via field like SOT or by a dc current via antidamping SOT.

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