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A fully web based control system framework for fusion experiments

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Fusion experiments like all large physics experiments requires orchestrating a large set or various subsystems. To make things more difficult is that comparing to accelerators, fusion experiments are far from finished, meaning they get upgrades and modifications all the time. So flexibility and interoperability are the main concerns. EPICS is mature in accelerator community and have been the go to choice for many large experiments. But its advantage in fusion experiments is not that prominent. Flexibility and interoperability is not its first concern. Ins this paper we present a control system framework build with standard web technology. The key of web is HTTP and HTML which is interoperable among the widest range of devices. The goal is to improve the interoperability of the control system allowing different component in the control system to talk to each other effortlessly. Communication between machines are done with standard HTTP RESTful API, and the HMI is based on browser, HTML and Javascript. This enables it to be integrated into the already well developed ecosystem of web technology. Such as InfluxDB can be used as the archiver, NodeRed can be used as the scripter and docker can be used for quick deployment. In this work we also present its application in 2 fusion experiments J-TEXT and HFRC. It shows that a control system for fusion experiment can be developed fast and easy.

Speaker's Affiliation

Huazhong University of Science and Technology

Member State or IGO

China, People's Republic of

Primary authors: WU, Feiyang; Ms LIYE, Wang (International Joint Research Laboratory of Magnetic Confinement Fusion and Plasma Physics, State Key Laboratory of Advanced Electromagnetic Engineering and Technology, School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, China); XIE, Xiaohan

Co-author: ZHENG, Wei (International Joint Research Laboratory of Magnetic Confinement Fusion and Plasma Physics, Huazhong University of Science and Technology)

Presenter: ZHENG, Wei (International Joint Research Laboratory of Magnetic Confinement Fusion and Plasma Physics, Huazhong University of Science and Technology)

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