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Directional spin wave emission by the spin transfer torque oscillator into a nanomagnonic waveguide[1] VLADISLAV DEMIDOV, SERGEJ DEMOKRITOV, Muenster University, SERGEI URAZHDIN, Emory University — Magnonics is based on signal transmission and processing by spin waves in a magnetic medium. Spin-torque nanooscillators (STNO) driven by dc electrical current can provide a local source of spin waves for nanomagnonics, but their spectral mismatch with the magnetic medium limits the spin wave emission efficiency. We have developed a nanomagnonic structure that combines a point-contact STNO with a dipolar field-induced nanowaveguide. We will describe our microfocus Brillouin light scattering microscopy measurements demonstrating efficient excitation of spin waves by the STNO and their directional propagation in the waveguide. Spectroscopic measurements and micromagnetic simulations indicate that efficient spectral matching between the waveguide and the STNO is achieved due the internal dipolar field of the nanopatterned waveguide. We show that the spin wave propagation length is increased compared to the extended films, due to their larger group velocity and the lack of wavefront spreading. Our results provide a simple and efficient route for the implementation of magnonic structures that integrate spin torque-based sources of spin waves and their processing via waveguiding structures.

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