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Controlling the persistent spin helix with strain induced spin-orbit coupling LUYI YANG, Lawrence Berkeley National Laboratory and University of California Berkeley, JAKE KORALEK, Lawrence Berkeley National Laboratory, JOE ORENSTEIN, Lawrence Berkeley National Laboratory and University of California Berkeley, ANDREI BERNEVIG, Princeton University, SHOUCHENG ZHANG, Stanford University, SHAWN MACK, DAVID AWSCHALOM, Center for Spintronics and Quantum Computation, University of California Santa Barbara —
We use transient spin grating spectroscopy to study the persistent spin helix (PSH) state of the 2D electron gas. The PSH is a meta-stable helical spin density wave that emerges as a result of increased symmetry when the Rashba and Dresselhaus spin-orbit coupling terms are balanced, and which offers great promise as a means of controlling large ensembles of spins. We demonstrate that the spin-orbit symmetry, and the PSH dynamics, can be manipulated *in-situ* by the application of uniaxial strain. This strain induces spin-orbit coupling with precisely the same symmetry as the Rashba term, allowing us to effectively tune the Rashba/Dresselhaus ratio in a single sample. This work is supported by DMSE office of BES-DOE, NSF, MARCO, ASEE and CNID.

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