

**Abstract Submitted for the 56th Annual Meeting
Division of Plasma Physics
October 27–31, 2014
New Orleans, Louisiana**

Category Number and Subject:

[] Theory [X] Experiment

A Novel Technique for Estimating Edge Pedestal Density Gradients Using Reflectometer Time Delay Data,* L. Zeng, E.J. Doyle, W.A. Peebles, T.L. Rhodes, G. Wang, *UCLA* – A new technique for fast pedestal density gradient estimation has been developed, using profile reflectometer time delay data without a direct profile inversion. Such a fast profile gradient estimator is a potentially key to providing new “real-time” analysis of profile reflectometer data, suitable for use in plasma control systems. The new approach utilizes a simple edge plasma model to provide an analytic estimate for the measured differential time delay between two adjacent reflectometer frequencies. The model predicts that the measured differential time delays should be inversely proportional to the local pedestal density gradient. Using existing DIII-D profile reflectometer data, it has been demonstrated that the estimated gradient using this new technique is in good agreement with the actual density gradient for a number of DIII-D discharges. Further tests of this technique in a variety of DIII-D plasma conditions will be presented.

*Supported by the US Department of Energy under DE-FG02-08ER54984, DE-FC02-04ER54698, and DE-SC0007880.