Abstract Submitted
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Separation of the spin Seebeck effect and anomalous Nernst effect using Exchange Bias[1] MIGUEL BUENO, BOCHAO LI, GEJIAN ZHAO, DONGRIN KIM, JI ZHANG, JESSICA GIFFORD, Student, TINGYONG CHEN, Advisor — In a pure spin current, electrons with opposite spins flow in opposite directions, thus information is conveyed only by spin current without any charge current, which has the potential to realize ultra-low-power-consumption electronics. Thermal gradient (∇T) across a magnetic insulator has been proposed to generate pure spin currents using the spin Seebeck effect. However, when a temperature gradient is applied perpendicular to a magnetic metallic thin film and a magnetic insulator, the magnetic insulator induces a Spin Seebeck effect (SSE) in the magnetic layer. In addtition, this temperature gradient also causes an Anomalous Nernst effect (ANE) in the magnetic layer with similar magnitude to that of the SSE. Separation of these two effects is important to improve the understanding of spin transport in these systems. Previously, a difference in coercivity between the two layers has been utilized to separate these two effects. In this work we use Exchange Bias (EB) to shift the magnetic metal and separate the SSE from the ANE. First, we optimize the thickness of the antiferromagnetic FeMn layer to achieve the largest EB. We then grew a Cu wedge between the magnetic insulator Yttrium Iron Garnet, Y3Fe2(FeO4)3, (YIG) and the ferromagnetic Py layer to achieve the separation of the two effects.

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