Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Plasma Profile Measurements for Laser Fusion Research with the Nike KrF Laser[1] JAECHUL OH, J.L. WEAVER, V. SERLIN, S.P. OBENSCHAIN, Plasma Physics Division, Naval Research Laboratory, Washington, DC — The grid image refractometer of the Nike laser facility (Nike-GIR) has demonstrated the capability of simultaneously measuring electron density (n_e) and temperature (T_e) profiles of coronal plasma.[2] For laser plasma instability (LPI) research, the first Nike-GIR experiment successfully measured the plasma profiles in density regions up to $n_e \sim 4 \times 10^{21}$ cm^{-3} (22% of the critical density for 248 nm light of Nike) using an ultraviolet probe laser ($\lambda_p = 263$ nm). The probe laser has been recently replaced with a shorter wavelength laser ($\lambda_p = 213$ nm, a 5^{th} harmonic of the Nd:YAG laser) to diagnose a higher density region. The Nike-GIR system is being further extended to measure plasma profiles in the on-going experiment using 135°-separated Nike beam arrays for the cross-beam energy transfer (CBET) studies.[3] We present an overview of the extended Nike-GIR arrangements and a new numerical algorithm to extract self-consistant plasma profiles with the measured quantities.

[1]Work supported by DoE/NNSA.
[2]J. Oh, et al, Rev. Sci. Instrum. 86 (2015) in press.
[3]J. Weaver, et al, Anomalous Absorption Conference, Ventura, CA, June 14-19, 2015.

Jaechul Oh
Plasma Physics Division, Naval Research Laboratory, Washington, DC

Date submitted: 24 Jul 2015 Electronic form version 1.4