Integrated Tokamak Modeling Taskforce: The Integrated Modeling Project on Equilibrium and Linear MHD Stability.

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The aim of the Integrated modeling taskforce [http://www.efda-taskforce-itm.org/] is to 'coordinate the development of a coherent set of validated simulation tools for the purpose of benchmarking on existing tokamak experiments, with the ultimate aim of providing a comprehensive simulation package for ITER plasmas'. Within the ITM taskforce, 5 physics projects have been defined together with 2 technical projects. The project on the equilibrium and linear MHD stability (IMP-1) was the first physics project to get started. Its objective is to provide to the ITM taskforce a set of validated equilibrium reconstruction codes, highresolution equilibrium and mapping codes and linear MHD stability codes. The codes included in the project are EFIT, EQUINOX, CEDRES, CLISTE, CAXE, CHEASE, HELENA, COTRANS, KINX, MISHKA, and CASTOR. The codes are complemented by an equilibrium toolbox (the JET FLUSH library).

One prerequisite for the verification and validation effort is that all codes involved use exactly the same data both for the tokamak geometry, the experimental data and for the data exchanged between codes. The data coordination project (DCP) and IMP-1 have defined a set of data structures which include a generic description of a tokamak, some diagnostics and a description of a generic equilibrium, in sufficient detail for the practical application within the IMP-1 project. The codes in IMP-1 are being adapted such that they do not contain any machine geometry data, all the explicit geometry data is read from the ITM database. The exchange of data between codes and the database and from code to code will be done using the defined data structures.

In the ITM database, the ITER reference scenarios will be available as well as data from JET and ASDEX Upgrade for the initial verification and validation of the codes. The subject for the verification and validation is the MHD stability limits in plasmas with a strong internal transport barrier. A first ITER equilibrium has been reconstructed with EFIT adapted to the ITM data structures.

The paper will present the progress made in the IMP-1 project together with the results from the application of the contributed codes to the data from several tokamaks.