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Doppler spectroscopy on plasma discharges produced in Proto-MPEX RUNPAL DHALIWAL, The University of Michigan, THEODORE BIEWER, CHRIS KLEPPER, ELIJAH MARTIN, JUERGEN RAPP, Oak Ridge National Laboratory — The Prototype Material Plasma Exposure eXperiment (Proto-MPEX) is a linear machine that produces pulsed plasma discharges, and is intended to study plasma-material interactions in conditions similar to those found in future fusion reactors. A high-resolution McPherson Czerny-Turner visible range spectrometer has been installed to study the behavior of ions in the plasma. Together with a Princeton Instruments EMCCD camera and an external trigger box, this system provides excellent spectral and temporal resolution for viewing the emission spectra of the discharges. Around 100 lines of sight have been established for use by this and other diagnostics in the lab. Initial data from recent experiments validate the utility of this setup. Analysis of spectral lines in helium and deuterium plasmas yields valuable information regarding the temperature and density of plasma ions at various locations in the machine as the various RF heating sources are implemented. Differentiating the thermal width of lines from other sources of broadening is an ongoing process. In addition to He I lines, data indicates the presence of the He II line at 468.5 nm, which corresponds to emission from singly ionized atoms at higher temperatures.

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