

Abstract Submitted
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Magnetization Dynamics of a Ferromagnet Attached to the Surface State of a Topological Insulator: A Time Dependent Keldysh Green Function Approach¹ FARZAD MAHFOUZI, NICHOLAS KIOUSSIS, Department of Physics and Astronomy, California State University, Northridge — Motivated by the recent experiments on the Spin Orbit Torque (SOT) generated by the Topological Insulators (TI) we investigate the conditions under which the SOT due to the in-plane current flowing through the surface state can switch the magnetic orientation of a ferromagnet attached to the TI. Using the Keldysh Green function approach, we developed the theoretical formalism for a classical system coupled to an electronic system out of equilibrium due to both bias voltage and the adiabatic variation of the classical degree of freedom. In this approach the quantities of interest that are calculated have the form of the generalized Fisher-Lee formula describing the electronic current and spin accumulation in terms of the Green functions in a unified approach. We show that due to the Edelstein effect the direction of the easy axis changes with the applied voltage which makes it difficult to separate the SOT into field like and anti-damping like components.

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