Abstract Submitted for the 54th Annual Meeting
Division of Plasma Physics
October 29 through November 2, 2012
Providence, Rhode Island

Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

Plasma Fluctuation Measurements in Ion Stiffness Experiments using Phase Contrast Imaging,* A. Marinoni, J.C. Rost, M. Porkolab, *PSFC-MIT*; K.H. Burrell, J. Candy, T. Luce, *General Atomics* – The Phase Contrast Imaging (PCI) diagnostic on the DIII-D tokamak has recently been modified to image density fluctuations near the plasma mid-radius, thus enabling the investigation of core turbulence. Results are presented on core fluctuations in experiments exploring ion profile stiffness [1], i.e. the degree of sensitivity of ion temperature profiles to heat flux variations. In these experiments, plasmas were heated by neutral beams (NBI) configured to provide both high and low input torque; the injected NBI power was varied at constant torque to evaluate profile stiffness. A preliminary analysis indicates a decreased stiffness at high rotation in the outer half of the plasma. The toroidal rotation depends primarly on torque, with little or no dependence on input power. The amplitude of fluctuations increases with decreasing rotation, and the power spectra at similar torque have quantitatively similar shapes and values with little dependence on input power. Correlation lengths depend neither on torque nor input power. PCI power spectra and correlation lengths are evaluated and compared to non-linear gyro-kinetic simulations using the GYRO code.

[1] J.E. Kinsey, et al., Bull. Am. Phys. Soc. **56**, 282 (2011).

*Work supported by the US Department of Energy under DE-FG02-94ER54235, DE-FC02-04ER54698 and DE-FG02-95ER54309.