

Abstract Submitted
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MSE diagnostic in HSX for simultaneous measurement of radial electric field and bootstrap current¹ S.T.A. KUMAR, C. RUIZ, F.S.B. ANDERSON, D.T. ANDERSON, HSX Plasma Lab, Department of Electrical and Computer Engineering, UW-Madison — Understanding of the bootstrap current and its temporal evolution is crucial in stellarators as it can significantly affect the magnetic topology and confinement. One of the parameters which could determine the evolution of the bootstrap is the radial electric field (E_r). Capability of the Motional Stark Effect (MSE) diagnostic for doing simultaneous E_r and bootstrap current measurement is being investigated in the HSX stellarator. Both spectral analysis and polarimetry are being pursued to get unambiguous E_r and bootstrap current information. A 30 keV, 5 Amp, 3 ms hydrogen diagnostic neutral beam is injected into vacuum and plasma configurations of HSX. Doppler shifted and Stark-split H-alpha and H-beta emissions are simultaneously measured using two spectrometers. Stark spectra from various plasma configurations are compared with those from vacuum configurations with same applied magnetic field, to study the effect of radial electric field and bootstrap current on the Stark spectra. A single channel, dual PEM polarimetry system has also been designed for Stark polarization measurements. Initial results are presented.

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