

Integrated scenario modelling in support of fusion experiments

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The JINTRAC suite of codes is a state-of-the-art tool for the integrated modelling of plasma scenarios [1]. It consists of several modules describing various kind of particle, heat and momentum sources, main plasma and impurity transport both in the core and in the scrape-off layer and MHD equilibrium and stability. Its modularity and versatility make it a unique tool to study several aspects of the physics of a plasma scenario to various degrees of fidelity in a self-consistent manner.

In this talk we describe in detail JINTRAC capabilities and give examples of its application to the study of scenarios on different experiments, both existing and under design. In particular, we give examples of the use of JINTRAC to test newly developed transport models on MAST-U, to predict and design experiments on JET, including two recent D-T campaigns, to analyze and prepare scenarios for JT-60SA and to model the full Q=10 ITER scenario from current ramp-up to plasma termination.

The use of the different JINTRAC modules in the integrated simulations is described and the quantification of the modelling uncertainties is discussed.

References

[1] Romanelli M. *et al.* Plasma and Fusion Research, 2014, Volume 9, Pages 3403023