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Frequency Domain Studies of Current-Induced Magnetization Dynamics in Single Magnetic-Layer Nanopillars[1] GERNOT GUNTHERODT, NICOLAS MUSGENS, SARAH FAHRENDORF, BERND BESCHOTEN, RWTH Aachen University, BARBAROS OEZYILMAZ, NUS Singapore, ALEXANDER HEISS, JOACHIM MAYER, RWTH Aachen University, JARA-FIT COLLABORATION — In spin-transfer torque studies on single ferromagnetic(FM)-layer nanopillars [1] the magnetization dynamics could be inferred only indirectly by changes in the differential resistance. Here we present the first proof of current-induced spin excitations in the frequency domain in asymmetric Cu/Co/Cu single FM-layer nanopillar devices. Circular shape (diameter < 100 nm) and magnetic fields perpendicular to the Co layer are used. For negative current polarity only we observe spin wave excitations in the GHz regime with minimum linewidths of 4 MHz for 15-nm thick Co layers at room temperature. Low frequency modes (f $\sim$ 2 GHz), decreasing upon increasing the absolute current, are attributed to vortex core precessions. High frequency modes (f $\sim$ 10 GHz), increasing with absolute current, are assigned to transverse spin waves. Frequency jumps indicate transitions between localized modes. - [1] B. Oezyilmaz et al., Phys. Rev. Lett. 93, 176604 (2004).

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