Experiment Planning and Execution Workflow at ASDEX Upgrade

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First, we present the current, historically established, workflow (with related tools and information management) from experiment proposals to the actual execution and evaluation of discharges at the ASDEX Upgrade tokamak:

To prepare a campaign, ASDEX Upgrade provides a background of system resources and capabilities and defines broad research goals (reflected in task forces) and planned experiment periods. Requests for experiments are solicited from both within the IPP and from external collaborators in the yearly call-for-proposals. Submitted proposals are checked for feasibility and compliance with the project's research goals, and, if accepted, prioritized, merged (eliminating possible redundancies), and collected in a proposal database.

During the campaign concrete shot requests (including specific time intervals for discharge execution and desired system configurations) are derived from the proposals and input to the shot request database. In weekly meetings, shot requests are mapped to the schedule (shotlist), taking into account backlogs, availability of resources, proposal priorities, upcoming deadlines (theses, conferences), and the possibility of merging or piggy-backing.

Before the execution of discharges the complete configuration data needs to be assembled. After the execution follows the analysis (including the evaluation of the discharge as to its usefulness for the underlying shot-request) and logging of the attained parameters into the so-called journal database. Depending on the results of the analysis and the availability of resources, a shot may have to be repeated with modified configuration data or the order of shots re-scheduled.

The paper then discusses methods for improving processes, software tools, and information management, which allow for a better use of system resources, minimize errors, and ultimately lead to an improved scientific productivity.