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A study of chiral magnetic stripe domains within an in-plane virtual magnetic field using SPLEEM QIAN LI, MENGMENG YANG, Univ of California - Berkeley, GONG CHEN, ANDREAS SCHMID, NCEM, Lawrence Berkeley National Laboratory, Berkeley, QIAOYAN DONG, Univ of California - Berkeley, YIZHENG WU, Fudan University, CHANYONG HWANG, Korea Research Institute of Standards and Science, JIA LI, Peking Univerisity, ZIQIANG QIU, Univ of California - Berkeley — Stripe domains form in magnetic thin films at the spin reorientation transition. Different from the typical Bloch type domain walls (DW), it was found recently that Dzyaloshinskii–Moriya interaction (DMI) could lead to chiral Néel type DMs in the stripe domain phase. While the application of an out-of-plane magnetic field is known to break the stripes into skyrmions, it is unclear how the chiral stripe phase would respond to an in-plane magnetic field? Here we report an experimental study on Fe/Ni/Cu/Co/Cu(001) system using spin-polarized low-energy electron microscopy (SPLEEM). In this system, the Fe/Ni layer exhibits stripe domains with chiral Néel type DMs and its interlayer coupling to Co across the Cu spacer layer serves as an in-plane virtual magnetic field whose strength can be tuned by changing the Cu spacer layer thickness. We find the in-plane field aligns the stripes parallel to the field direction. Increasing the in-plane field strength gradually changes the Néel type DWs into Bloch type DWs. However, it is surprising the adjacent Néel DWs behave asymmetrically in-response to the in-plane magnetic field, suggesting a topological effect in switching the chiral Néel DWs to the non-chiral Bloch DWs.

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