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Electron temperature fluctuation measurements using a two-pulse Thomson scattering diagnostic on MST H.D. STEPHENS, A.F. FALKOWSKI, D.J. DEN HARTOG, R. O'CONNELL, J.A. REUSCH, University of Wisconsin - Madison — Advanced Thomson scattering diagnostic capabilities enable exploration of fast electron dynamics that may be associated with several physical processes such as tearing modes, dynamo mechanisms and electrostatic fluctuations. The photon sources for the Thomson scattering diagnostic on MST are two independently triggerable Nd:YAG lasers. The two lasers can be fired arbitrarily close together in time. Data acquisition becomes the limiting factor in time resolution. Overall the system is capable of measuring changes in the radial electron temperature profile with a temporal resolution of 200 ns and with a spatial resolution of 2 cm or less. A fluctuation power spectrum can be built up over an ensemble of shots. The power spectrum of electron temperature fluctuations near tearing mode frequencies (5-30 kHz) is presented as well as a correlation analysis of temperature and magnetic modes. How this method can be applied to higher frequency fluctuations is discussed. The research was performed under appointment to the Fusion Energy Sciences Fellowship Program and supported by US DOE.

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