

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Gate tunable magneto-optical effects in layered antiferromagnets¹

NIKHIL SIVADAS, Department of Physics, Carnegie Mellon University, SATOSHI OKAMOTO, Materials Science and Technology Division, Oak Ridge National Laboratory, DI XIAO, Department of Physics, Carnegie Mellon University — It has long been believed that the Faraday and the magneto-optic Kerr effects are absent in collinear antiferromagnets due to their vanishing net magnetic moment. To the contrary, using first-principles calculations we demonstrate that these effects can be controlled by a perpendicular voltage in bilayer MnPSe₃, which has a collinear AF-Néel spin texture. The Kerr rotation can be as high as 10 mrad, and is reversed on the reversal of the polarity of gate voltage. The tunable nature of the magneto-optic effects can result in novel optoelectronic device applications. It also provides a nondestructive way to characterize the magnetic ground state of 2D materials.

¹This work is supported by AFOSR No. FA9550-12-1-0479 and FA9550-14-1-0277

Nikhil Sivadas
Department of Physics, Carnegie Mellon University

Date submitted: 06 Nov 2015

Electronic form version 1.4