

Abstract Submitted
for the 4CF15 Meeting of
The American Physical Society

Spin-Polarized Current Induced by a Magnetic Insulator

BOCHAO LI, GEJIAN ZHAO, DONGRIN KIM, MIGUEL BUENO, JI ZHANG, JESSICA GIFFORD, TINGYONG CHEN, Arizona State University — Spintronics takes advantage of both charge and spin of conduction electrons but a spin source is often required to generate a spin polarized current for a spintronic device. Conventionally a magnetic metal is utilized as a spin source but in many cases spin cannot be efficiently injected from a magnetic metal into another material because of complexities such as lattice and conductivity mismatch. In this work, we experimentally demonstrate that a spin-polarized current can be generated in a nonmagnetic metal using a magnetic insulator through the proximity effect. A Pt layer of a few nanometers grown on a magnetic insulator Yttrium iron garnet, $Y_3Fe_2(FeO_4)_3$, (YIG) shows anisotropic magnetoresistance and substantial spin polarization.

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Date submitted: 11 Sep 2015

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