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Ion Temperature and Toroidal Velocity Fluctuation Measurements Using Two-Point Ultra-Fast CHarge Exchange Recombination Spectrometer (UF-CHERS)[1] I.U. UZUN-KAYMAK, R.J. FONCK, G.R. MCKEE, Z. YAN, U. Wisconsin-Madison — An upgraded version of the UF-CHERS high efficiency, high throughput, customized spectrometer, has been deployed at DIII-D to observe CVI charge exchange emission at 529 nm using an array of cooled avalanche photodiode detectors (APDs) with 1 μs time resolution. The new spectrometer achieves 80% transmission efficiency at the wavelength of interest with 0.27 nm resolution. Accompanied with low noise preamplifiers APDs can achieve high-frequency response up to 400 kHz. Fast time scale ion-temperature fluctuation measurements are crucial to characterizing turbulence and potentially identifying the underlying instabilities driving low-k turbulence. Initial results will evaluate the diagnostic capabilities with observations of thermal fluctuations. Measurements of the collisionality dependence of turbulence and transport, obtained from an upcoming experiment, will be investigated in detail.

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