Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Measurement of magnetic field using a spectral motional Stark effect diagnostic[1] D.J. DEN HARTOG, J. KO, K.J. CASPARY, E.A. DEN HARTOG, University of Wisconsin-Madison, N.A. PABLANT, University of California-San Diego, H.P. SUMMERS, University of Strathclyde — We are continuing to develop a diagnostic based on the motional Stark effect (MSE) to provide internal magnetic field measurements in high-temperature plasmas. A high-energy beam of neutral hydrogen atoms is injected into the plasma, with a component of the atom velocity perpendicular to the magnetic field. The atoms experience a Lorentz electric field and emit Stark-split line spectra. The entire Stark spectrum is recorded and analyzed. This makes this diagnostic technique applicable to the measurement of low fields (down to 0.2 T), or to conditions in which polarization information may be compromised (e.g., burning plasma devices). A new analysis scheme has been developed to infer both the polarization direction and the magnitude of Stark splitting, from which both the direction and magnitude of the local magnetic field can be derived. Improved modeling of the relative magnitudes and positions of the Stark multiplets is underway using the Atomic Data and Analysis Structure (ADAS). This improvement is expected to reduce the systematic uncertainty of the measured magnetic field.

[1]Supported by the U.S. Department of Energy.

Daniel Den Hartog
University of Wisconsin-Madison

Date submitted: 12 Jul 2010 Electronic form version 1.4