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Category Number and Subject: 5.6.2. DIII-D Tokamak

Theory Experiment

The DIII-D Plasma Control System as a Scientific Research Tool,* A.W. Hyatt, J.R. Ferron, D.A. Humphreys, J.A. Leuer, M.L. Walker, W.S. Welander, *General Atomics* – The digital plasma control system (PCS) is an essential element of the DIII-D tokamak as a scientific research instrument, providing experimenters with real-time measurement and control of the plasma equilibrium, heating, current drive, transport, stability, and plasma-wall interactions. A wide range of sensors and actuators allow feedback control not only of global quantities such as discharge shape, plasma energy, and toroidal rotation, but also of non-axisymmetric magnetic fields and features of the internal profiles of temperature and current density. These diverse capabilities of the PCS improve the effectiveness of tokamak operation and enable unique physics experiments. We will present an overview of the PCS and the systems it controls and interacts with, and show examples of various plasma parameters controlled by the PCS and its actuators.

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