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Advanced control of MST's poloidal field with a programmable power supply B.E. CHAPMAN, D.J. HOLLY, K.J. MCCOLLAM, J.C. MORIN, J.S. SARFF, A. SQUITIERI, J.K. ANDERSON, A.H. SELTZMAN, UW-Madison — One thrust of the MST program is to advance inductive control for the development of both the RFP's fusion potential and the predictive capability of fusion science. This entails programmable power supplies (PPS's) for the Bt and Bp circuits. A Bt PPS is in place, and a Bp PPS is being designed. Together, these supplies will provide inductive capability rivaling that of any fusion device in the world. To better inform the design of the Bp PPS, and to demonstrate some of the new capabilities that will be provided, the existing Bt PPS has been connected to MST's Bp circuit. While limited to lower voltage and current than the planned Bp PPS, this has already more than quadrupled the Ip flattop duration. It has also allowed access to very low Ip, down to 20 kA, substantially increasing MST's range of Lundquist number, important for the validation of MHD computational models. Low Ip has also allowed electron energization by high-harmonic EBW. At higher Ip, work has begun on self-similar ramp-down of Ip, a potential route to improved confinement. Work supported by U.S.D.O.E.

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