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Thomson Scattering at 250 kHz[1] WILLIAM YOUNG, D. J. DEN HARTOG, L. A. MORTON, University of Wisconsin-Madison, CMSO, MST TEAM — The fast Thomson scattering diagnostic on the MST Reversed-Field Pinch experiment now measures electron temperature at rates of up to 250 kHz, allowing for single shot analysis of phenomena that previously required ensembles of measurements from many shots. Recent laser upgrades include the addition of a second Nd:glass amplifier (giving a total of six amplifiers including four Nd:YAG stages) and optimization of neodymium doping levels within the glass amplifier stages to reduce thermal defocusing. The master-oscillator power-amplifier laser system operates in a pulse-burst mode where the laser generates multiple pulses per flashlamp firing and these bursts of laser pulses are repeated multiple times. When optimizing for the largest number of laser pulses, the laser produces up to 30 pulses at a rate of 100 kHz per burst repeated up to 4 times every 2 ms for a total of 120 temperature measurements per MST discharge. When optimizing for fastest pulsing rate, the laser can produce 8 pulses at 250 kHz within a single burst. A laser system upgrade currently underway is replacement of the diode-pumped pulsed Nd:YVO_4 master oscillator with a CW laser chopped by an acoustic-optic modulator; this upgrade may enable pulsing rates faster than 250 kHz.

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William Young
University of Wisconsin-Madison, CMSO

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