Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Creation of Broad Bandwidth using Stimulated Rotational Raman Scattering in the Nike Laser[1] DAVID KEHNE, JAMES WEAVER, JAECHUL OH, United States Naval Research Laboratory, ROBERT LEHMBERG, Research Support Instruments, STEPHEN OBENSCHAIN, MATTHEW WOLFORD, United States Naval Research Laboratory — Broad bandwidth can be used to suppress laser-plasma instabilities generated in applications such as inertial confinement fusion. At the Naval Research Laboratory's Nike Laser Facility, experiments exploring stimulated rotational Raman scattering (SRRS) to enhance bandwidth have been performed. Nike is a krypton-fluoride laser that delivers to planar targets 2kJ of 248 nm radiation spread over 56 beams. While SRRS has been previously observed in Nike [J. Weaver, et al, Appl. Optics, 56, 31, 2017], recent experiments further enhance SRRS production by compressing a single beam by a factor of three and propagating it for 38 meters. Far-field beam image, pulse width, energy, and time-integrated spectrum diagnostics are placed before and after the compression. In addition, a time-resolved spectrometer measures bandwidth post-propagation and imaging cameras resolve the near-field of the compressed beam. Pulse widths range from 0.35 ns to 4 ns and far-field XDLs (times diffraction limit) vary from 15 to 60. Bandwidths of up to ˜5 THz (compared to intrinsic 1 THz) have been measured with mild increase in transverse beam size.

[1]Work supported by the U.S. DOE/NNSA

David Kehne
United States Naval Research Laboratory

Date submitted: 29 Jun 2020 Electronic form version 1.4