

Abstract Submitted
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Terahertz Nano-oscillator using Antiferromagnet RAN CHENG, DI XIAO, Carnegie Mellon University, ARNE BRATAAS, Norwegian University of Science and Technology — We present an analytical study on the current-induced dynamics of collinear antiferromagnets (AFs), and find that a sufficiently large current gives rise to terahertz auto-oscillation of the staggered order. For easy-plane AFs such as NiO, the acoustic and optical modes are well separated in frequency, and none of them exhibit chirality of precession. However, with increasing current-induced torque, the two modes become degenerate at a threshold, after which the chirality of precession is acquired. At a second threshold, the degenerate mode is driven into auto-oscillation with elliptical precession where the semi-major axis is 45 degree with respect to the easy-plane. The terahertz nano-oscillator is illustrated by X/AF/X heterostructures where X can either be a heavy metal or topological insulator.

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