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☐ Theory    ☒ Experiment

**Real-Time CER Spectral Analysis on DIII-D,\*** R.J. Harrington, *Rensselaer Polytechnic Institute*, M.R. Wade, *ORNL*, and J.R. Ferron, *General Atomics*– A computer algorithm is being developed to provide real-time plasma ion temperature and rotation information suitable for active feedback control using the DIII-D digital plasma control system (PCS). Data is obtained from the charge-exchange recombination (CER) spectroscopy system. The algorithm completes the necessary spectral fitting to determine the Gaussian amplitude, width, and Doppler shift. The temperature and rotation from the fit is passed to the PCS in the appropriate form for feedback control. Because the PCS code is written in the C programming language, the algorithm is being developed in C using the between-shot spectral analysis code CERQUICK (written in IDL) as a template. The goal is to analyze up to 8 CER channels in real-time so that feedback control of the impurity temperature can be done by the PCS. The CERQUICK code will be used to verify the accuracy/validity of the new code. Adjustments and improvements will then be made for increased efficiency, providing timing benchmarks on the analysis speed. The developed code will then be implemented with the PCS for real-time control of the impurity temperature and/or rotation.

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