Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Faraday-Effect Polarimeter-Interferometer System for current density measurement on EAST[1] HAIQING LIU, YINXIAN JIE, Institute of Plasma Physics, Chinese Academy of Sciences, WEIXING DING, DAVID LYN BROWER, University of California Los Angeles, ZHIYONG ZOU, JINPING QIAN, WEIMING LI, LONG ZENG, SHOUBIAO ZHANG, LIQUN HU, BAONIAN WAN, Institute of Plasma Physics, Chinese Academy of Sciences — An eleven-channel far-infrared laser-based **PO**larimeter-**INT**erferometer (**POINT**) system utilizing the three-wave technique has been implemented for current density and electron density profile measurements in the EAST tokamak. Both polarimetric and interferometric measurement are obtained in a long pulse ($\sim$ 52s) discharge. The electron line-integrated density resolution of POINT is less than 5×10^{16} m^{-2} ($\sim 2^\circ$), and the Faraday rotation angle rms phase noise is $<0.1^\circ$. With the high temporal ($\sim$ 1 μsec) and phase resolution($<0.1^\circ$), density perturbations associated with the saw-teeth cycle and tearing mode activities have been observed. It is evident that tearing modes are well correlated to dynamics of equilibrium current profile (or q-profile). Faraday rotation angle shows clear variation with low hybrid current drive while line-integrated density remains little changed, implying the current drive in the core. A Digital Phase Detector with 250 kHz bandwidth provides real-time Faraday rotation angle and density phase shift output, which will be integrated into current profile control system in a long pulse discharge in future.

[1]This work is supported by the National Magnetic Confinement Fusion Program of China with contract No.2012GB101002 and partly supported by the US D.O.E. contract DESC0010469.

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Date submitted: 24 Jul 2015 Electronic form version 1.4