Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Spin current draining effect on heat-driven spin transport[1]
YADONG XU, BOWEN YANG, CHI TANG, ZILONG JIANG, JING SHI, UC Riverside, MICHAEL SCHNEIDER, RENU WHIG, Everspin Technologies — As a non-magnetic heavy metal is attached to a ferromagnet, a vertically flowing heat-driven spin current is converted to a transverse electric voltage, which is known as the longitudinal spin Seebeck effect. If the ferromagnet is a metal, this voltage is also accompanied by voltages from two other sources, i.e. the anomalous Nernst effect in both the ferromagnet and the proximity-induced ferromagnetic boundary layer. In this work, we have investigated these phenomena in NiFe/Cu/heavy metal multilayer structure. By identifying and carefully separating those effects, we find that in this pure spin current circuit the additional spin current drawn by the heavy metal generates another voltage in the ferromagnetic metal via the inverse spin Hall effect.

[1]The research was supported by the DOE BES award #DE-FG02-07ER46351 and DARPA/DMEA under H94003-10-2-1004.

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Date submitted: 14 Nov 2014 Electronic form version 1.4