The IAEA Data Centre Network – Data Evaluation Activities

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The Atomic and Molecular (A+M) Data Unit of the International Atomic Energy Agency works to establish databases and a knowledge base of atomic, molecular and plasma-surface interaction (PSI) processes that are important for fusion energy research. Activities for database development include IAEA Coordinated Research Projects (CRP), Technical Meetings, Consultant Meetings and a number of collaborations. New data produced through these activities is published in journals and in IAEA reports and is included in the numerical database ALADDIN that is freely accessible to all fusion researchers.

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, data centre 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 rapid advances in computing capabilities and in on-line search functions theoretical data sets are being generated and accessed with more ease. As a result, there have been increasing requests from the user community for evaluation of the quality of available data sets, and at their most recent meeting the DCN acknowledged the great need to increase data evaluation activities.

The DCN meeting and a subsequent smaller Consultancy meeting (at NIFS in Feb 2012) identified important issues that must be addressed to support data evaluation and, in the longer run, the development of a comprehensive internationally recommended standard library for A+M (+PSI) data for fusion. One key issue is the assessment of uncertainty of theoretical data when, as is very often the case, direct comparison with experimental data is not possible. (Theoretical cross-section data may be finely resolved with respect to incoming and outgoing states whereas measured cross-sections are often under-resolved on both sides.) In addition to such scientific issues there are practical issues of the provision of measured and calculated unevaluated data in a format that facilitates comparison and the assignment of uncertainties. The development of a standard library of evaluated data requires also a library, or at least a common format and convenient means of exchange, of unevaluated data. The initial effort by the IAEA A+M Data Unit and the DCN towards the development of a standard library is focussed on A+M collision cross section data. Plasma-surface interaction data are the other important component of the work of the A+M Data Unit and the DCN, and evaluation is much needed for such data too, but many more variables are involved both in experiment and in computation.

In the present meeting the recommendations and conclusions of the Data Centre Network meeting and the Consultancy meeting 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.