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Current-Induced Magnetization Switching with a Spin-Polarized Scanning Tunneling Microscope MATTHIAS BODE, Argonne National Laboratory, STEFAN KRAUSE, University of Hamburg, LUIS BERBIL-BAUTISTA, University of California at Berkeley, GABRIELA HERZOG, ROLAND WIESENDANGER, University of Hamburg — The understanding of current-induced magnetization switching is in the focus of many ongoing investigations since switching the magnetization by the injection of a spin-polarized current rather than by magnetic fields may open the gateway for new data storage technologies at much higher bit densities. We show how individual superparamagnetic Fe nanoislands with typical sizes of 100 atoms can be addressed and locally switched using a magnetic scanning probe tip. We demonstrate current-induced magnetization reversal across a vacuum barrier and combine it with the ultimate resolution of spin-polarized scanning tunneling microscopy. This technique allows us to clearly separate and quantify three fundamental contributions that are involved in magnetization switching, i.e. current-induced spin torque, heating the island by the tunneling current, and Oersted field effects.

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