Contribution ID: **187** Type: **Poster**

Assessment of the Baseline Scenario at q95˜3 for ITER

Thursday, 20 October 2016 14:00 (4h 45m)

In the last two years the Integrated Operation Scenarios Topical Group (IOS-TG) of the ITPA IOS-TG has combined results of joint experiments with other data available at q95˜3 in a database of global parameters with ˜3300 entries of stationary discharges from AUG, C-Mod, DIII-D, JET and JT-60U for both carbon wall and metal wall experiments. The analyses focus on discharges that are stationary for ≥5 energy confinement times.
Compared to carbon wall data, experiments with metal walls (AUG, JET-ILW, and C-Mod) have (so-far) not found a way to access the low collision frequencies (as defined in [1]). No difference in performance is observed between carbon wall and metal wall discharges at high collisionality. Stationary discharges at q95˜3 and H98(y,2)˜1.0 are typically obtained at βN˜2.0, using pre-dominantly co-current NBI heating (AUG, DIII-D and JET). In experiments using a metal walls in AUG, C-Mod H-mode and JET, the confinement is significantly reduced (H98(y,2)˜0.8-0.9) at βN≤1.8. The figure of merit G ≡ H89x⊠N/q952 should be 0.42 for Q=10 in ITER (note H89 is used here). For carbon wall data, G spans a range of 0.25 to 0.51 at the ITER reference beta of ⊠N=1.8, while for data obtained with metal walls G varies from 0.23 to 0.36. More specifically, G>0.4 has only been obtained at ⊠N>2.5 for metal devices operating at q95˜3, using dominant co-current NBI heating (AUG and JET). The ITER requirement for operation at fGW=0.85 can be obtained for triangularities (separatrix) in the range 0.2 to 0.45; an issue for ITER is that at the design value ⊠x=0.49 or higher, DIII-D and C-mod (metal wall) have no data for fGW > 0.8 and H98(y,2) > 0.95.

This material is based upon work supported by DOE under Awards DE-FC02-04ER546984 and DE-AC02-09CH114668. This work has been carried out within the framework of the EUROfusion Consortium and has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 633053. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

[1] T.C. Luce, et al, Nucl. Fusion 54 (2014) 013015.

Paper Number

EX/P6-42

Country or International Organization

European Commission

Primary author: Dr SIPS, Adrianus (JET Exploitation Unit)

Co-authors: Dr KESSEL, Charles (Princeton Plasma Physics Laboratory); Dr JOFFRIN, Emmanuel (CEA); Dr RIMINI, Fernanda (CCFE, Culham Science Centre, Abingdon, Oxfordshire OX14 3DB, UK.); Dr JACKSON, Gary L. (General Atomics); Dr URANO, Hajime (JAEA); Dr FERREIRA NUNES, Isabel Maria (IPFN/IST); Dr HOBIRK, Joerg (Max-Planck-Institut für Plasmaphysik, Garching D-85748, Germany); Dr STOBER, Joerg (IPP Garching); Dr SCHWEINZER, Josef (IPP Garching); Dr LOMAS, Peter (CCFE, Culham Science Centre, Abingdon, Oxfordshire OX14 3DB, UK); Dr IDE, Shunsuke (Japan Atomic Energy Agency); Dr WOLFE, Steve (Massachusetts Institute of Technology, Plasma Science and Fusion Center, Cambridge, Massachussetts, USA); Dr PUETTERICH, Thomas (Max-Planck-Institut für Plasmaphysik, Garching D-85748, Germany); Dr LUCE, Timothy C. (General Atomics)

Presenter: Dr SIPS, Adrianus (JET Exploitation Unit)

Session Classification: Poster 6

Track Classification: EXS - Magnetic Confinement Experiments: Stability