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Thermal effects in spin torque switching MICHAEL SCHNEIDER, MATTHEEW PUFALL, WILLIAM RIPPARD, STEPHEN RUSSEK, National Institute of Standards and Technology, JORDAN KATINE, Hitachi Global Storage — We compare low temperature device behavior with room temperature behavior. We find agreement between our low temperature critical current measurements and Slonczewski theory[1]. In addition, we find that the values extrapolated from the low temperature measurements were robust with respect to device size. At room temperature we find substantial variation in the hysteretic region from device to device for devices of the same nominal size. While this is not expected, it has been attributed to thermal effects having a strong influence on the response of the freelayer to applied field as well as the coercivity[2]. We find that by reducing the temperature, and thus any thermal fluctuations, the device to device variations are drastically reduced. While we did observe indications of non-single domain behavior at 5 K, it is noteworthy that these did not seem to affect the critical switching current. Thus, we conclude that the room temperature device to device variations in the quasi-static switching behavior is dominated by thermal effects. 1. J. C. Slonczewski, J. Magn. Magn. Mater. **159,** L1-L7 (1996) 2. D. Lacour, J. A. Katine, N. Smith, M. J. Carey, and J. R. Childress, **85,** 4681-4683 (2004).

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