

Supplementary Information

Orbital Transport in W Revealed by THz Spectroscopy

Bohai Zhao^{1,2}, Yongshan Liu^{1,2*}, Yong Xu^{1,2*}, Yunqing Jiang^{1,2}, Ziyue Wang^{1,2},
Xiaoqiang Zhang^{1*}, Tianxiao Nie², Weisheng Zhao^{1,2}

1 State Key Laboratory of Spintronics, Hangzhou International Innovation Institute,
Beihang University, Hangzhou 311115, China

2 Fert Beijing Institute, School of Integrated Circuit Science and Engineering, Beihang
University, Beijing 100191, China

*Email: yongxu@buaa.edu.cn, xqzhang@buaa.edu.cn, liuyongshan@buaa.edu.cn

Supplementary Note 1. TMM Simulation results with No IOREE

In our samples, the orbital decoherence length is very long, and the contribution of the IOREE cannot be neglected. To verify the long decoherence length of the orbital current, we removed the IOREE contribution based on the previous simulation and the orbital current decoherence length was set to 2 nm. As shown in Figure S1, the fitting curve shows poor agreement with the experimental results. Implying that the orbital current can be transported through the W layer to reach the W/MgO interface.

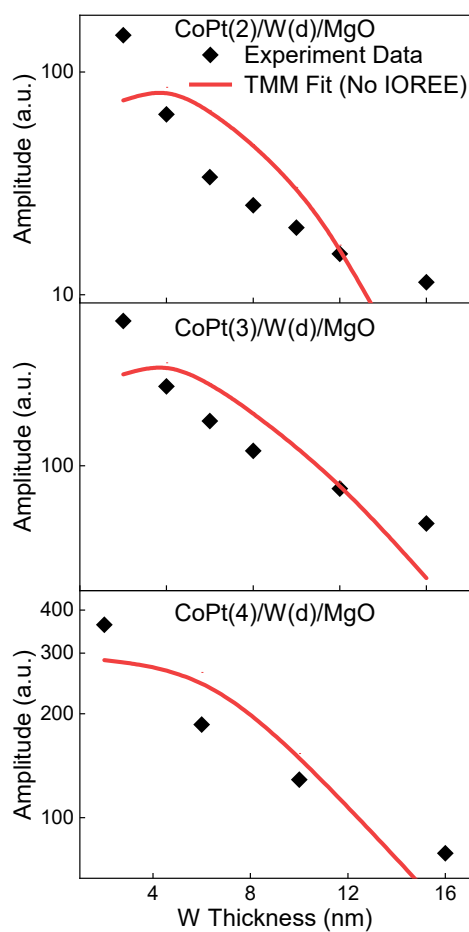


Figure S1: Fitting results after removing the IOREE contribution from the model. The black diamonds represent the experimental data, and the red curve shows the fitting result.