

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Coulomb drag between helical edge states** VLADIMIR ZYUZIN, GREGORY FIETE, University of Texas at Austin — We theoretically investigate the Coulomb drag between the edge states of two quantum spin Hall systems. Using an interacting theory of the one-dimensional helical edge modes, we show that the drag vanishes at second order in the inter-edge interaction, where it is typically finite in other systems, due to the absence of backscattering within the edges. However, in the presence of a small external magnetic field, the drag is finite and scales as the fourth power of the magnetic field, a behavior that sharply distinguishes it from other systems. We obtain the temperature dependence of the drag for regimes of both linear and quadratic edge dispersion in the presence of a finite field. This work was financially supported by ARO under Grant No. W911NF-09-1-0527. V. A. Zyuzin and G. A. Fiete, Phys. Rev. B 82, 113305 (2010).

Vladimir Zyuzin  
University of Texas at Austin

Date submitted: 02 Dec 2010

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