Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Charge Exchange Recombination Detection of Low-Z Impurities in the Extreme UV using Digital Lock-In Techniques[1] N.H. BROOKS, General Atomics, O. MEYER, CEA-Cadarache — A digital technique has been used to extract that portion of the XUV spectrum which varies synchronously in time with the modulation of the 30-Left neutral beam (NB) viewed by DIII-D's SPRED spectrometer [1]. A scalar product of two temporal vectors is performed for each pixel in the SPRED linear array detector–the first vector is the time history of light intensity at that pixel, the second is a NB-derived correlation function. In the spectra resulting from this pixel-by-pixel manipulation of the temporal data, all light from medium-Z and high-Z metals are strongly suppressed, exposing with great clarity the Rydberg-series lines from the H-like charge states of the low-Z impurities He, B, C and O. Time-averaged relative abundances of the low-Z impurities may be readily deduced. Removal of the beam-correlated component of the detected XUV light will be used as a pre-processing step to improve reliability of emission line time histories calculated from SPRED data.

[1] R.J. Fonck et al., Applied Optics **21**, 2115 (1982).

[1]Work supported in part by the US DOE under DE-FC02-04ER54698.

N.H. Brooks
General Atomics

Date submitted: 22 Jul 2009 Electronic form version 1.4