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Spin Wave Directional Coupler[1] KASUNI NANAYAKKARA, ALEXANDER KOZHANOV, Center for Nano Optics, Department of Physics and Astronomy, Georgia State University, Atlanta, GA — Spin wave based logic devices are evolved as promising candidates for information processing due to potential in scaling and low power consumption. An element performing directional energy transfer between spin waveguides is required in order to implement existing proposed spin wave logic devices. Optical waveguide couplers are well studied and widely utilized in integrated and fiber optics applications. In this work we apply the concept of optical directional coupler to design and investigate the spin wave directional coupler comprised of the two ferromagnetic stripes separated by a nanometer scale air gap. Micromagnetic simulations and experimental spin wave energy transfer investigations using propagating spin wave spectroscopy were carried out. Spin waves are generated at one of the ends of the input waveguide while detected at remaining three ends of both spin waveguides. Spin wave coupling is investigated as the coupler geometry, biasing magnetic field amplitude and orientation and the spin wavelength are varied. Results are modeled as coupled backward volume magnetostatic spin wave modes.

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