

**Abstract Submitted for the 54th Annual Meeting
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Category Number and Subject:

Theory Experiment

Initial tests of NSTX millimeter-wave polarimeter on DIII-D*,
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S. Kubota, T.L. Rhodes, G. Wang, and L. Zeng, *UCLA* - Polarimetry
is a powerful diagnostic technique to probe plasma equilibria and
magnetic fluctuations in fusion plasmas. In high beta plasma devices
such as NSTX, these measurements are important for understanding
the stability, structure and anomalous transport induced by
electromagnetic turbulent fluctuations. A 288 GHz polarimeter
operating along the major radius has been developed and is being
tested on DIII-D prior to deployment on NSTX-U. The system
launches a rotating linearly polarized beam and detects phase shifts
related to polarization changes due to the plasma. To improve phase
resolution, quasi-optical isolation is used to minimize multi-path
feedback effects. Preliminary data indicates that equilibrium results
are consistent with synthetic diagnostic calculations. Typically,
phase resolution of <1 degree is observed over a frequency range
from 5 to 300 kHz, opening the possibility for the measurement of
magnetic fluctuations. Measured spectra indicate the presence of
various coherent modes, e.g. Neoclassical Tearing Modes, Toroidal
Alfvén Eigenmodes. Analysis is underway to establish whether these
spectral components are primarily caused by magnetic fluctuations.

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