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P1.1081 Multi-machine analysis of EU experiments using the EUROfusion Integrated Modelling (EU-IM) framework

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Multi-tokamak analysis and modelling is performed within the EUROfusion Integrated Modelling (EU-IM) framework [1], backbone to the Integrated Modelling and Analysis Suite (IMAS)[2], which offer unique capabilities by providing device agnostic integrated simulation workflows, encompassing interchangeable physics modules spanning from high-fidelity to (fast) simplified models. EU-IM/IMAS workflows are now mature and are being prepared for full exploitation on a wide variety of devices, as JET, MST tokamaks, JT-60SA, ITER, DEMO, WEST. In particular, the impact of MSE or polarimetry measurements constraints on improving equilibrium reconstructions has been investigated on JET, MST and WEST plasmas, via an arbitrary device IMAS workflow. Analysis of JET mixed isotopes scenarios, has been enabled by self-consistent simulation of multi-species plasmas with the European Transport Simulator (ETS) [3], recently enhanced to meet the requirements for DT predictive modelling [4]. ETS offers the capability for separate modelling of hydrogen isotopes, as well as light and heavy impurities in all their charge states; further, a set of advanced heating and current drive modules, can valuably account for proper modelling of fast particle species and mixed isotope heating schemes, as well as for the synergy between ICRH and NBI heating. Validation of ETS multi-species simulations was achieved on JET L-mode H and D plasmas, assessing the impact on effective diffusivities of the quasilinear versus multi-fluid transport models therein (TGLF, QuaLiKiz or EDWM). Novel results on modelling of JET H and 3He minority hybrid discharges heated by waves and beams highlight the key role of the interplay of the various particle populations. Self-consistent modelling of NBI and ICRH synergy in JET D hybrid discharges, shows a resulting enhancement of the DD fusion reaction neutron rate (depending on H minority concentration), in good agreement with the measurements.

References

[1] G.L. Falchetto, et al., Nucl. Fusion, 54, 043018 (2014)
[2] F. Imbeaux, et al. Nucl. Fusion 55, 123006 (2015)
[3] D. Kalupin, et al., Nucl. Fusion 53, 123007 (2013)
[4] P. Strand, et al., 27th IAEA FEC 2018

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