Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Resonant optical third-harmonic generation in few-layer black phosphorus[1] CHRISTIANO J. S. DE MATOS, MackGraphe, Mackenzie Presbyterian University, MANUEL J. L. F. RODRIGUES, Centre for Advanced 2D Materials and Graphene Research Centre, National University of Singapore, RAFAEL E. P. DE OLIVEIRA, MackGraphe, Mackenzie Presbyterian University, HÉLDER X. P. PEIXOTO, HSIN-YU WU, HO Y. WEI, ANTONIO H. CASTRO NETO, JOSÉ C. VIANA-GOMES, Centre for Advanced 2D Materials and Graphene Research Centre, National University of Singapore — Black phosphorus (BP), a layered monoatomic anisotropic crystal, has recently re-emerged due to demonstrations of its exfoliation down to few-layer thicknesses. It has been shown that BP remains a direct bandgap semiconductor from the bulk to the monolayer, which has triggered interest in its optoelectronic applications. However, optical characterization has been largely restricted to the linear regime, with nonlinear characterization limited to z-scan and saturable absorption measurements. In this work, we show optical third-harmonic generation measurements in bulk and few-layer BP. Results indicate a resonant increase in the generation efficiency of the latter, with signal intensities reaching values three orders of magnitude higher then those of graphene. The mechanisms leading to the resonant increase will be discussed.

[1]This work is supported by Fapesp (2012/50259-8 and 2015/11779-4), MackPesquisa, NRF-CRP (R-144-000-295-281), and NRF - Medium Sized Centre Programme

Christiano de Matos
MackGraphe, Mackenzie Presbyterian University

Date submitted: 06 Nov 2015 Electronic form version 1.4