Abstract Submitted
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Magnetization and resistance noise in spin valves JøRN FOROS, ARNE BRATAAS, Department of Physics, Norwegian University of Science and Technology, GERRIT E. W. BAUER, Kavli Institute of NanoScience, Delft University of Technology, YAROSLAV TSERKOVNYAK, Department of Physics and Astronomy, University of California — Electronic noise hinders the application of spin valves as read heads in magnetic hard drives. We report a theoretical analysis of such noise. Electronic or resistance noise in spin valves is caused by fluctuations in the relative orientation of the magnetic layers via the magnetoresistance-effect. Two sources of thermal magnetization fluctuations can be distinguished: Random fields intrinsic to the bulk ferromagnets, and external spin current fluctuations that affect the magnetizations through the spin-transfer torque. The cross talk between fluctuating magnetizations and the corresponding resistance noise strongly depends on the magnetic configuration. In agreement with experiments by Covington et al.[1] we find that the noise level in the antiparallel configuration can exceed that of the parallel one by an order of magnitude.

[1]M. Covington et al., unpublished

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