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Programmable power supplies for the Pegasus Toroidal Experiment¹ D.J. BATTAGLIA, N.W. EIDIETIS, R.J. FONCK, G.D. GARSTKA, B.A. KUJAK-FORD, B.T. LEWICKI, E.A. UNTERBERG, University of Wisconsin-Madison — The Pegasus power systems are composed of switching power supplies with active current feedback control using pulse-width modulation (PWM) controllers. The 72 MVA poloidal and toroidal field power systems use conventional IGBT switches (900V, 2.5 kHz) and analog PWMs. These systems have a flexible configuration to allow for a variety of operational scenarios. The 113 MVA OH power system uses IGCT switches (2.4 kV, 3 kHz) and a new digital PWM that was developed to avoid damaging switching events by defining minimum switching state intervals. OH switching transient suppression is achieved with RLCD snubbers and by minimizing the internal inductance of the switch structure. A passive LC filter in series with the OH solenoid provides a smooth $V_{loop}(t)$ while maintaining a sub-ms response time. IGCT switch limitations due to finite driver energy have been measured, and are used to map the operating space for present experiments.

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Gregory Garstka
garstka@engr.wisc.edu
University of Wisconsin-Madison

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