

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Electron transport driven by nonequilibrium magnetic textures

YAROSLAV TSERKOVNYAK, MATTHEW MECKLENBURG, UCLA — Spin-polarized electron transport driven by inhomogeneous magnetic dynamics is discussed in the limit of large exchange coupling. Electron spins rigidly following the time-dependent magnetic profile experience spin-dependent fictitious electric and magnetic fields. We show that the electric field acquires important corrections due to spin dephasing, when one relaxes the spin-projection approximation. Furthermore, spin-flip scattering between the spin bands need to be taken into account in order to calculate voltages and spin accumulations induced by the magnetic dynamics. A phenomenological approach based on the Onsager reciprocity principle is developed, which allows us to capture the effect of spin dephasing and make connection to the well studied problem of current-driven magnetic dynamics. In addition, we relate and generalize the results that recently appeared in literature.

Yaroslav Tserkovnyak
UCLA

Date submitted: 27 Nov 2007

Electronic form version 1.4