

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Characterization of spin-orbit fields in InGaAs quantum wells<sup>1</sup>**

GIAN SALIS, TOBIAS HENN, LUKAS CZORNOMAZ, IBM Research - Zurich —  
Narrow-gap semiconductors exhibit strong spin-orbit interaction and are therefore of interest for spin-based quantum devices and for Majorana zero modes. We investigate coherent electron-spin dynamics and the size and symmetry of spin-orbit interaction in InGaAs/InAlAs quantum wells from 10 K to room temperature using time-resolved Kerr rotation. The spin lifetime exceeds 1 ns at 10 K and decreases with temperature. By imprinting a diffusive velocity on the measured electron spins [1], the spin-orbit energy is measured as a change in spin precession frequency. A Rashba symmetry of the spin-orbit interaction is determined with a Rashba coefficient of  $2 \times 10^{-12}$  eVm [2]. This technique can be applied to other narrow-gap semiconductors without the need to lithographically process the sample or to apply electrical signals.

[1] M. Kohda *et al.*, Appl. Phys. Lett. **107**, 172402 (2015).

[2] T. Henn *et al.*, Appl. Phys. Lett. **109**, 152104 (2016).

<sup>1</sup>NCCR QSIT, EU SiSpin

Gian Salis  
IBM Research - Zurich

Date submitted: 11 Nov 2016

Electronic form version 1.4