Abstract Submitted
for the SES19 Meeting of
The American Physical Society

Spatial Self-Phase Modulation in Tungsten and Molybdenum Disulfide Atomic Layers[1] TIKARAM NEUPANE, BAGHER TABIBI, FELIX SEO, Hampton University, HAMPTON UNIVERSITY TEAM — The spatial self-phase modulation (SSPM) of optical field in tungsten and molybdenum disulfide atomic layers in liquid solution displayed a number of concentric diffraction rings at the far-field. The formation of concentric diffraction ring is due to the coherent superposition of transverse wave vectors. The number of diffraction ring as a function of applied intensity revealed the nonlinear refraction coefficient of tungsten and molybdenum disulfide atomic layers. The diffraction pattern of SSPM also identified the polarity of nonlinear refraction coefficient. The temporal evolution of the diffraction ring indicated the spatial alignment of nanoflakes at the initial time of excitation, the maximum diffraction rings at the intermediate time of excitation, and the thermal distortion of the upper vertical ring of SSPM at the longer time duration of laser excitations. The vertical asymmetric diffraction ring indicates the phase distortion of the optical field due to heat convection. The ratio between distortion- and half-cone angles of SSPM as a function of applied intensity revealed the change of the nonlinear refraction coefficient due to the thermal effect.

[1]This work is supported by ARO W911NF-15-1-0535, NSF HRD-1137747, and NASA NNX15AQ03A

Felix Seo
Hampton University

Date submitted: 30 Sep 2019 Electronic form version 1.4