

Abstract Submitted  
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**Control system upgrade for high-repetition-rate Thomson scattering on the Madison Symmetric Torus**<sup>1</sup> N.C. HURST, D.J. DEN HARTOG, W.S. HARRIS, Y.M. YANG, Department of Physics, University of Wisconsin - Madison — The Thomson scattering diagnostic on the Madison Symmetric Torus (MST) is currently being upgraded for high repetition rate operation (maximum 250 kHz). The upgrade includes commissioning of a new custom pulse-burst laser, as well as a new control system based on FPGA (Field-Programmable Gate Array) technology to accommodate high-speed operation of the new laser. Timing accuracy of the FPGA system can be characterized by  $\pm 100$  ns jitter between the trigger from MST and the laser pulse-burst sequence. The new control system will be described in detail, including control requirements of the new laser, control software on both the FPGA card and the host computer, and hardware layout of the entire Thomson scattering system. The laser control code has been carefully designed such that the Thomson scattering system can be easily and quickly re-programmed for different modes of operation during MST science runs, but can also be tested and optimized in great detail during the development phase.

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