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Nanowire Spin Torque Oscillator Driven by Spin Orbit Torques ANDREW SMITH, ZHENG DUAN, LIU YANG, BRIAN YOUNGBLOOD, ILYA KRIVOROTOV, Univ of California - Irvine — We report microwave signal emission from a spin torque oscillator driven by spin orbit torques in a 17 um long Py(5 nm)/Pt(5 nm) ferromagnetic nanowire with an 1.8 um long active region. The emitted signal arises from excitation of the bulk and edge spin wave eigenmodes of the nanowire and detected with anisotropic magnetoresistance. This type of self-oscillatory dynamics is qualitatively different from the previously reported self-localized nonlinear bullet mode excited by spin orbit torques in extended ferromagnetic films. The eigenmode self-oscillations in the nanowire geometry are enabled by geometric confinement suppressing nonlinear magnon scattering. Our work demonstrates feasibility of spin torque oscillators with a micrometer-scale active region.

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