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Spin-Transfer-Torques at a Ferromagnet/Antiferromagnet Interface[1]

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Spintronics in ferromagnetic systems is built on a complementary set of phenomena in which the magnetic configuration of the system influences its transport properties and vice versa. Giant magnetoresistance (GMR) [1] and spin- transfer-torque (STT) [2] phenomena are typical examples of such interconnections. Recently, MacDonald and co-workers [3] predicted that corresponding effects ought to occur in systems where ferromagnetic (F) components are replaced by antiferromagnets (AFM). I will present our experimental search for these new AFM effects which may potentially lead to a new all-antiferromagnetic spintronics where antiferromagnets are used in place of ferromagnets. In particular I will focus on our experiments with exchange-biased spin valves [4] where extreme current densities were found to affect the exchange bias at F/AFM interface [5-7]. As exchange bias is known to be associated with interfacial AFM magnetic moments, our observation can be taken as the first evidence of STT effect in AFM materials.

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