

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin-current induced dissipation in metals¹ ASHWIN A. TULAPURKAR, Indian Institute of Technology, Mumbai, India, YOSHISHIGE SUZUKI, Osaka Univ., OSAKA UNIV. TEAM — By using the Boltzmann's transport equations, we calculate the rate at which entropy is produced when spin-polarized current flows through a metal. A new pair of thermodynamic force and current is required to describe the entropy production. The dissipation, which is related to the entropy production, can be interpreted in terms of a simple circuit model which is also used to describe the giant magneto-resistance (GMR) effect. As an application of these results, we find that when current is passed through an interface between two oppositely magnetized ferromagnets, the extra dissipation produced due to the GMR effect is more localized than the variation of spin-dependent electrochemical potentials.

¹Grant-in-Aid for Scientific Research in Priority Area from MEXT

Yoshishige Suzuki
Osaka Univ.

Date submitted: 28 Jan 2010

Electronic form version 1.4