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Dynamics of coupled vortices in spin-valve nanostructures PAOLO BORTOLOTTI, N. LOCATELLI, V. CROS, J. GROLLIER, Unité Mixte de Physique CNRS/Thales, Palaiseau, France, V.V. NALETOV, G. DE LOUBENS, CEA-SPEC Saclay, Gif-sur-Yvette, France, C. ULYSSE, G. FAINI, CNRS Phynano team, Marcoussis, France, O. KLEIN, CEA-SPEC Saclay, Gif-sur-Yvette, France, A. FERT, Unité Mixte de Physique CNRS/Thales, Palaiseau, France — Recently, vortex dynamics driven by spin-transfer torque have been considered for new generation of nano-oscillators and memory devices. In this work we study the coupled vortex dynamics in FeNi(15nm)/Cu(10nm)/FeNi(4nm) samples where one single vortex state is favoured in both magnetic layers. Our experimental data are in good agreement with the corresponding simulations obtained through a 3D spin diffusion approach. Each vortex is characterized by a given chirality and polarity controllable separately by varying the external field (both in-plane and out-of-plane) and by applying a DC current perpendicular to the sample plane. The system modes are detected by static magneto-transport and microwave emissions analysis. In particular, it can be shown that vortex dynamics with large power appear only for configuration characterized by vortex cores pointing in opposite directions. The coupling of those two vortices allows to reach very narrow peak linewidth (down to 50 kHz), two order of magnitude smaller than in the uncoupled case.

Paolo Bortolotti
Unité Mixte de Physique CNRS/Thales, Palaiseau, France

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