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Spatial and Temporal characterization of plasma properties via emission spectroscopy in fusion materials testing device Proto-MPEX*[1] CASEY MOREAN, Lock Haven Univ, THEODORE BIEWER, GUINEVERE SHAW, JOSH BEERS, HOLLY RAY, ORNL — The Prototype Material Plasma Exposure eXperiment (Proto-MPEX) is a linear plasma source, and is intended to study plasma-material interactions (PMI) in conditions similar to those found in future fusion reactors. A high-resolution McPherson Czerny-Turner visible range spectrometer has been utilized to study the behavior of ions in the plasma. Analysis of the spectral lines, D_beta, D_gamma, and D_delta yields valuable information regarding the temperature and density of plasma ions at various locations along Proto-MPEX. Spectroscopic temperature and density measurements are compared to double Langmuir probe measurements to determine plasma behavior as a function of radius. Temporal and spatial measurements along the length of Proto-MPEX are constructed and compared to a photomultiplier tube based diagnostic manufactured at ORNL to determine the plasma's axial behavior along Proto-MPEX. Relative emission of beta, gamma, and delta lines are used to assess recycling effects in the device.

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Casey Morean
Lock Haven Univ

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