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Spin wave beam splitter XIANSI WANG, XIANGRONG WANG, Department of Physics, the Hong Kong University of Science and Technology — Spin waves are promising information carriers in spintronics. A spin wave beam splitter, which can divide a spin wave beam into two or more beams, is a fundamental element of spin wave circuits. Here we demonstrate a low-loss and integrable spin wave beam splitter utilizing a domain wall in a ferromagnetic strip. We show that with a proper lattice structure and spin-spin interaction, the ferromagnetic spin system supports topologically protected chiral edge states, and a spin wave beam propagating along one edge towards a domain wall will be guided along the domain wall and split into two spin wave beams propagating in two opposite directions along the other edge. It is found that there are two branches of bound spin waves in the domain wall and their superpositions can result in different power division ratios depending on the strip width (domain wall length). Various types of devices are designed based on these findings.

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