Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Giant spin Hall angle from topological insulator $Bi_xSe_{(1-x)}$ thin films MAHENDRA DC, University of Minnesota, MAHDI JAMALI, Micron Technology, JUNYANG CHEN, DANIELLE HICKEY, DELIN ZHANG, ZHENGYANG ZHAO, HONGSHI LI, PATRICK QUARTERMAN, YANG LV, ANDRE MKHYON, JIAN-PING WANG, University of Minnesota — Investigation on the spin-orbit torque (SOT) from large spin-orbit coupling materials has been attracting interest because of its low power switching of the magnetization and ultrafast driving of the domain wall motion that can be used in future spin based memory and logic devices. We investigated SOT from topological insulator $Bi_xSe_{(1-x)}$ thin film in $Bi_xSe_{(1-x)}$ /CoFeB heterostructure by using the dc planar Hall method, where $Bi_xSe_{(1-x)}$ thin films were prepared by a unique industry-compatible deposition process. The angle dependent Hall resistance was measured in the presence of a rotating external in-plane magnetic field at bipolar currents. The spin Hall angle (SHA) from this $Bi_xSe_{(1-x)}$ thin film was found to be as large as 22.41, which is the largest ever reported at room temperature (RT). The giant SHA and large spin Hall conductivity (SHC) make this $Bi_xSe_{(1-x)}$ thin film a very strong candidate as an SOT generator in SOT based memory and logic devices.

Mahendra DC
Univ of Minnesota - Twin Cities

Date submitted: 14 Nov 2016 Electronic form version 1.4