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Measurement of anisotropic spin-orbit interaction in a two-dimensional electron gas using ballistic spin resonance WING-WA YU, Univ. of British Columbia, SERGEY FROLOV, Delft University of Technology, SILVIA LUESCHER, YUAN REN, JOSHUA FOLK, Univ. of British Columbia, WERNER WEGSCHEIDER, ETH Zurich — We report the observation of strongly anisotropic spin-orbit interaction in a 2D electron gas (2DEG) along the [110] and [1$\bar{1}$0] crystal axes of a GaAs/AlGaAs triangular well, indicating that the Rashba and Dresselhaus contributions to the interaction are closely matched in this structure. Spin relaxation due to spin-orbit interaction is probed using ballistic spin resonance (BSR) [1] in a narrow 2DEG channel: an oscillating spin-orbit field is induced by high-frequency bouncing of free electrons between the channel walls, which leads to rapid relaxation when the bouncing frequency matches the Larmor frequency in a static external magnetic field. Drastically different BSR strengths are observed for channels fabricated along the two crystal axes, from which the magnitudes of Rashba and Dresselhaus contributions can be extracted.
[1] S. M. Frolov et al., Nature 458, 868-871(2009)

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