

THE CONTROLLED FUSION ATOMIC DATA CENTER

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The principal mission of the Controlled Fusion Atomic Data Center (CFADC) is to provide critically evaluated atomic collision data to address the most urgent needs of the fusion energy research and development community. To this end, ongoing activities include the creation and maintenance of a bibliography of atomic and molecular collision references, participation in an international network of data centers, and operation of the JET/Strathclyde Atomic Data and Analysis Structure (ADAS). To facilitate the dissemination of these resources to the community, a World-Wide-Web (WWW) site (www-cfadc.phy.ornl.gov) has been established through which to make them available.

For example, the CFADC's group of expert consultants has gleaned and categorized over two thousand new bibliographic entries which have been added to the on-line bibliography since the last Physics Division Progress Report in 1996, bring the total to over 31,000 entries dating from 1978 to present. Work to improve data entry, storage, and retrieval functions of the on-line bibliography will be carried out in the next period to enhance our ability to maintain, update, and allow flexible access to the database. Updates of the bibliography form the basis for the distribution by the International Atomic Energy Agency (IAEA) of the publication "The International Bulletin on Atomic and Molecular Data for Fusion."

A linkage between the WWW engine through which users can search the bibliography has been made to the ALADDIN numerical database, another important resource provided the CFADC and the international data center network coordinated by the IAEA. This linkage will be improved in the future and other key resources will similarly be connected so that users can located data through a single interface point. Goals of future development will also include adding flexible tools to manipulate graphically or numerical linked data or even generate new data from standard procedures, coordinated through the central WWW search engine. One of the resources that would be of great use to link to the search engine is the famous CFADC Redbook series of recommended atomic data. As a first step, the most often cited and requested volumes of the Redbooks have been electronically scanned, converted to graphic format, and made accessible through the WWW site. Another significant contribution made by the CFADC since the last progress report is the completion of a large project to compute and make accessible a database of integral elastic and related transport cross sections for low energy collisions among the principal constituents of the divertor and edge regions of present and next-step fusion reactors. This database is to be published and has been placed on the WWW site in an interactive implementation that allows uses to select collision partners and display for viewing or downloading the pertinent graphical or tabular integral or differential elastic cross sections. This database will be extended to include new calculations involving

inelastic collision which are also of significant importance in modeling the relatively low temperature regions of fusion devices.

Another very important resource available through the data center is ADAS which contains compiled atomic data and modeling software to predict and diagnose the radiating properties of plasmas. Through the cooperation of data producers who have contributed to the atomic data in ADAS, we have initiated and will continue a project to place these data sets directly on-line allowing users to more easily find and utilize them.

Thus, the system through which the CFADC allows access to the full array of bibliographic and numerical data of use in plasma sciences will continue to evolve in order to improve the level of ease and the depth of resources available to the user community. In addition, the data center will continue to augment the bibliographic and numerical databases through further work to search the literature for potentially relevant information and through the production of new data theoretically.

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