# Role of the Fusion Atomic Databases in the Internet Environment *

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Most of the original atomic collision data used by the researchers in boundary plasma and in the plasma-material interface (PMI) are currently easily and instantenuously accessible using world wide web, from both scientific publications and institutional databases. However, critical evaluations of the data with respect to their quality, applicability in a desired range of parameters and extendibility of the data beyond their measured or calculated range are widely absent, and is certainly a desired activity which would signifficantly upgrade the role of the data centers to a higher level. Even more rare are the recommended data sets, developed by the critical evaluation and comparison of large number of available experimental and theoretical data, which passed the strict process of verification, validation and uncertainty quantification (UA). Such recommendations require close collaboration of the theoretical and experimental physicsts as well as mathematical and computational scientists. On the other hand, UA or error assesment of the data with respect to the plasma response is another critical set of information, a feddback of the data users, which is readily missing, and requires a mutual interaction of the data users and producers. The national and international funding restrictions for the atomic data production and the data dissemination are one of the main reasons for the poor activity in this field. The IAEA Atomic and Molecular data unit has played an important coordination role in the efforts of the national data centers, and its activity in the recommendation of hydrogen and helium atomic data in the Aladdin database was noticable in the past. After more than a decade the updates and extensions to the new recommendations for the plasma boundary and PMI data are a must.

Prominent example which well illustrates the importance of the data evaluation and recommendation, as well as verification, validation and UQ is the design of the plasma-material interface. The traditional trial-and-error approach to PMI for future fusion devices by successively refitting the walls of toroidal plasma devices with different materials and component designs is becoming prohibitively slow and expensive because of the increasing device size, curved toroidal geometry, access restrictions, and complex programmatic priorities. A comprehensive UQ effort is very valuable for this research since one has to couple multiple codes to span the partially overlaping but disparate time and length scales involved in PMI. In addition, it was established that the details of the surface microstructure play a large role in both qualitative and quantitative outcome of the targeted cross sections and yields in the particle-surface interactions, promoting importance of statistical sampling of local variations in surface microstructure in studies of the PMI processes.

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