

Abstract Submitted
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Development of diffractive XUV-VUV light extractors for fusion plasma diagnostic D. STUTMAN, G. CARAVELLI, L. DELGADO-APARICIO, M. FINKENTHAL, K. TRITZ, Johns Hopkins University, R. KAITA, L. ROQUE-MORE, Princeton University — The diagnostic and control of next generation MFE and ICF fusion experiments will require optical light extractors capable of withstanding intense plasma and radiation exposure. A solution applicable from the XUV to the infrared is to use free-standing diffractive optics such as transmission gratings or zone plates. Here we present results on XUV-VUV diffractive extractors for the diagnostic of boundary MFE plasmas. For the VUV range we developed Si transmission gratings having 1 μm period, 5 μm thickness, 40% open fraction, 1x2 mm active area, and coated with Ni, while for the XUV range we use SiN gratings having 0.2 μm period, 0.3 μm thickness, 1x1 mm area, and coated with Ta. The grating extractors are spectrally and spatially calibrated in the laboratory using a newly developed extended XUV-VUV source and will be employed for imaging spectrometry on the NSTX experiment. The operational characteristics of the extended source and first space resolved XUV-VUV spectra will be presented. Work supported by DoE Grant DE-FG02-99ER54523 at JHU and Contract DE-AC02-09CH11466 at PU.

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