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**Spin Hall magnetoresistance in ultra thin Pt/LSMO.** NA LEI, Beihang University, YU BAI, ZHAO DING, JIAN SHAO, WENGANG WEI, LIFENG YIN, YIZHENG WU, JIAN SHEN, Fudan University — Spin Hall magnetoresistance (SMR) in a non-/ferro-magnetic (NM/FM) bilayer is an angular dependence of resistance of the NM layer on the magnetization of FM layer [1]. It provides an easy approach to the spin Hall effect in a simple bilayer system, however similar effects mixed in the system and might complicate the data analysis and interpretation. Here we present a case of ultra thin Pt/LSMO, in which LSMO (below 7 unit cells) layer is an insulating magnetic oxide with Curie temperature of 120K. Below 120K, our results clearly show the coexistence of the anisotropic magnetoresistance (AMR) and SMR effects. However, far away above Curie temperature, where the LSMO is paramagnetic, the magnetoresistance doesn't disappear but even increase, which is distinct from the case of Pt/YIG [2]. Here it is neither SMR nor AMR, and an additional mechanism is required. Anomalous Hall effect was also performed, which is consistent with SMR measurement. We propose some physical pictures which could attribute to this magnetoresistance in paramagnetic state. Reference: [1] H. Nakayama, M. Althammer, Y.-T. Chen, K. Uchida, et al., Phys. Rev. Lett. 110(20), 206601 (2013). [2] K. Uchida, Z. Qiu, T. Kikkawa, R. Iguchi, E. Saitoh, Appl. Phys. Lett. 106, 052405 (2015).

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