

# Coordinated Activities on Evaluation of Collisional Data for Fusion Applications

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**Abstract.** The research to create sustainable fusion reactions for energy generation is highly inter-disciplinary and requires extensive sets of data on atomic, molecular and plasma-surface interaction (AM/PSI) properties used for modeling the confined plasma and the evolution of the plasma-facing materials. Data are needed for the main plasma species and a variety of impurity elements and molecules and their ions over a wide range of plasma conditions and for plasma interaction with different pure and mixed wall materials. In many cases the uncertainty in the collisional data is poorly known and many data sets have not been critically evaluated due to the technical difficulties and the lack of researchers to carry out data evaluation. However, the need is greatly increasing for evaluated data, and ultimately for a standard reference library for fusion relevant data.

It is the role of the Atomic and Molecular (A+M) Data Unit of the International Atomic Energy Agency to review progress and achievements in the production of AM/PSI data for fusion program, and to encourage international cooperation in measurement, compilation and evaluation of AM/PSI data for fusion. Since 1978 the A+M Data Unit has supported the International Atomic and Molecular Data Centre Network (DCN) where a number of institutions coordinate the production, exchange, compilation, dissemination and evaluation of fusion relevant data. Until recently, DCN activities were focused on producing, compiling and disseminating new data sets in response to demands for non-existing data from the fusion community. With the increasing requests from the fusion community for evaluation of the quality of available data sets, the DCN members discussed on the international coordination and effort to verify and validate the AM/PSI data sets relevant to fusion applications.

The DCN meeting and subsequent Consultancy meetings identified important issues that must be addressed to support data evaluation and, in the longer run, the development of an internationally recommended standard library for AM/PSI data for fusion. A technical meeting on data evaluation is held in Daejeon, Korea, from 4 to 7 September 2012. Approximately 30 people from 11 countries participate to discuss relevant issues: 1) Error Propagation and Sensitivity Analysis, 2) Current Status of Evaluated Data bases, 3) Uncertainty Estimates of Theoretical Data, 4) Experimental Data Evaluation, 5) Data Evaluation Methods and Semi-Empirical Fits and 6) Establishment of Evaluators' Network.

In the present meeting the summaries of the Technical Meeting, the recommendations and conclusions of the Data Centre Network meeting and the Consultancy meetings on data evaluation activities will be presented and the long-term goal to establish the IAEA standard library of fusion relevant atomic, molecular and plasma-material interaction data will be discussed.