

Distributed editing of experiment programs at Wendelstein 7-X

Wednesday, 17 July 2024 15:40 (1h 30m)

Wendelstein 7-X –as the world’s largest stellarator-type fusion device –has been going successfully through its first operation phases showing reliable operation assisted by the W7-X Segment Control and experiment-planning framework. During the upgrade phase for the full machine extent, not only the actively cooled divertor and first wall are being installed, but also a list of new diagnostics. Furthermore, many diagnostics, which in previous campaigns could only participate in the experiment operation via auxiliary triggers, are now more closely integrated to take advantage of the pre-checking for reasonability of program parameter settings, central event-based segment switching, continuous data streaming and monitoring, and standardized parameter logging.

While the Segment Control framework was implemented flexibly enough to cope with the growing number of integrated components to be controlled, the Experiment Program Editor Xedit had to be adapted for efficient setting of the many experiment parameters.

The core requirement remains that the experiment planner always has the possibility to get a complete overview of the involved components and to intervene if necessary. However, with an increasing number of systems, he is neither able to enter every parameter value nor does he know about the reasonableness of internal parameters in detail. Experiment planning must become a joint but coordinated task of the involved technicians and physicists.

With these new requirements, Xedit was extended to cope with “TaskLinks”: externally configured program parts (tasks) of individual components can be linked into the planned sequence of the central experiment program. The preparation of these tasks is done using a local Xedit instance –in the same way, as the users are already familiar with from the creation of local programs for commissioning or calibration runs. Centrally, as with all integrated components, the linked components’ tasks are then visualized and all parameters are checked for limit violations or other pre-defined rules before saving the complete planned program ready for executing.

All developments have been closely coordinated with the users, both the experiment leaders and those responsible for the components. The use of Xedit also for experiment planning at the WEST-Tokamak and the practical collaboration ensure the development of a generally applicable solution for distributed editing of experiment programs.

Speaker’s Affiliation

Max Planck Institute for Plasma Physics, Greifswald

Member State or IGO

Germany

Primary author: SPRING, Anett (Max Planck Institute for Plasma Physics)

Co-authors: RIEMANN, Heike (Max Planck Institute for Plasma Physics); LEWERENTZ, Marc (Max Planck Institute for Plasma Physics)

Presenter: SPRING, Anett (Max Planck Institute for Plasma Physics)

Session Classification: Poster Session

Track Classification: Plasma Control and Simulation