Abstract Submitted
for the 4CF12 Meeting of
The American Physical Society

Determination of Spin Polarization of $Fe_{65}Si_{35}$ Using Andreev Reflection Spectroscopy JONATHAN MARTINEZ, JESSICA GIFFORD, CHARLES SNIDER, TINGYONG CHEN, Arizona State University, JULIE KAREL, FRANCES HELLMAN, UC Berkeley, CHEN COLLABORATION, HELLMAN COLLABORATION — Ferromagnetic Fe_xSi_{1-x} alloys have been proposed as potential spin injectors into silicon with a substantial spin polarization. Experimentally, however, the observed spin polarization of the alloys still remains low. Ideally, spin polarization of a metal is defined as the imbalance of density of states at the Fermi level, but in amorphous alloys it is different since the Fermi level is not well defined. Recently, it has been found that the magnetic properties of the amorphous Fe_xSi_{1-x} alloys are very different from the crystalline phase. In this work, we utilize Andreev Reflection Spectroscopy (ARS) to determine the spin polarization of both amorphous and crystalline $Fe_{65}Si_{35}$ alloys. We show that the additional resistance in ARS is quite high because of large resistivity of these alloys and must be taken into account to correctly extract the spin polarization. The obtained spin polarization values are very different: the amorphous phase has a much higher spin polarization than that of the crystalline phase.

Jonathan Martinez
Arizona State University

Date submitted: 24 Sep 2012 Electronic form version 1.4