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Electron Temperature Measurement using Collisional Radiative Model in PFRC-II[1] CHRISTOPHER JAKUBACK, Princeton Plasma Physics Laboratory — The PFRC-II experiment is a plasma containment device that aims to improve odd-parity rotating magnetic field (RMF) heating. This method drives electrical current and is theoretically capable of heating a plasma to fusion temperatures. To achieve this goal, a myriad of different parameters must be assessed during a pulse that lasts only milliseconds long. The primary objective of my research was to study the electron temperature values as a function of time observed in each discharge of the PFRC-II experiment. A non-intrusive method of studying electron temperature is examining specific wavelengths of visible light that are emitted during an RMF pulse. These spectra are produced due to electron-impact excitation of neutral hydrogen followed by radiative deexcitation. The spectroscopic data central to studying electron temperature is the three lowest energy spectra in the Hydrogen Balmer Series. To ensure a strong level of precision, an Ocean Optics Spectrometer was utilized to measure all three spectra and background radiation simultaneously. Using the empirically generated spectroscopic data and a collisional radiative model's approximations, electron temperature values were produced without impeding the heating process of the PFRC_II experiment.

[1]Princeton Plasma Physics Lab

Christopher Jakuback
Princeton Plasma Physics Laboratory

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