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Creating Skyrmions Using Spin Transfer Torque JENNIFER GRAB, ALISON RUGAR, DAVID MACNEILL, Cornell University, GIOVANNI FINOCCHIO, University of Messina, ROBERT BUHRMAN, DANIEL RALPH, Cornell University — Finding efficient methods to read and write individual skyrmions under ambient conditions is an important first step toward realizing skyrmion-based applications, such as high density information storage and racetrack memory. Of recent interest experimentally are heavy metal /ferromagnet bilayers with a strong interfacial Dzyaloshinskii-Moriya Interaction and perpendicular magnetic anisotropy (PMA), which favor the formation of helical spin textures. Micromagnetic simulations of these materials suggest that an out of plane spin polarized current could be used to write isolated skyrmions and excite skyrmion breathing modes. In this project, we attempt to create skyrmions using a spin valve like device. Our devices consist of a PMA nanopillar on top of a bulk Co/Pt bilayer. The nanopillar generates a spin polarized current, which is expected to locally reverse the magnetization of the film underneath the pillar via spin transfer torque. We report measurements of the DC current and field dependence of the pillar resistance. By monitoring the magnetization state of the bilayer independently, these measurements can be used to isolate the resistive signatures of skyrmion formation.

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