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P2.033 Actuator management development on ASDEX-Upgrade

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The future AUG control research is expected to cope with a large number of control tasks using a limited number of actuators in high performance regime. Essential part of a control system for future tokamaks is an intelligent actuator management that will be responsible for allocating the most convenient actuators to the control tasks of the highest importance.

Activities in this field have been started at DIII-D, AUG and TCV. The first version of the actuator management at AUG was developed for MHD control and impurity accumulation preemption using ECRH with fast mirrors [Rapson et al, FED 2017]. The next step will be to develop actuator management routines applicable to all heating actuators available at AUG: ECRH, NBI, and ICRH. The first application of this will be in beta control both using NBI and ECRH (so far it has been possible only by NBI) and extension of the applicability of the Te profile controller, which currently uses one gyrotron per channel and suffers from saturation problems. The actuator management will allow for more flexible allocation of actuators to Discharge Control System controllers and for the combination of different actuator types. In later stages, a plasma control supervisor capable of repurposing actuator for different control tasks will be developed.

This contribution will discuss the techniques that allow for reaching such a flexibility. The first experimental results in beta and Te profile control using the actuator management will be reported. Also, the first concept of the real time plasma control supervisor will be presented.

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