

13th INTERNATIONAL STELLARATOR WORKSHOP

HSX Hardware, Controls and Diagnostics^{*}

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The HSX Helically Symmetric Stellarator has been operational for the last year, making plasmas at 0.5T using 28 GHz ECH. During this phase of operation, hardware, machine diagnostics, and plasma diagnostics have been continually implemented to improve machine operation and control, and plasma diagnostic capabilities. This paper will provide an overview of the basic machine control concepts, some details of the He glow discharge cleaning methods used to provide density control under plasma operation, and some details of the LabView^R (National Instruments) and SLC interfaced machine control, timing and diagnostics. Low-level machine operation (coil deflection, ground currents, vacuum base pressures and contaminants, etc.), motor generator, coil cooling and temperature monitoring is also performed using the LabView/SLC combination; more of which is planned for the ensuing months.

Diagnostic implementation, from 288 GHz microwave interferometer, basic magnetic diamagnetic signals, optical and x-ray diagnostics, probes, etc., are primarily interfaced using LabView A/D, digital and analog I/O, and timing cards controlled by PC computers; all of which save the data to a PC based data storage site. A ten-chord FIR Thomson Scattering system and a multichannel ECE system are under construction for operation in the near future, again with primary control and data interface planned for incorporation into the PC based system.

A SQL database is currently under implementation to improve overall data searching and accessibility, and to facilitate backup and data protection; both MatLab^R and IDL^R are currently used for data analysis and presentation, which will be maintained through the database implementation.

^{*} Work supported by U.S. DoE under grant DE-FG02-93ER54222

Topic: Transport and Confinement Improvement

Poster preferred: Yes

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