

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Freely-tunable broadband polarization rotator for terahertz waves¹ RU-WEN PENG, REN-HAO FAN, YU ZHOU, SHANG-CHI JIANG, XI-ANG XIONG, Nanjing University, XIAN-RONG HUANG, Argonne National Laboratory, MU WANG, Nanjing University — It is known that commercially-available terahertz (THz) emitters usually generate linearly polarized waves only along certain directions, but in practice, a polarization rotator that is capable of rotating the polarization of THz waves to any direction is particularly desirable and it will have various important applications. In this work, we demonstrate a freely tunable polarization rotator for broadband THz waves using a three-rotating-layer metallic grating structure, which can conveniently rotate the polarization of a linearly polarized THz wave to any desired direction with nearly perfect conversion efficiency. The device performance has been experimentally demonstrated by both THz transmission spectra and direct imaging. The polarization rotation originates from multi wave interference in the three-layer grating structure based on the scattering-matrix analysis. We can expect that this active broadband polarization rotator has wide applications in analytical chemistry, biology, communication technology, imaging, etc.. Reference: R. H. Fan, Y. Zhou, X. P. Ren, R. W. Peng, S. C. Jiang, D. H. Xu, X. Xiong, X. R. Huang, and Mu Wang, *Advanced Materials* 27,1201(2015).

¹Freely-tunable broadband polarization rotator for terahertz waves

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Date submitted: 19 Oct 2015

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