

Abstract Submitted
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Gate-control of spin polarization waves¹ LUYI YANG, J.D. KORALEK, J. ORENSTEIN, UC Berkeley and LBNL, D.R. TIBBETTS, J.L. RENO, M.P. LILLY, SNL — We report on control of the persistent spin helix (PSH) in semiconductor quantum wells with tunable spin-orbit (SO) coupling via external gates. The PSH is a collective spin excitation of two-dimensional electron systems that emerges as a new conserved quantity of the SU(2) symmetry. It occurs when the strengths of Rashba and linear Dresselhaus SO coupling are equal. Previously, this effect was demonstrated by a set of samples with different doping asymmetry and well width [1]. Now we fabricate samples with both front and back gates aiming to control Rashba SO coupling continuously and increase the lifetime-enhancement by reducing the symmetry-breaking cubic Dresselhaus term.

[1] J. D. Koralek et al., Emergence of the persistent spin helix in semiconductor quantum wells, *Nature* 458, 610-613 (2009).

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