

Abstract Submitted
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**Spectroscopic Line Ratio Determination of Electron Density,
Electron Temperature, and H₂ Dissociation Fraction in PFRC-2 Pulsed
Hydrogen Plasmas** ERIC PALMERDUCA, Princeton University, Princeton
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The degree of H₂ dissociation in a hydrogen plasma affects the relative intensities of H I spectral lines and is therefore an important parameter in the interpretation of H I spectra. Line ratio spectroscopy using an iCCD spectrometer and a high time resolution monochromator is used to determine the electron temperature, electron density, and degree of H₂ dissociation in PFRC-II pulsed hydrogen plasmas. Ratios of impurity helium I spectral line intensities yield measurements of the electron temperature and density via a collisional-radiative (CR) model.¹ Similar CR calculations for hydrogen then relate the observed Balmer line ratio H- β /H- α to the degree of H₂ dissociation.² Results are presented at various axial and radial positions in the plasma as parameters such as RF input power, axial magnetic field, and initial gas pressure are varied.

¹S. Sasaki, S. Takamura, S. Watanabe, S. Masuzaki, T. Kato, and K. Kadota, Review of Scientific Instruments **67**, 3521 (1996).

²T. Fujimoto, K. Sawada, and K. Takahata, Journal of Applied Physics **66**, 2315 (1989).

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