

Progress in the ITER Integrated Modelling Programme and the ITER Scenario Database

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The ITER Integrated Modelling & Analysis Suite (IMAS) is the software infrastructure that is being developed using expertise from across the research facilities within the ITER Members to meet the needs of the ITER Integrated Modelling Programme. It builds around a standardised representation of data described by a Data Dictionary that is both machine independent and extensible. Machine independence is important for allowing tools and workflows developed in IMAS to be tested on existing devices, whilst extensibility allows the Data Dictionary to grow and evolve over time as more and more Use Cases are addressed.

In addition to providing all the scientific tools for the scientific exploitation of ITER once operations start, IMAS also has a role to play during the construction phase by providing simulation data to support systems design, in particular for diagnostics, heating, fuelling and control systems.

Recently an IMAS database of ITER simulations has started to be developed and populated to help manage the exchange of physics data with ITER collaborators and Domestic Agencies. The database is being populated through a combination of translating existing data and running new simulations. The scenario simulation codes used to initially populate the database are ASTRA, CORSICA, DINA, JINTRAC, and METIS. Additional data structures consistently describing other aspects of these scenarios, for example the fast ion distribution functions, are being added to the database upon request to facilitate the design of specific systems.

The scenarios for all stages of the ITER Research Plan are represented in the database and are at least populated with a description of the plasma equilibrium and profiles in the core of the plasma.

This database is accessible by all ITER contributors through the IMAS Access Layer, either for visualisation or as input to IMAS-adapted workflows and simulation codes. Subsequently generated data can be stored in the database subject to acceptance criteria and provenance requirements being met. The capabilities of the final implementation of the database, including strict acceptance and validation procedures and full provenance tracking for all entries will be discussed in the paper.

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