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The Implementation of KTX Central Control System

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Keda Torus eXperiment (KTX) is a middle-size reversed field pinch (RFP), designed and implemented jointly by the University of Science and Technology of China (USTC) and the Institute of Plasma Physics at the Chinese Academy of Science (IPP CAS). All the components fabrication and assembly completed in August 2015, and the central control system (CCS) has operated stably since the first discharge shot. The CCS for KTX is to integrate, harmonize and supervise all of the control subsystems, it consists of graphical user interface (GUI), process control system, timing system, safety & interlock system, gas injection system and shot information system. Almost all the systems are implemented by using PXIe devices, and the software environment is LabVIEW Real-Time.

The GUI for the operator indicates the subsystems' status and pre-define parameters. The process control system focuses on monitoring the logic of discharge and controlling the operation schedule. The timing system provides the trigger signals, and controls the participation in the experiment of subsystems in time series. FPGA device is used in the safety & interlock system to protect the machine from accidents and prevent the propagation of the risk from an accident. The gas injection module is mainly to set the injection amplitude and width of each specific valve for vacuum system. Shot information system stores the experimental parameter and sends the shot number and discharge information to diagnostic systems for data acquisition.

This contribution is organized as follows. The physics parameters and design of the overall system are presented. The details about the central control system architecture and components will be described respectively, and some experimental results will be shown at last.

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