Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Implementation of the real-time NBI code RABBIT in the discharge control system of ASDEX Upgrade MARKUS WEILAND, BERNHARD SIEGLIN, Max-Planck-Institut fuer Plasmaphysik, Garching, FEDERICO FELICI, Technische Universiteit Eindhoven, LOUIS GIOANNONE, MICHAEL KOELBL, ONDREJ KUDLACEK, ALEXANDER LENZ, MARKUS RAMPP, Max-Planck-Institut fuer Plasmaphysik, Garching, MARK SCHEFFER, Technische Universiteit Eindhoven, WOLFGANG TREUTTERER, THOMAS ZEHETBAUER, ROBERTO BILATO, Max-Planck-Institut fuer Plasmaphysik, Garching, ASDEX UPGRADE TEAM, EUROFUSION MST1 TEAM — Knowledge of the fast-ion distribution arising from neutral beam injection (NBI) is important for transport analysis and magnetic equilibrium reconstruction. For sophisticated plasma control, which will be essential for the success of future fusion devices, it is very beneficial to know this distribution function already in real-time during the discharge. For this purpose, the RABBIT code has been developed. Despite its fast calculation time (≈20 ms per time-step), it still shows good agreement with computationally much heavier codes like NUBEAM. In this contribution, we report on the first real-time application of the code. It has been implemented in the Discharge Control System (DCS) of ASDEX Upgrade as a DCS satellite. The input equilibrium is provided by the real-time Grad-Shafranov solver JANET and kinetic profiles come from the RAPTOR transport code, which reconstructs the profiles based on available real-time measurements. Future applications, such as for control of neutral beam current-drive, will be discussed and outlined.

Markus Weiland
Max-Planck-Institut fuer Plasmaphysik, Garching

Date submitted: 03 Jul 2019 Electronic form version 1.4