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Spin-current induced magnetic excitations in single magnetic layer nanopillars¹ BERND BESCHOTEN, NICOLAS MÜSGENS, MARK WEIDENBACH, EVA MAYNICKE, COEN SMITS, II. Physikalisches Institut, RWTH Aachen, MATTHIAS BÜCKINS, JOACHIM MAYER, Gemeinschaftslabor für Elektronenmikroskopie, RWTH Aachen, GERNOT GÜNTHERODT, II. Physikalisches Institut, RWTH Aachen — We investigate current-induced spin-wave excitations in Cu/Co/Cu single magnetic layer nanopillar devices with asymmetric Cu leads by means of transport and microwave probes at room temperature. The thin film stack is deposited by MBE in prefabricated nanostencil masks with lateral dimensions below 100 nm. At high current densities, we observe narrow excitations (bandwidth \sim 100MHz) and higher harmonics for magnetic fields perpendicular to the layers. The frequency increases with increasing current and magnetic field, which indicates an out-of plane precessional mode as found in bilayer systems (e.g., Kiselev et al., PRL 93, 036601(2004)). Furthermore, we observe frequency jumps as a function of both current and magnetic field, which might originate from transitions between different localized nonlinear spin-wave modes.

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Bernd Beschoten
RWTH Aachen University

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