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Spin-transfer torque effect in nanopillar superconducting-magnetic hybrid Josephson junctions BURM BAEK, WILLIAM RIPPARD, MATTHEW PUFALL, SAMUEL BENZ, STEPHEN RUSSEK, HORST ROGALLA, PAUL DRESSELHAUS, National Institute of Standards and Technology, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM — We have developed single nanopillar Josephson junctions with pseudo-spin-valve barriers with a feature size 50 nm or larger. We observed changes in Josephson critical current depending on the magnetization state of the barrier (parallel or anti-parallel) through the superconductor-ferromagnet proximity effect. The magnetization states of the pseudo-spin-valve barriers could also be switched with applied bias currents which is consistent with the spin-transfer torque effect in room-temperature spin valve devices. Our results demonstrate devices that combine superconducting and spintronic functions promising for a nanoscale cryogenic memory technology.

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