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Direct Measurement of Impurity Transport Coefficients in an FRC T. ROCHE, W.W. HEIDBRINK, R. MCWILLIAMS, E. TRASK, F. WESSEL, UC Irvine, N. BOLTE, E. GARATE, H. GOTA, D. GUPTA, M. MOREHOUSE, Tri Alpha Energy — An optical tomography diagnostic is being developed that will be used to make a direct measurement of the time and space resolved density profile of an impurity species in a Field-Reversed Configuration (FRC). Localization of the impurity will be controlled by means of a puff valve. This will allow for accurate temporal resolution up to within a few millimeters of the nozzle. The tomographic system consists of sixteen collimated chords. They are fanned in such a way as to cover about 30% of the FRC at the midplane. The signal of each chord will be piped out to an individual Photo-Multiplier Tube (PMT) equipped with a narrow band pass filter which is centered at the wavelength of the desired spectral line of the impurity species. An inversion method, such as linear regularization, will be used to generate an image of the density profile from these data. Once this has been accomplished the convective and diffusive transport coefficients will be determined by further analysis. Preliminary investigation has verified that when Argon is used as the impurity it emits enough light to be measured when it comprises 0.1% of the total backfill.

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