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Gate-tunability of electron spin precession in an InGaAs quantum well below an interdigitated ferromagnetic grating GIAN SALIS, LORENZ MEIER[1], IBM Research, Zurich Research Laboratory, Saeumerstrasse 4, 8803 Rueschlikon, Switzerland, CHRISTOPH ELLENBERGER, EMILIO GINI[2], KLAUS ENSSLIN, Solid State Physics Laboratory, ETH Zuerich, 8093 Zuerich, Switzerland — Time-resolved Faraday rotation is used to measure the coherent electron spin precession in a GaAs/InGaAs quantum well below an interdigitated magnetized Fe grating. We show that the electron spin precession frequency can be modified by applying a gate voltage of opposite polarity to neighboring bars. A tunability of the precession frequency of 0.5 GHz/V is observed. Modulating the gate potential at a gigahertz frequency allows the electron spin precession to be controlled on a nanosecond timescale. Besides the contribution from a spatial displacement of electrons in the inhomogeneous stray field, we also observe spin precession induced by spin-orbit coupling of the moving electrons.

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