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**Switching Josephson coupling through a pseudo-spin-valve barrier with an exchange-field effect** BURM BAEK, WILLIAM RIPPARD, SAMUEL BENZ, STEPHEN RUSSEK, PAUL DRESSELHAUS, MATTHEW PUFALL, HORST ROGALLA, National Institute of Standards and Technology, PHYSICAL MEASUREMENT LABORATORY TEAM — With respect to information technology applications, Josephson junctions can be used in circuits that perform logic operations in picoseconds, which may result in energy-efficient, high-performance cryogenic computers, provided that memory elements can be developed that can be switched between two stable states by integrated superconducting logic circuits. We show that Josephson junctions based on pseudo-spin-valve barriers could enable such memory elements. We tuned the magnetic materials and carefully analyzed the full magnetic field dependence of the critical current in order to differentiate the controlled changes in Josephson coupling from the spatial superconducting phase modulation mediated by the remanent fields. We observed clear changes in Josephson critical current that can be either in magnitude or phase, which are explained well by the direct exchange-field effect on the spin-singlet superconducting pairs. These devices are the first that demonstrate nonvolatile, size-independent switching of the Josephson coupling in magnitude or phase, and they may allow for the first scalable superconducting memory devices.

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