

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Multi-frequency reflectometer for edge density profile and fluctuation measurement on MST¹ WILLIAM CAPECCHI, JAY ANDERSON, ANDREW SELTZMAN, MARK THOMAS, PAUL NONN, DINH TRUONG, University of Wisconsin- Madison — An accurate temporally and spatially resolved measurement of the electron density profile is an important diagnostic for a confined plasma device. An understanding of particle transport during events like a sawtooth crash can be obtained from the changes in the density profile, and resolving density fluctuations can help in the understanding of plasma instabilities. Proposed here is a multi-frequency phase-measuring reflectometer which uses O-mode launch to measure the signal reflected from the plasma cutoff layer. Simultaneous measurements of phase change for four frequencies between 4-8 GHz are used to reconstruct the edge density profile. Each phase shift is measured via digital complex demodulation of a 455 kHz signal created by mixing each drive signal with an appropriately tuned local oscillator which can in principle deliver fluctuation information up to around 200 kHz. Included in this design is a phase and amplitude control to zero out the signal from the vacuum interface reflection. Far-edge density profiles and fluctuations are noninvasively probed for a variety of MST operating conditions.

¹Work supported by US DoE

William Capecchi
University of Wisconsin- Madison

Date submitted: 12 Jul 2012

Electronic form version 1.4