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Electron Temperature Diagnostics on the Pegasus Toroidal Experiment¹ D.J. BATTAGLIA, M.W. BONGARD, R.J. FONCK, D.J. DEN HARTOG, University of Wisconsin-Madison — A soft X-ray (SXR) Pulse Height Analysis (PHA) system has been implemented to measure the electron temperature on the Pegasus Toroidal Experiment. The detector is a silicon drift diode (SDD) mounted on a bellows. The SDD detector is well suited for high resolution (139 eV at 5.9 keV), high count rate (10^6 cps) X-ray spectroscopy and therefore is able to obtain time-resolved temperature measurements on the order of a millisecond. The detector is radially scannable which permits profile measurements on a shot-to-shot basis with a spatial resolution as low as a few centimeters. Temperatures in the range of 300 eV – 1 keV should be measurable with the PHA system. Temperatures below 300 eV can be measured using oxygen and carbon line ratios with SXR Ross filter spectroscopy. A Thomson-scattering system is also being designed for future implementation. The first generation of the diagnostic will include a 10 J, 40 ns Q-switched ruby laser ($\lambda = 694.3$ nm) and a single-spatial-channel avalanche photodiode detector/spectrometer system.

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