Abstract Submitted
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Coherent control of magnetic moment dynamics and switching via spin momentum transfer L. YE, S. GARZON, T.M. CRAWFORD, R.A. WEBB, Department of Physics and Astronomy and USC Nanocenter, University of South Carolina, M. COVINGTON, S. KAKA, Seagate Research — We have measured the switching probability of CoFe/Cu/CoFe nanopillars driven by shaped current waveforms consisting of two ∼30ps FWHM pulses with adjustable amplitudes and delay. We observe oscillations in the switching probability as the delay is varied over the timescale of a free precession cycle, demonstrating large sensitivity to precise pulse timing. We also observe a non-monotonic increase in the switching probability as the amplitudes of the two pulses are simultaneously increased, showing that employing larger current pulses does not necessarily increase switching probabilities. Our data shows that two pulses with precisely adjusted amplitudes and delay can switch a nanopillar device with higher probability than a single pulse with equivalent total power, and that ∼100% switching probability can be obtained even with short (∼30ps FWHM) pulses. Our results suggest a new set of techniques for studying coherent time-domain magnetic moment dynamics.

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