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Monochromatic Talbot-Lau X-ray deflectometry diagnostic for high-energy-density experiments[1] MAXIMILIAN SCHNEIDER, MARIA PIA VALDIVIA, DAN STUTMAN, Johns Hopkins University — Talbot-Lau X-ray deflectometry (TXD) is a refraction-based technique that has been developed into a diagnostic for high-energy-density physics (HEDP) experiments. A sample located along a probing X-ray beam path causes small-angle X-ray deflections induced by changes in line-integrated density along the path. This information provides a temporally and spatially resolved map of electron density gradients within the sample. TXD can improve visibility of small features in a plasma due to the higher contrast refraction-based imaging can provide for low-Z materials when probed with X-rays in the 1-100 keV range. Recent experiments to benchmark the diagnostic on the OMEGA EP and MTW laser facilities have shown that X-ray backlighter emission outside the interferometer contrast curve can reduce electron density mapping accuracy. In order to suppress this unwanted emission, a monochromatic TXD (M-TXD) system has been developed through implementation of a graded multilayer X-ray mirror. This mirror reflects only the desired X-ray energy band, preventing higher energies from reaching the system's detector and reducing performance. Results from laboratory experiments to characterize the M-TXD system are presented in preparation for upcoming MTW and OMEGA EP campaigns

Maximilian Schneider
Johns Hopkins University

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