

Abstract Submitted
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0.2-10 keV X-Ray measurements on the PFRC-2: EEDF, heating, and confinement¹ B. M. ALESSIO, Princeton University, C. SWANSON, Princeton Satellite Systems, K. R. TORRENS, Princeton University, E. S. EVANS, S. A. COHEN, Princeton Plasma Physics Laboratory — Time and spatially resolved X-Ray spectra from odd-parity RMF-heated hydrogen plasma in the PFRC-2 were obtained with in-house-calibrated silicon-drift detectors (SDD). Both Bremsstrahlung and line radiation were observed. Maxwellian-fit electron density and temperature were extracted from the Bremsstrahlung segment of the spectra using a Poisson-regularized inversion method. Temperatures of a minority component exceeded 600 eV. The rate-of-rise of the electron energy was used as a proxy for the effectiveness of the heating process and quality of confinement. Line emission showed the presence of carbon, oxygen, iron, and nitrogen. The brightness values of these line emissions were sensitively dependent upon applied magnetic field strength, gas fill pressure, pumping method, and boundary conditions. Conditions were found where the SDD viewing through the axial midplane of the plasma measured an X-ray brightness as much as 100x greater than that measured by an SDD viewing 5 cm away from the midplane. Possible causes, including non-uniform electron energization, plasma shape changes, and plasma-wall interactions, for this disparity are discussed.

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