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Nanowire spin Hall oscillators: width dependence and spatial mapping[1] KEMAL SOBOTKIEWICH, Univ of Texas-Austin, ANDREW SMITH, Univ of California-Irvine, KYONGMO AN, XIN MA, KEVIN OLSSON, Univ of Texas-Austin, ERIC MONTOYA, ILYA KRIVOROTOV, Univ of California-Irvine, XIAOQIN LI, Univ of Texas-Austin — We present experimental studies of auto-oscillatory modes in nanowire Spin Hall Oscillators(SHOs). The nanowires are composed of Pt(7 nm)/Py(5 nm)/AlOx(2 nm). A direct dc current induces the Spin Hall Effect (SHE) in the platinum providing a pure transverse spin current in the Permalloy. This spin current exert an anti-damping spin torque which enables auto-oscillations. In particular, we investigate how the width of the nanowire affects the critical current density required to induce the auto-oscillations and which modes undergo the auto-oscillation. For the latter, the spatial resolution afforded by the micro Brillouin Light Scattering technique (μ-BLS) is crucial. By scanning the beam spot across the sample we were able to distinguish between edge and bulk modes spatially. We determined that they have different threshold currents and frequency shifts with increasing direct current.

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