Abstract Submitted for the Thirteenth Topical Conference on High Temperature Plasma Diagnostics June 18–22, 2000, Tucson, Arizona

Category Number and Subject:

[ ] Theory [x] Experiment

Improved CCD Detectors for the Charge Exchange Spectroscopy System on the DIII–D Tokamak,* K.H. Burrell, P. Gohil, R.J. Groebner, D.H. Kaplan, D.M. Thomas, *General Atomics*, D.G. Nilson, *Livermove National Laboratory* — Charge exchange spectroscopy allows determination of ion temperature, poloidal and toroidal velocity, impurity density and radial electric field E_r in high temperature tokamak plasmas. Charge exchange spectroscopy has been one of the workhorse diagnostics on the Doublet III and DIII–D tokamaks since 1983. The ability to determine the E_r, for example, has been essential in testing the model of E×B shear suppression of turbulence. For the 2000 experimental campaign, we have replaced the intensified photodiode array detectors on the edge portion of the system with advanced CCD detectors mounted on faster (*f*/4.7) spectrometers. The combination has improved the photoelectron signal level by about a factor of 20 and the signal to noise by a factor of 2 to 8, depending on the absolute signal level. A major portion of the signal level improvement comes from the improved quantum efficiency of the back-illuminated, thinned CCD detectors (70% to 85% for the CCD versus 10%–20% for the image intensifier) with the remainder coming from the faster spectrometers. The CCD camera also allows shorter minimum integration times: 320 μs while archiving to PC memory and 150 μs using temporary storage on the CCD chip. The PC memory option allows up to 4096 spectra per tokamak shot, limited only by available memory, while the faster on-chip storage is limited to 254 spectra. Results from tokamak plasma shots will be presented.

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[x] Prefer Poster Session

[ ] Prefer Oral Session

[ ] No Preference

[ ] This poster/oral should be placed in the following grouping: (specify order)

[ ] Special Facilities Requested (e.g., movie projector)
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[ ] Other Special Requests
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Submitted by:

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