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Spin transport in antiferromagnetic insulator detected by spin pumping WEI CAO, YI LI, WILLIAM BAILEY, Columbia Univ — Spin transport in antiferromagnetic insulators has drawn attention recently. Prior work has been done on the spin diffusion length of different antiferromagnetic materials via inverse spin hall effect. In this work, we measure the spin pumping of Py/Cu/CoO to characterize the absorption of spin current in the CoO layer. The series of Py/Cu/CoO (t) with changing the thickness of CoO layer indicates that there is a Gilbert damping enhancement of 0.001 in saturation at about 2 nm at room temperature. The spin mixing conductance obtained from this experimental series and from Py (t)/Cu/CoO series is 2.4 nm^{-2} and 3.2 nm^{-2}, respectively. We also measured the spin pumping of the Py/Cu/CoO sample at low temperatures. The Gilbert damping exhibits a positive peak at about 280 K, which is close to the Nel temperature of CoO. Our work shows a finite spin mixing conductance in Py/Cu/CoO and the spin diffusion length of CoO is quite small at room temperature. We also find that its Gilbert damping reaches its maximum value at Nel temperature.

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