

Abstract Submitted
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Anatomy of Dzyaloshinskii-Moriya Interaction at Co/Pt Interfaces¹ HONGXIN YANG, Spintec/INAC, Grenoble France, STANISLAS ROHART, ANDRE THIAVILLE, LPS, Universit Paris-Sud, CNRS UMR 8502, F-91405 Orsay, France, ALBERT FERT, Unit Mixte de Physique CNRS/Thales, 91767 Palaiseau and Universit Paris-Sud, 91405 Orsay, France, MAIRBEK CHSHIEV, Spintec/INAC, Grenoble France — Dzyaloshinskii-Moriya Interaction (DMI)[1] was recognized to play a crucial role at ferromagnetic (FM)/heavy metal (NM) interfaces to create magnetic skyrmions[2]. DMI also plays an essential role for fast domain wall dynamics driven by spin-orbit (SO) torques[3]. Here, we clarify the main features and microscopic mechanisms of DMI in Co/Pt bilayers by ab initio. We find that large anticlockwise DMI of the bilayers has a predominant contribution from DMI pair couplings between spins of interfacial Co layer. This DMI between interface Co spins is directly related to the change of SO energy in the adjacent Pt when Co spin chirality is reversed. DMI does not extend significantly into other Co layers and is very weak between the proximity-induced spins in Pt. It was suggested[4] that DMI at FM/NM interfaces is directly related to the proximity induced moment in NM. However, we find the opposite result, i.e. Pt moment reduction slightly increases the DMI[5]. [1] I. E. Dzialoshinskii, Sov. Phys. JETP 5, 1259 (1957); T. Moriya, Phys. Rev. 120, 91 (1960). [2] A. Fert et al. Nat. Nanotech. 8, 152 (2013). [3] A. Thiaville, et al, Europhys. Lett. 100, 57002 (2012). [4] K. Ryu et al, Nat. Nanotech. 8, 527 (2013). [5] H. Yang et al, submitted

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