Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Epitaxial IrMn3 on MgO(111) by sputter deposition ALEJANDRO JARA, IGOR BARSUKOV, YU-JIN CHEN, BRIAN YOUNGBLOOD, Univ of California - Irvine, JOHN READ, PATRICK BRAGANCA, HGST, San Jose, CA, USA, ILYA KRIVOROTOV, Univ of California - Irvine — Antiferromagnets are promising systems for spintronic applications due to the absence of stray fields and high spin wave group velocity. Coupling between the charge and spin degrees of freedom in metallic antiferromagnets is a topic of high interest. The chemically ordered compensated antiferromagnet IrMn3 has recently been predicted to show anomalous Hall effect (AHE) arising from its noncollinear spin configuration. The AHE would provide a unique opportunity to probe the order parameter of an antiferromagnet via direct electrical measurements, which should be of tremendous utility for antiferromagnetic spintronics. To quantify and further exploit AHE, IrMn3 must be grown in the L12 phase, which supports ordering of the Mn spins on stacked sheets of Kagome spin lattices. Here we present an experimental study of IrMn3 thin films grown on MgO(111) by sputter deposition. We carry out XRD measurements and identify two quasi-epitaxial phases rotated by 60 deg to each other in the film plane. The IrMn3 is strongly (111)-textured with the $< 111 >$ axis deviating by less than 2 degrees from the film normal due to oblique deposition of the material. The grain size in our films is determined to be 15 nm, while the dimensionless chemical order parameter of the L12 phase is found to be 0.4.

Alejandro Jara
Univ of California - Irvine

Date submitted: 14 Nov 2014 Electronic form version 1.4