APR10-2009-001113

Abstract for an Invited Paper
for the APR10 Meeting of
the American Physical Society

**Application of Spectro-Polarimetric Techniques for Imaging Plasma Flows and Current Density in Fusion Devices**[1]

AHMED DIALLO, SPE, Australian National University, Canberra, Australia presently at Princeton Plasma Physics Laboratory, Princeton, NJ, U.S.A

Recent advances in optical coherence imaging have opened up new avenues for active and passive plasma diagnostic systems in fusion devices. Based on polarization interferometric architectures, these systems exploit the detector area to both target and image the projection of physical parameters such as the ion temperature, the flow speed, and the magnetic field pitch encoded in the spectral scene. These imaging devices are referred to as spectro-polarimeters. Following their description, we report recent imaging results of the magnetic field pitch angle associated with the motional Stark effect on injected neutral hydrogen obtained on the TEXTOR tokamak. With this active imaging capability, two-dimensional measurements of the current density can be deduced. In addition, we show two types of interferometric flow measurements at the edge of the DIIID tokamak using the passive plasma emission of CIII and the neutral beam induced CVI emission. We observe that the projected flow along the sight line is affected by the reversal of the toroidal current. Finally, an overview of future experimental campaigns to access physics pertaining to the edge flows in tokamaks will be discussed.

[1]International Science Linkages established under the Australian Government's innovation statement, Backing Australia's Ability.