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**Development of an Active Plasma Control System for Pegasus**<sup>1</sup> M.W. BONGARD, S.P. BURKE, R.J. FONCK, B.T. LEWICKI, University of Wisconsin-Madison — The Phase II Pegasus ST experiment includes fully programmable power supplies for all magnet coils. These will be integrated with a digital feedback plasma control system (PCS), based on the PCS in use on DIII-D, to provide active feedback control of the plasma evolution. The initial goal is to control  $I_p(t)$ ,  $R(t)$ , and  $Z(t)$ . The feedback cycle consists of: 1) sampling magnetic diagnostics, 2) applying a response matrix derived from equilibrium reconstructions, 3) accounting for induced vessel currents and power supply frequency responses, and 4) adjusting the current demand, all on a timescale that is fast compared to the shot duration of  $\sim 25$  ms. Data is sampled via a 500 kHz, 96-channel CPCI digitizer from DTACQ Solutions, Ltd. The power supply control signals are generated by 16 analog waveform generators, with the option to utilize 32 digital I/O lines in the future. The PCS digitizer is controlled via a system of Linux-based computers that perform requisite computation-intensive tasks and interface to the existing LabVIEW control codes via a TCP/IP network link.

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Prefer Oral Session  
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