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INTERNATIONAL NUCLEAR DATA COMMITTEE

**IAEA Technical Committee Meeting:
11th Meeting of the IFRC Subcommittee on
Atomic and Molecular Data for Fusion**

3-4 May 1999, Vienna, Austria

SUMMARY REPORT

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May 1999

IAEA NUCLEAR DATA SECTION, WAGRAMERSTRASSE 5, A-1400 VIENNA

**IAEA Technical Committee Meeting:
11th Meeting of the IFRC Subcommittee on
Atomic and Molecular Data for Fusion**

3-4 May 1999, Vienna, Austria

SUMMARY REPORT

Prepared by: R.K. Janev

May 1999

Abstract

Brief description of the proceedings, conclusions and recommendations of the 11th Meeting of the Subcommittee on Atomic, Molecular (A+M) and Plasma-Material Interaction (PMI) Data for Fusion of the IAEA International Fusion Research Council (IFRC), held on May 3-4, 1999, at the IAEA Headquarters in Vienna, Austria, is provided. The report includes also the Executive Summary from the meeting and is appended with the Report on Activities of IAEA A+M/PMI Data Unit for the period May 1998 - May 1999.

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1. INTRODUCTION

The 11th Technical Committee Meeting of the Subcommittee on Atomic, Molecular (A+M) and Plasma-Material Interaction (PMI) Data for Fusion of the IAEA International Fusion Research Council (IFRC A+M Subcommittee) was held on May 3-4, 1999 at the Agency Headquarters in Vienna. The main objectives of the meeting were to review and assess the Agency activities in the area of A+M/PMI data for fusion in the period May 1998 - May 1999 and provide recommendations to the Agency regarding its programme for the years 2001-2002 and beyond.

The meeting was attended by eight (out of ten) Subcommittee members (see [Appendix 1](#)), including two new, recently nominated members, Dr. R. Guirlet (CEA, Cadarache, France, as successor of Dr. M. Mattioli) and Dr. W.P. West (General Atomic, USA, as successor of Dr. D.E. Post). The newly nominated representative of the Russian Federation, Dr. Yu. Martynenko (Kurchatov Institute, Moscow, Russia, Successor of late Dr. V. Abramov) and Dr. H. Tawara (NIFS, Japan) were not able to attend the meeting due to financial reasons. Apart from Dr. R.K. Janev, Head of the A+M Data Unit, who also serves as a secretary to the Subcommittee, the meeting was attended by Dr. J. Stephens, staff member of the A+M Data Unit.

2. BRIEF MEETING PROCEEDINGS

The meeting was opened by the Scientific Secretary of the meeting, R.K. Janev, who welcomed the participants and, in particular, the new Subcommittee members Dr. R. Guirlet and Dr. W.P. West. Then, Dr. D.W. Muir, Head of the Nuclear Data Section (to which the A+M Data Unit is organizationally attached), also welcomed the Subcommittee and provided some insight in the ongoing programme review processes in the Agency which may have certain impact on the research related coordinating activities of the Agency. Dr. Muir also provided information about the status of the administrative process related to the replacement of the outgoing Head of A+M Data Unit, as well as about the presently discussed possibility for shifting the Agency programme and budget planning cycle for one year in the near future. The meeting then proceeded according to the adopted agenda (see [Appendix 2](#)) and was chaired by the Subcommittee Chairman, Dr. R. McKnight.

During the first session, the Head of A+M Data Unit briefly outlined the highlights of activities of the Unit during the period May 1998 - May 1999. These include: publication of two volumes of the APID series, establishment of a state-of-the-art Website for the numerical part of AMDIS databases (ALADDIN), substantial up-grading of He- and Li-databases, and a substantial progress in the extrabudgetary programme on the establishment of an international database for irradiated nuclear graphite properties. Other parts of the Data Unit activities (co-ordination of the A+M Data Centre Network, status of co-ordinated research projects, experts' meetings, etc) were not described in detail, but were addressed through responses to individual questions and comments, since the Report of A+M Data Unit activities in the

reporting period (see Appendix 3) has been distributed to the meeting participants about one month before the meeting. A half-hour demonstration of the design and the access to the data in the ALADDIN Website was presented to the Subcommittee members.

The second session of the meeting was devoted to a detailed analysis of the Data Unit programmes for the year 2000 and for the programme and budget cycle period 2001-2002. No suggestions for modifications of the programme for the year 2000 were made by the Subcommittee. This programme (including the year 1999) is given in Attachment A to Section 5 of the present report. The programme for the years 2001-2002, however, was slightly modified to reflect the recommendations from the closing Research Co-ordination Meeting of the CRP on A+M/PMI data for divertor modeling and the Subcommittee analysis of the next-generation reactor design A+M/PMI data needs. These modifications are summarized in the Appendix following the Attachment B of Section 5 of the present report. The most important changes and/or clarifications include: inclusion of charge exchange data for high-Z impurities in the task G.1.04/T3, inclusion of particle-surface processes and reactions into the scope of planned CRP on data for molecular impurities (G.1.04/T4), transfer of the dust particle subject from task G.1.04/T4 to task G.1.04/T6 and introduction of a new task (G.1.04/T12) for publication of a CIAMDA volume on particle-surface interaction bibliography in 2001. The Subcommittee emphasized that the administrative procedure for organizing the large Technical Committee Meeting on A+M/PMI Data for Fusion Reactor Technology, planned to be held in 2001, should start sufficiently early to ensure a smooth organization of the meeting.

The third session of the meeting dealt with the Data Unit's publication policy. It was concluded that the volumes of APID series continue to represent an important vehicle for delivering an up-to-date information to the fusion research/reactor design community and their regular publication should be a high priority in the A+M Data Unit programme. The Subcommittee also discussed the outcome of the contacts of the Chairman with the members of the APID Editorial Board regarding their service beyond their first five-year term. The following replacements for the outgoing Board members were suggested; J. Roth, V. Barabash, K. Wilson, A. Haasz, and V. Philipps.

The International Bulletin on A+M Data for Fusion similarly continues to be one of the major and most popular Agency A+M data products, satisfying the needs of a broad range of researchers (more than 800 recipients). The continued publication of the Bulletin should also be regarded of high priority, and the contributing A+M/PMI data centres are urged to provide the input regularly and in timely fashion.

The publication of CIAMDA '98 is an important result of the Data Unit's activity in 1998. The Subcommittee suggests that a CIAMDA volume be published in 2001 containing the bibliographic data on particle-surface interaction processes.

In its publication policy, however, the Data Unit should follow the trends and policies of the IAEA with regard to the use of modern electronic formats in publishing.

The activities of national A+M/PMI data centres were also briefly analyzed by the Subcommittee, including, in particular, the co-ordination of these activities by the Agency. The participation in the preparation of the Bulletin, contributions to the APID series volumes, bilateral and multilateral data related projects, programme complementarity, etc show that the level of co-ordination of the activities of the A+M/PMI data centre network is very high. The collaboration within the data centre network on joint establishment of new A+M/PMI databases, including collaboration in data generation, has been significantly intensified in recent years.

During the fifth meeting session, the Subcommittee discussed some business matters. There has been significant changes in the Subcommittee membership in the last several years and other are expected in the near future. In the period between the two meetings, Drs. R. Guirlet and W.P. West became new Subcommittee members, filling the vacant positions of Drs. M. Mattioli and D. Post, respectively. Due to retirement from NIFS, Dr. Tawara will no longer be member of the Subcommittee. He will be replaced by Dr. T. Kato, Director of the NIFS Data and Planning Centre, who has already been nominated for that position by the corresponding Japanese authorities.

The present Subcommittee Chairman, Dr. R. McKnight, has announced that he would no more be able to serve on the Subcommittee due to other assignments given to him by his organization. A likely replacement for Dr. McKnight is Dr. Mike Crisp from the DOE Office of Fusion Energy Sciences.

The filling of the position of Subcommittee Chairman was discussed. After some deliberations Dr. N.J. Peacock was elected to this position by consensus. It was felt that the present head of the A+M Data Unit would bring unique expertise to the Subcommittee work based on his IAEA Data Unit experience. It has been, therefore, recommended that Dr. R.K. Janev become a member-at-large of the Subcommittee.

Reflecting all these changes, the Subcommittee composition for the period after the present Subcommittee meeting is shown in Attachment C to Section 5 of the present report.

3. MEETING CONCLUSIONS AND RECOMMENDATIONS

The review of the A+M Data Unit activities in the reporting period, and the discussions during the meeting on the items of the meeting agenda, have lead to the following conclusions and recommendations:

- 1) The IAEA A+M Data Unit activity continues to be strong, professional and effective in carrying out the A+M/PMI data related Agency programmes for fusion. As stressed

many times in the past, the role of this Agency activity in the overall international fusion programme is unique, highly beneficial and cost-effective, and its integrative and co-ordinating aspects irreplaceable. It is strongly recommended that the Agency continues to provide active and strong support to this unique activity in the future.

- 2) The co-ordinated research programmes (CRPs) are one of the major forms for integration, co-ordination and focusing the world efforts and expertise in the areas of A+M/PMI data generation, data collection and their critical assessment, a mechanisms for involvement of less developed countries in major international scientific projects, and for transfer of knowledge and research methods to those countries. The CRPs are, at the same time, the most important mechanism for establishment of new recommended numerical A+M/PMI databases for fusion (and other science and technology applications), which is one of the principal missions of the Agency and its A+M Data Unit.

The Subcommittee strongly recommends a continuing support of the Agency to this form of activity in the area of A+M/PMI data for fusion. Only in this way the Agency can provide a timely response to the evolving (and, sometimes, rapidly changing) needs for A+M/PMI data in the fusion energy research.

- 3) The establishment of the Website "ALADDIN" for direct on-line access to the numerical databases in AMDIS is an important step forward in the data dissemination and providing service to the fusion and other research communities. The A+M Data Unit should continue to further develop this type of service to the scientific community by both enlarging the data files in ALADDIN and enhancing the technical features of this Website.

Establishment of a similar Website for the bibliographic databases in AMDIS (AMBDAS) is strongly encouraged.

- 4) The APID series is an important source of both quantitative and more fundamental (but still practical) information on A+M/PMI processes in fusion plasmas and devices, as has been widely recognized by the fusion community. The Subcommittee strongly recommend continued Agency support to this activity. Likewise, the International Bulletin on A+M Data for Fusion is an important source of bibliographic information delivered to the fusion and other research communities in a timely fashion. Continued Agency support to this activity has to be ensured.

The periodic publication of the Bulletin information in a more compact form (CIAMDA) proved to be a useful form of bibliographic data dissemination and should be continued. Publication of CIAMDA volume on the bibliography for particle-surface interaction data is strongly recommended for 2001.

- 5) The Subcommittee endorses the A+M Data Unit programme of activities for the period 2001-2002, with the amendments specified in the Executive Summary of the Meeting (see the next section of this report). This Executive Summary contains the recommendations of the Subcommittee related to other matters.

4. EXECUTIVE SUMMARY OF THE MEETING

(to be submitted to IAEA Director General and to the IFRC Chairman)

The IFRC Subcommittee on Atomic and Molecular Data for Fusion met at IAEA Headquarters in Vienna on May 3-4, 1999. In attendance were R. McKnight, E. Menapace, N.J. Peacock, J. Roth, T. Shirai, new members R. Guirlet and W.P. West and from the Agency R. Janev and J. Stephens. New member Y. Martynenko and outgoing member H. Tawara were unable to attend the meeting because of a lack of travel funds.

Doug Muir, Head of IAEA Nuclear Data Section, welcomed the Subcommittee and provided useful information on the ongoing Agency Program Assessment Activities and possible resulting consequences.

When asked about the status of a replacement for R. Janev, Dr. Muir stated that the process has not been completed, but a replacement is anticipated to be announced by July. It was also reported that the Agency is considering shifting the biannual budget cycle by one year, a situation which would cause the Subcommittee to meet next year (2000) so as to be in phase with budget planning.

This 1999 meeting of the Subcommittee demonstrates significant changes that are occurring in membership, and the makeup of the Subcommittee will see at least four new members and a new Chairman. The retirement of R. Janev and any changes which may result from reviews will contribute to producing a new environment for the Subcommittee in coming years.

Despite these changes, the Subcommittee retains its international representation and the high level of expertise of its members. It is appropriate the Subcommittee reflect the international nature of IAEA activities, since it is the open access to data activities that make the IAEA unique.

The activity carried out over the last year as reported to Subcommittee has been excellent as highlighted by the following examples:

- Publication of 2 APID volumes and CIAMDA 98.
- Establishment of Web Site for numerical database in AMDIS.
- Continued successful coordination of International Data Centre Network.
- Progress on Extraordinary program.
- Continuing support for Data Unit staff travel outside Agency for professional meetings.
- Distribution of the progress report at least one month in advance of meeting.

Jeff Stephens reported on the continuing development of a Web Site for the Data Unit. The Subcommittee notes that approval allowing external access to the web site is welcome, but the approval process was far too long. The numerical database is now available and the work

of preparing bibliographic data for web access will be carried out during the next year. The Subcommittee looks forward to the next report of Web Site activity.

The Subcommittee also makes the following recommendations and urges the Agency to consider our specific concerns.

- The CRP's have provided the Data Unit with important guidance and direct technical input. The success of the Data Unit in responding to the communities need for varied data, as expressed by the Subcommittee, is directly tied to the activities of the CRP's.
- Some Subcommittee members have been unable to participate because of lack of travel funds. We recommend that adequate funds be made available to address such exceptional cases.
- Consistent with Agency policy consideration should be given to distribution of data in electronic format.
- The Data Unit should produce and distribute to the Subcommittee a summary report of progress for the year between biannual meetings.
- The Subcommittee underlines the usefulness of the APID series and recommends stable Agency support for this series.
- The Subcommittee welcomes the initiative of INIS to increase the visibility of Agency databases and other resources including AMDIS.

Subcommittee Business

The Subcommittee by consensus recommended that N.J. Peacock be Chairman of the Subcommittee for the ensuing two year cycle. The outgoing Chairman will write, on behalf of the Subcommittee, a letter to inform appropriate management of the Subcommittee recommendation urging continued support of Dr. Peacock in this activity.

It is the recommendation of the Subcommittee that Ratko Janev become a member-at-large of the Subcommittee. This will bring to the Subcommittee one with a record of distinguished service in the data area and a unique perspective based on his IAEA Data Unit experience.

The Subcommittee discussed the program plan for the year 2000 in comments regarding year 2000 and proposed efforts for the two years 2001-2002 are in Appendix I which summarises approved and proposed activities. The Subcommittee strongly supports the proposed activity for the years 2001-2002.

The results of a poll of the existing APID-series editorial board were presented by the Chairman. Six members of the original board will serve for another 5 year term. To assure necessary breadth on the board the participation of several additional experts will be solicited by the outgoing Chairman and results communicated to the Subcommittee.

The schedule for the next Subcommittee meeting is dependent on Agency budgeting policies. If the two year cycle is shifted, then there should be a meeting in May of next year. If not, then a two year interval as given in the Terms of Reference is appropriate.

Respectfully submitted on behalf of the Subcommittee,

Ronald H. McKnight
Chairman

5. ATTACHMENTS

Attachment A

A+M DATA UNIT PROGRAMME PLAN FOR 1999-2000

Tasks Planned for 1999 -2000	Related Action	Completion
<u>Project G.1.01 : Data Centre Activities</u>		
T.1. Operate computers, maintain hardware (i.e. IBM RISC 6000: RS E-30, PCS) and provide on-line services (joint task with the rest of NDS)	CS '99, 2000	Continuing
T.5. Maintain A+M databases (atomic, molecular, plasma-material interaction data) in AMDIS	CS '99, 2000	Continuing
T.10. Hold 11 th Meeting of IFRC Subcommittee on A+M data for fusion (biennial review of A+M data programme)	TCM 2000	2000-2001
<u>Project G.1.02 : Data Network Co-ordination</u>		
T.3. Hold co-ordination meeting of A+M Data Centre Network (biennial)	AGM '99	Continuing
T.6. Maintain A+M manuals and documentation (ALADDIN and AMDIS)		Continuing
T.7. Co-ordinate A+M Data Centre Network (joint data management software and evaluation programmes)		Continuing
T.9. Maintain CIAMDA database (computer index of A+M bibliographic data)		Continuing
T.10. Publish the International Bulletin on Atomic and Molecular Data for Fusion (two volumes per year)		Continuing (semiannually)
<u>Project G.1.04 : Establishment of A+M/PMI databases</u>		
T.1. Co-ordinate a CRP on atomic and plasma-wall interaction data for fusion reactor divertor modeling (1995-2000). Publish a report in 2001	RCM 99 CS 2000	2000 2001
T.2. Co-ordinate a CRP on charge exchange data for fusion plasma studies (1997-2000)	2nd RCM 2000	2001
T.3. §Co-ordinate a CRP on plasma-material interaction data for mixed plasma facing materials (1997-2000) [to be extended]	2nd RCM 2000	2004
T.4. §Review status and requirement for tritium retention in fusion reactor materials. [Critical assessment of tritium retention data]	AGM 99 [TCM 2000]	2000 [2002]
T.5. Review and upgrading of the electron-impact collision data for selected plasma impurities	CS 99	2000
T.6. Prepare and publish Nuclear Fusion A+M Supplement	Vol. 10, 1999 Vol. 11, 2000	Continuing
T.7. Collect and assess atomic and particle-surface interaction data	CS 99, 2000	Continuing
T.8. §Co-ordinate a CRP on A+M data for fusion plasma diagnostics (2000-2003) [including fusion alpha particle diagnostics]. [Initiate the CRP in 2000]	[2000 TCM]	2003 [2004]
T.9. *Co-ordinate the establishment and maintain Intern. irradiated graphite database	CM 99, 2000 [RCM ~ CM]	Continuing
<u>Project G.1.05 : Data User Support and Promotion</u>		
T.2. A+M on-line system development and enhancement of WWW service capabilities	CS 99, 2000	Continuing
T.11. Participation in the work and organization of ICPEAC and ICAMDATA Conferences	ICPEAC '99 ICAMDATA '00	Continuing

* Extrabudgetary programme (in negotiation stage)

§ Extension beyond year 2000 recommended by IFRC A+M Subcommittee

[] denotes recommended changes

**Proposed A+M/PMI Data Programme for the IAEA A+M/PMI
Data Activities for the 2001-2002 Period**

Tasks Planned for 2001-2002	Related Action	Completion
Project G.1.01: Data Centre Activities* Project G.1.02: Data Network Co-ordination* Project G.1.05: Data User Support* * All tasks from the 1999-2000 programme remain (mutatis mutandis)		
<u>Project G.1.04: Establishment of A+M/PMI Databases</u>		
T.1. CRP on charge exchange data for fusion plasma studies. Final report editing and publication	CM 2001	2002
T.2. CRP on plasma-material interaction data for mixed materials	RCM 2002	2004
T.3. Co-ordinate CRP on A+M data for fusion plasma diagnostics	1st RCM 2001	2004
T.4. *Initiate CRP on collisional data for molecular impurities in plasma edge (including interactions with surfaces)	CM 2001 1st RCM 2002	2005
T.5. *A+M/PMI data for fusion reactor technology (and publish proceedings)	TCM 2001	2002
T.6. *Review and upgrading of the database for tritium retention and release in fusion reactor materials (including dust particles)	AGM 2001	2002
T.7. Prepare and publish APID volumes	vol. X 2001 vol. Y 2002	Continuing
T.8. Collection and assessment of A+M/PMI data	CS 2001 CS 2002	Continuing
T.9. Review and upgrading databases for selected A+M/PMI processes	CM 2001 CM 2002	
T.10. *AGM on A+M/PMI data for modeling and diagnostics of localised high-energy density plasma phenomena	AGM 2001	
T.11. #Establishment of int. irradiated nuclear graphites database	CM 2001 CM 2002	
T.12. *Prepare and publish CIAMDA on PSI data	Publ. 2001	

*: New; #: extrabudgetary programme

Appendix to the Attachments A & B

Comments and Addenda to Program Plans

IA. (2000)

No comments

IB. (2001 and 2002)

- T3. Consideration should be given to charge exchange for multiply charged higher Z impurities in this CRP.
- T4. The dust particle considerations more appropriately belong in T6. Also, the CRP should also consider particle - surface interactions.
- T5. The Subcommittee recognizes that this activity will require considerable planning, a long lead time and the Agency should begin to explore options for this meeting including meeting timing and location.
- T6. The Subcommittee emphasises the continuing importance of this topic and recommends regular meetings with the goal of producing a database.
- T10. The AGM should assess the need for A+M/PMI data for modeling and experimental applications and recommend any needs for further activities.
- T12. Publication of CIAMDA volume for particle-surface interaction data (2001). The publication of this volume should be consistent with Agency policy covering electronic format.

Present Composition of the IFRC A+M Subcommittee

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**IAEA Technical Committee Meeting:
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Atomic and Molecular Data for Fusion**

3-4 May 19998, IAEA Headquarters, Vienna, Austria

Meeting Agenda

Monday, May 3

Meeting Room: B-05-45

09:30 - 10:00 - Opening
- Adoption of Agenda

Session 1: Review of IAEA A+M/PMI Data Activities

10:00 - 10:30 Report on the activities of A+M Data Unit

10:30 - 11:00 Discussion of the Report

11:00 - 11:30 *Coffee break*

11:30 - 12:30 Programme implementation assessment

12:30 - 14:00 *Lunch*

Session 2: Review of Activity Plans for 1990-2000 and 2001-2002 Programme Periods

14:00 - 15:30 Formulation of programme recommendations

15:30 - 16:00 *Coffee break*

Session 3: A+M Data Unit's Publication Policy

16:00 - 17:30 - APID series (and its Editorial Board)
- CIAMDA series: necessity for continuation
- The bibliographic data bulletin

Tuesday, May 4

Meeting Room: B-05-45

Session 4: Data Centre Network Activities

09:00 - 10:30 Activity status assessment and recommendations

10:30 - 11:00 *Coffee break*

Session 5: Business Matters

11:00 - 12:30 - Subcommittee membership: changes
- Election of new Subcommittee Chairman

12:30 - 14:00 *Lunch*

Session 6: Meeting Conclusions and Recommendations

14:00 - 16:00 - Summary of meeting conclusions and recommendations
- Executive Summary of the Meeting

16:00 - *Adjournment of the Meeting*

**Report on Activities of IAEA A+M/PMI Data Unit
(Period: May 1998 - May 1999)**

R.K. Janev

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1. Introductory Remarks
2. Status of Co-ordinated Research Projects
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5. Bibliographic A+M Data Bulletin and CIAMDA
6. APID Series
7. Experts' Meetings and Consultants
8. Other Data Related Activities
9. Programme Plans: 1999-2000 and 2001-2002 Cycles
10. Organizational Matters

Attachments: Programme Plans, Data Services Usage Report

1. Introductory Remarks

The activity of the Atomic and Molecular (A+M) Data Unit in the reporting period May 1998 - May 1999 was carried out according to the established regular IAEA programme and following the recommendations of the IFRC Subcommittee on A+M Data for Fusion (IFRC A+M Subcommittee) given at its last meeting (May 27-28, 1998). The programme was implemented within the planned size and time-frame. Among the highlights of the A+M Data Unit's activity during the reporting period one can mention:

- establishment of the ALADDIN website for the numerical A+M databases contained in A+M Data Information System (AMDIS);
- publication of two volumes of APID series;
- substantial up-grading (nearly completion) of the Li-beam database for edge plasma diagnostics;
- consolidation of the extrabudgetary project on irradiated nuclear graphite properties.

2. Status of Co-ordinated Research Projects (CRPs)

There are presently three active CRPs conducted by the A+M Data Unit:

- 1) "Atomic and Plasma-Wall Interaction Data for Fusion Reactor Divertor Modeling" (August 1995 - August 2000; 12 participants)

The 3rd (and final) Research Co-ordination Meeting (RCM) for this CRP was held on March 8-9, 1999. The RCM participants decided to publish the results obtained within this CRP in a separate volume of the APID series in 2000 or 2001. A consultancy in connection with the editing of this volume is scheduled for the year 2000. The RCM participants suggested establishment of an IAEA CRP on particle-surface interaction processes for the period beyond year 2000.

- 2) "Charge Exchange Cross Section Data for Fusion Plasma Studies" (December 1997 - December 2000; 14 participants)

The first RCM of this CRP was held on September 24-25, 1998, and its results are contained in the published Summary Report for the meeting (INDC(NDS)-398). The RCM participants have defined realistic objectives for the CRP which should result in generation of complete CX databases for certain diagnostic impurities and in a substantial increase of the CX data information for all relevant plasma impurities.

- 3) "Plasma-Material Interaction Data for Mixed Plasma Facing Materials in Fusion Reactors" (December 1997 - December 2000; 11 participants)

The first RCM of this CRP was held in October 19-20, 1998, and its results are summarized in the Summary Report from the meeting, published as an IAEA internal publication (INDC(NDS)-390). The RCM participants have performed a detailed analysis of the available data on erosion and hydrogen retention/release properties for selected mixed materials involving Be, C and W, and agreed on a co-ordinated and well focused approach in their work within the CRP to produce a significant amount of new

data for the selected materials by the end of the CRP. The CRP participants believe that this would have considerable practical effects on the design of next generation fusion devices.

3. Co-ordination of A+M Data Centre Network Activities

During the reporting period no meeting of the A+M Data Centre Network (DCN) was held (because of the biennial schedule of DCN meetings). The next A+M DCN meeting is scheduled for September 1999. A good level of co-ordination of the work of several DCN members was exercised through visits of the A+M Data Unit staff to a number of data centres. Working visits were made to the Kurchatov (A+M/PMI) (Moscow) and Efremov (PMI) (St. Petersburg) data centres in October 1998, to the NIST and ORNL data centres in September 1998, and to the GAPHYOR data centre (July 1998 and February, 1999). These visits were used not only to discuss technical details related to the data formatting, storage and exchange (including compatibility of computer software), but also to ensure timely inputs and contributions from these data centres to the Agency A+M data programmes, as well as joint work on certain data generation projects. These direct interactions between the IAEA A+M Data Unit and the national A+M data centres has demonstrated a high effectiveness in the programme co-ordination within the Data Centre Network.

4. AMDIS and ALADDIN Developments

The process of ALADDIN formatting of two large, recently produced databases ("Chemical Erosion Rates" and "Elastic and Momentum Transfer Cross Sections Involving Hydrogen Isotopomers") is now under way.

A substantially up-graded (and virtually complete) database for all electron- and ion-impact processes of neutral Li-atoms interacting with a fusion edge plasma has been established in a collaboration of the IAEA A+M Data Unit with the Technical University of Vienna and the Institute for Plasma Physics, Garching. The old version of the Li-beam database has already been ALADDIN formatted, and the work on ALADDIN formatting the up-graded parts of this database is planned for the second quarter of 1999. Work on the database for physical sputtering and RES (radiative enhanced sublimation) for Be, C and W materials under impact of plasma ions is in progress. The finalization of this work (which should produce the Volume 7, part B of the APID-series) is expected within 3-4 months.

A major achievement of the A+M Data Unit work during the reporting period is the establishment of an autonomous website for all the numerical databases contained in AMDIS. This website is designed as "ALADDIN". The design and implementation of ALADDIN Website was done by Dr. Yu. Ralchenko (Weizmann Institute of Science) during its five week visit to the A+M Data Unit (November-December, 1998), in collaboration with the A+M Data Unit staff. The ALADDIN website allows direct online, interactive use of the data from the database, with multiple search criteria and is equipped with a wide spectrum of most modern and powerful software for direct (online) data generation from the evaluation (fit) functions, for graphical and tabular representation of the (search) results, etc. An effort is presently under way to place this database outside the Agency firewall. The WWW ALADDIN database can currently be

accessed by a selected number of DCN members, and its official release will be made after the Agency approval is obtained.

Currently, the AMDIS databases (both numerical and bibliographic) can be accessed via the A+M Data Unit's homepage on Internet by using a telnet session. This option, however, is not equipped with appropriate graphics software.

5. Bibliographic A+M Data Bulletin and CIAMDA

The issues 54 and 55 of the bibliographic International Bulletin on A+M Data for Fusion appeared in one volume in December 1998. There is a tendency, observed in recent years, that the main suppliers of input data for the Bulletin (the ORNL and NIST data centres) tend to delay the preparation and the transfer of the data. That was the cause that both in 1996 and in 1998 the planned two semiannual issues of the Bulletin have appeared in one volume.

The work on the preparation of CIAMDA-III has been completed and the publication appeared in December 1998 as CIAMDA '98. CIAMDA '98 contains the bibliographic content of AMDIS (called AMBDAS) for the period 1987-1998 related only to the A+M collisional and spectroscopic data (in accordance with the content of the previous two volumes of CIAMDA). There are 6,852 references cited of which 5,300 are indexed on 58,000 indexation lines. CIAMDA '98 has about 630 pages.

The new CIAMDA production system (designed by Dr. J. Botero in 1997), based on direct computer retrieval of relevant entries from AMBDAS, made possible the CIAMDA volumes to be produced with a relatively modest effort. The A+M Data Unit is now planning, subject to endorsement by the IFRC A+M Subcommittee, publication in 2001 a CIAMDA volume which should include all particle-surface (and plasma-wall) interaction data contained in AMBDAS.

6. APID Series

Two volumes of the series "Atomic and Plasma-Material Interaction Data for Fusion" (APID series) were published in 1998:

- 1) Vol. 7: "Particle induced erosion of Be, C and W in Fusion Plasmas"
Part A: "Chemical erosion of carbon-based materials"
Authors: A.A. Haasz, J.A. Stephens, E. Vietzke, W. Eckstein, J.W. Davis and Y. Hirooka
- 2) Vol. 8: "Elastic and related transport cross sections for collisions among isotopomers of $H^+ + H$, $H^+ + H_2$, $H^+ + He$, $H + H$ and $H + H_2$ ".
Authors: P.S. Krstic and D.R. Schultz

The preparation of the following APID volumes is now in progress:

- 1) Vol. 7., Part B: "Physical sputtering and RES" (tentative title).

- 2) Vol. 9: "Radiative power loss of fusion plasma impurities"
Contributors: H.P. Summers, R.E.H. Clark and their associates.
- 3) Vol. 10: "Thermo-mechanical properties of plasma facing fusion reactor materials"
Guest editors: V. Barabash, I. Mazul, H. Stamm, T. Burchell.

7. Experts' Meetings and Consultants

A) Meetings: May 1998 - May 1999

- 1) 1st RCM on "Charge exchange cross section data for fusion plasma studies"
(September 24-25, 1998; 10 participants)
- 2) 1st RCM on "Plasma-material interaction data for mixed plasma facing materials in fusion reactors"
(October 19-20, 1998; 10 participants, 2 observers)
- 3) 3rd RCM on "Atomic and plasma-wall interaction data for fusion reactor divertor modeling"
(March 8-9, 1999; 8 participants)
- 4) CM on "Technical aspects of international database on irradiated nuclear graphite properties"
(February 24-25, 1999; 8 participants)
- 5) TCM: 11th IFRC A+M Subcommittee meeting
(May 3-4, 1999; 8 participants/expected)

B) Consultants

- 1) Dr. W. Eckstein (IPP, Garching, Germany)
Period: October 19-23, 1998
Purpose: Assist the A+M Data Unit in the preparation of APID vol. 7, Part B.
- 2) Dr. Yu. Ralchenko (Weizmann Institute of Science, Rehovot, Israel)
Periods: November 16-19, 1998; December 7-18, 1998
Purpose: Assist the A+M Data Unit in the design of ALADDIN Website.
- 3) Dr. E.A. Solov'ev (Institute for Energy Research, Skopje, Macedonia)
Period: December 9-18, 1998
Purpose: perform critical assessment of state-selective electron capture data and generate such data for certain plasma impurities.

8. Other Related Activities

8.1. Work on numerical databases

- 1) Dr. F.J. de Heer (FOM-Institute for Atomic and Molecular Physics, Amsterdam) has been volunteering during the last several years to prepare a critical assessment of all available cross section data for electron-impact excitation of all singlet and

triplet states of helium atoms with principal quantum number $n \leq 4$. This work has been completed in October 1998 and its results have been published by the Agency as an INDC(NDS)-385 report.

- 2) With the Plasma-Chemistry group of the University of Bari (Profs. M. Capitelli and R. Celiberto) and Prof. J. Wadehra of the Wayne State University (Detroit), the A+M Data Unit started the establishment of a comprehensive database for all the electron-impact processes involving vibrationally excited hydrogen molecules and their isotopes. The completion of this work is expected in 2-3 months, with inclusion of the data in the ALADDIN (AMDIS) database.

8.2. Extrabudgetary programme

The administrative and technical work on the establishment of "International Database on Irradiated Nuclear Graphite Properties" has continued. At the February 24-25, 1999, Consultants' Meeting, the legal document establishing this Database (as an "organization") has been adopted, and the Database has already four registered members (UK, USA, Japan and Germany). The increase of its membership is expected in near future (with Russia, China, and some other countries). Extrabudgetary funds for the operation of this Database have already been obtained from a Japanese nuclear graphite manufacturing company (Toyo Tanso Co. Ltd.) and offers from other sponsors are expected in the near future.

The A+M Data Unit has already prepared the necessary computer infrastructure for the accommodation and operation of this database (starting officially in June).

8.3. Interaction with the scientific community

The Head of the A+M Data Unit has been invited to deliver invited talks on the physics and data aspects of atomic and molecular processes in fusion and other plasmas at the following conferences:

- a) International Workshop on Collisional and Radiative Spectroscopy in Laboratory and Space Research (Moscow, October 12-14, 1998);
- b) 4th International Conferences on Dissociative Recombination (Stockholm-Nässlingen, June 16-20, 1999).

He was also invited to serve on the advisory boards of the following conferences/symposia:

- a) 5th Greifswalder Gespräch: "Databases for Modeling and Simulation of Plasmas" (Greifswald, Germany; May 10-12, 1999);
- b) International Seminar on Atomic Processes in Plasmas (Toki/Nagoya, Japan; July 29-30, 1999).

9. Programme Plans: 1999-2000 and 2001-2002 Cycles

The programme plans of the A+M Data Unit activity for the 1999-2000 and 2001-2002 programme and budget cycles are given in the Attachments A and B, respectively, as

determined at the last IFRC A+M Subcommittee meeting. In the reconsideration of the A+M Data Unit activity for the period 2001-2002, the Subcommittee may wish to consider the following suggestions:

- 1) Initiation of an activity (e.g. CRP) on "Low-energy particle-surface interaction processes" as suggested by the participants of the 3rd RCM on "Atomic and plasma-wall interaction data for fusion reactor divertor modeling". The RCM participants felt that the basic knowledge on these processes on a quantum level is still highly incomplete, and the quantitative information for these processes is even less available.
- 2) Publication of a CIAMDA volume for the bibliographic data on particle-surface/plasma-wall interaction processes, comprising the entire information contained in AMBDAS.

10. Organizational Matters

- 1) The contract with the Agency of the present Head of A+M Data Unit expires on June 31, 1999. The selection process for the successor on this position has been completed in February 1999. It is expected that the new Head of the A+M Data Unit will assume his/her duties on July 1, 1999.
- 2)
 - Dr. Yu. Martynenko has been nominated by the Ministry for Atomic Energy of Russian Federation (via the Kurchatov Institute, Moscow) to serve as Russian representative in the IFRC A+M Subcommittee (the position previously occupied by the late Dr. V.V. Abramov).
 - The CEA, France, has nominated (via the Department for Fusion Research in Cadarache) Dr. R. Guirlet to serve as French representative in the IFRC A+M Subcommittee (to replace Dr. M. Mattioli on this position after his retirement).
 - The US DOE has nominated Dr. Ph. West (General Atomic, San Diego) as new US member in the IFRC A+M Subcommittee, as replacement for Dr. D.E. Post (who has left the fusion research field).
- 3) There is some experience that some of the Subcommittee members have financial difficulties for attending the Subcommittee meetings. It can be anticipated that this problem will grow in future. The Subcommittee, therefore, may wish to recommend to the IAEA that some travel funds be associated in the budget with its meetings.

5. ATTACHMENTS

Attachment A

A+M DATA UNIT PROGRAMME PLAN FOR 1999-2000

Tasks Planned for 1999 -2000	Related Action	Completion
<u>Project G.1.01 : Data Centre Activities</u>		
T.1. Operate computers, maintain hardware (i.e. IBM RISC 6000: RS E-30, PCS) and provide on-line services (joint task with the rest of NDS)	CS '99, 2000	Continuing
T.5. Maintain A+M databases (atomic, molecular, plasma-material interaction data) in AMDIS	CS '99, 2000	Continuing
T.10. Hold 11 th Meeting of IFRC Subcommittee on A+M data for fusion (biennial review of A+M data programme)	TCM 2000	2000-2001
<u>Project G.1.02 : Data Network Co-ordination</u>		
T.3. Hold co-ordination meeting of A+M Data Centre Network (biennial)	AGM '99	Continuing
T.6. Maintain A+M manuals and documentation (ALADDIN and AMDIS)		Continuing
T.7. Co-ordinate A+M Data Centre Network (joint data management software and evaluation programmes)		Continuing
T.9. Maintain CIAMDA database (computer index of A+M bibliographic data)		Continuing
T.10. Publish the International Bulletin on Atomic and Molecular Data for Fusion (two volumes per year)		Continuing (semiannually)
<u>Project G.1.04 : Establishment of A+M/PMI databases</u>		
T.1. Co-ordinate a CRP on atomic and plasma-wall interaction data for fusion reactor divertor modeling (1995-2000). Publish a report in 2001	RCM 99 CS 2000	2000 2001
T.2. Co-ordinate a CRP on charge exchange data for fusion plasma studies (1997-2000)	2nd RCM 2000	2001
T.3. §Co-ordinate a CRP on plasma-material interaction data for mixed plasma facing materials (1997-2000) [to be extended]	2nd RCM 2000	2004
T.4. §Review status and requirement for tritium retention in fusion reactor materials. [Critical assessment of tritium retention data]	AGM 99 [TCM 2000]	2000 [2002]
T.5. Review and upgrading of the electron-impact collision data for selected plasma impurities	CS 99	2000
T.6. Prepare and publish Nuclear Fusion A+M Supplement	Vol. 10, 1999 Vol. 11, 2000	Continuing
T.7. Collect and assess atomic and particle-surface interaction data	CS 99, 2000	Continuing
T.8. §Co-ordinate a CRP on A+M data for fusion plasma diagnostics (2000-2003) [including fusion alpha particle diagnostics]. [Initiate the CRP in 2000]	[2000 TCM]	2003 [2004]
T.9. *Co-ordinate the establishment and maintain Intern. irradiated graphite database	CM 99, 2000 [RCM + CM]	Continuing
<u>Project G.1.05 : Data User Support and Promotion</u>		
T.2. A+M on-line system development and enhancement of WWW service capabilities	CS 99, 2000	Continuing
T.11. Participation in the work and organization of ICPEAC and ICAMDATA Conferences	ICPEAC '99 ICAMDATA '00	Continuing

* Extrabudgetary programme (in negotiation stage)

§ Extension beyond year 2000 recommended by IFRC A+M Subcommittee

[] denotes recommended changes

**Proposed A+M/PMI Data Programme for the IAEA A+M/PMI
Data Activities for the 2001-2002 Period**

Tasks Planned for 2001-2002	Related Action	Completion
Project G.1.01: Data Centre Activities* Project G.1.02: Data Network Co-ordination* Project G.1.05: Data User Support* * All tasks from the 1999-2000 programme remain (mutatis mutandis)		
<u>Project G.1.04: Establishment of A+M/PMI Databases</u>		
T.1. CRP on charge exchange data for fusion plasma studies. Final report editing and publication	CM 2001	2002
T.2. CRP on plasma-material interaction data for mixed materials	RCM 2002	2004
T.3. Co-ordinate CRP on A+M data for fusion plasma diagnostics	1st RCM 2001	2004
T.4. *Initiate CRP on collisional data for molecular impurities in plasma edge (including interactions with surfaces)	CM 2001 1st RCM 2002	2005
T.5. *A+M/PMI data for fusion reactor technology (and publish proceedings)	TCM 2001	2002
T.6. *Review and upgrading of the database for tritium retention and release in fusion reactor materials (including dust particles)	AGM 2001	2002
T.7. Prepare and publish APID volumes	vol. X 2001 vol. Y 2002	Continuing
T.8. Collection and assessment of A+M/PMI data	CS 2001 CS 2002	Continuing
T.9. Review and upgrading databases for selected A+M/PMI processes	CM 2001 CM 2002	
T.10. *AGM on A+M/PMI data for modeling and diagnostics of localised high-energy density plasma phenomena	AGM 2001	
T.11. #Establishment of int. irradiated nuclear graphites database	CM 2001 CM 2002	
T.12. *Prepare and publish CIAMDA on PSI data	Publ. 2001	

*: New; #: extrabudgetary programme

Data Services Usage Report

Restricted Release of Aladdin Numerical Database Website,
A+M Data Unit and AMDIS Informational Website, and
Telnet Online Retrievals

Atomic and Molecular Data Unit
IAEA Nuclear Data Section

Prepared By:

RIPC_A1

IAEA

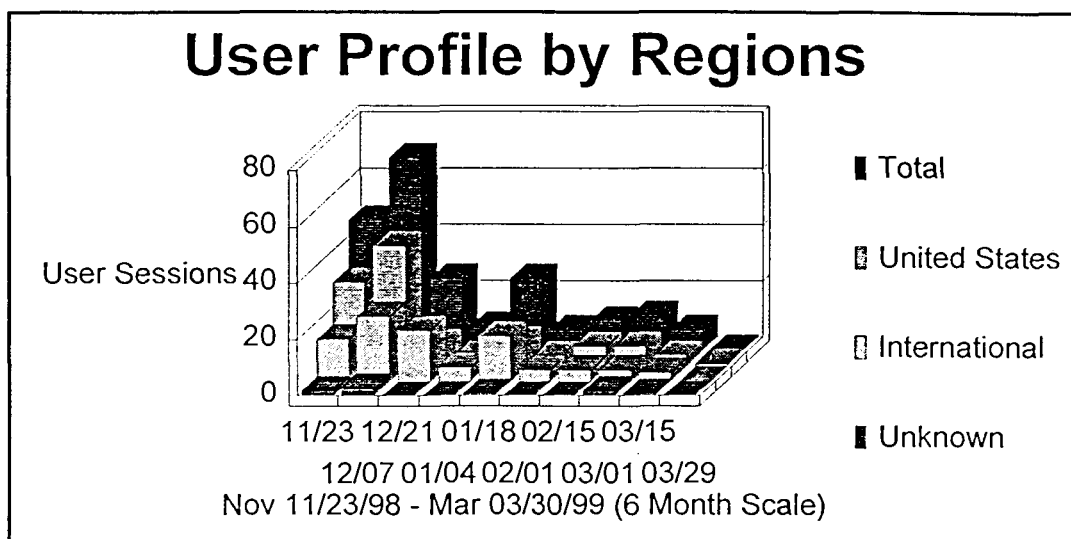
on 03/31/99, 16:11:24

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Most Active Countries	
Technical Statistics and Analysis	
Atomic and Molecular Data Unit Informational Website	
AMDIS Telnet Service	

General Statistics

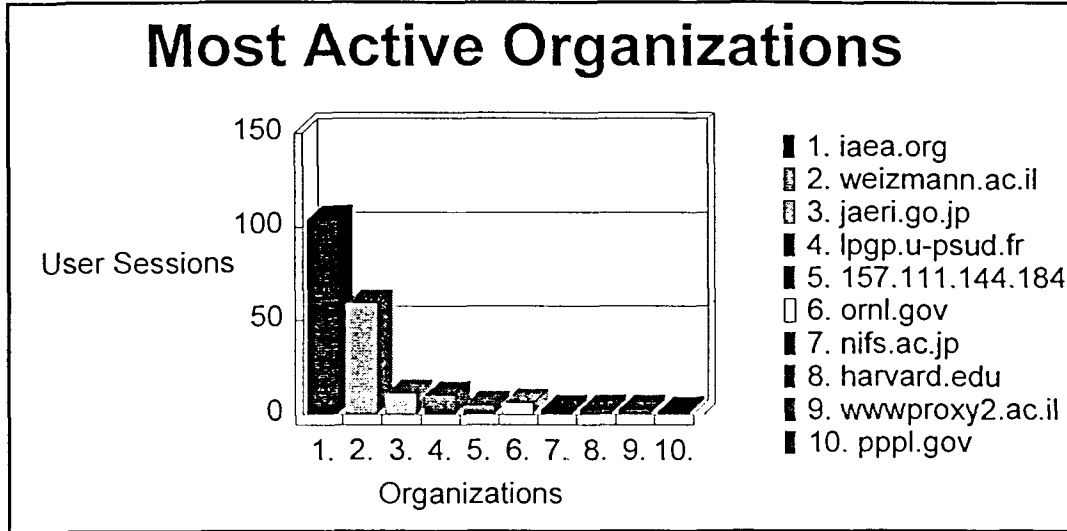
The User Profile by Regions graph identifies the general location of the visitors to <http://ripccr01.iaea.or.at/aladdin.html>, where dynamic webserving of Aladdin numerical data is available. This is presently restricted (for testing) to members of the Data Centre Network and selected laboratories. The General Statistics table includes statistics on the total activity for this server during the designated time frame.



General Statistics	
Date & Time This Report was Generated	Wednesday March 31, 1999 - 10:26:30
Timeframe	11/23/98 10:21:24 - 03/30/99 18:02:13
Number of Hits for Home Page	245
Number of Successful Hits for Entire Site	7816
Number of Page Views (Impressions)	1231
Number of User Sessions	218
User Sessions from United States	53.66%
International User Sessions	42.2%
User Sessions of Unknown Origin	4.12%
Average Number of Hits per Day	61
Average Number of Page Views Per Day	9
Average Number of User Sessions per Day	1
Average User Session Length	00:33:43

Most Active Organizations

This section identifies the organizations that accessed your Web site the most often.

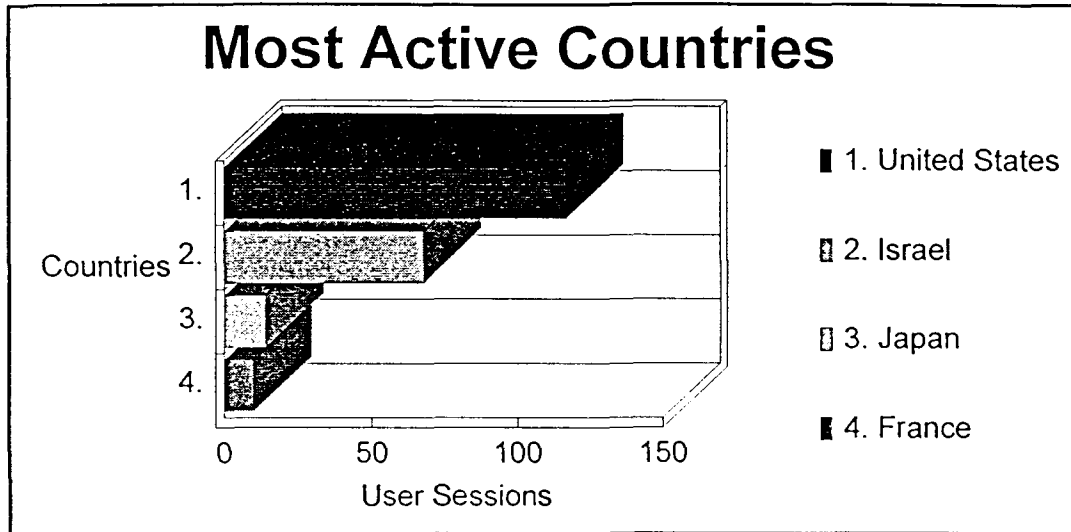


Most Active Organizations				
	Organizations	Hits	% of Total Hits	User Sessions
1	iaea.org	5662	72.44%	104
2	weizmann.ac.il	1153	14.75%	59
3	Japan Atomic Energy Research Institute Shirane Shi jaeri.go.jp	303	3.87%	11
4	lpgp.u-psud.fr	187	2.39%	10
5	157.111.144.184	140	1.79%	5
6	Oak Ridge National Laboratory ornl.gov	120	1.53%	6
7	National Institute For Fusion Science nifs.ac.jp	76	0.97%	3
8	Harvard University - Network Services Division Off harvard.edu	58	0.74%	3
9	wwwproxy2.ac.il	27	0.34%	3
10	Profit Programming - Incprinceton Plasma Physics L pppl.gov	24	0.3%	2
	Subtotal For Organizations Above	7750	99.15%	206

Most Active Organizations				
	Organizations	Hits	% of Total Hits	User Sessions
	Total For the Log File	7816	100%	218

Most Active Countries

This section identifies the top locations of the users of your site by country. The country of the user is determined by the suffix of their domain name.



Most Active Countries		
	Countries	User Sessions
1	United States	117
2	Israel	68
3	Japan	14
4	France	10
	Total	209

Technical Statistics and Analysis

This table shows the total number of hits for the site, how many were successful, how many failed, and calculates the percentage of hits that failed.

Technical Statistics and Analysis	
Total Hits	8065
Successful Hits	7816
Failed Hits	249
Failed Hits as Percent	3.08%
Cached Hits	903
Cached Hits as Percent	11.19%

A+M Data Unit and AMDIS Informational Website

The A+M Data Unit presently maintains its informational website <http://www.iaea.org/programmes/amdis> on an IAEA Unix server which is separate from the Data Unit's Aladdin numerical data website. In the period 01-01-1998 – 31-03-1999 the average number of html pages transfers per month was 1570 by internal and external users.

AMDIS Telnet Services

The A+M Data Unit maintains a telnet server for access to the AMDIS Aladdin numerical and Bibliographic databases, via a menu-driven interface which is available to guest and registered external users. This service is accessed either directly by users or through the Informational Website. In the period 01-01-1998 – 31-03-1999, there were 1,189 on-line retrievals by this telnet/ftp service. The A+M Data Unit is planning on phasing out the telnet service following complete migration of the AMDIS bibliographic databases to a completely Web-driven interface.

To: 37th IFRC Meeting
9-10 June, 1999

Date: 20 April 1999

From: IAEA A+M Data Unit
(R.K. Janev)

**PROGRESS REPORT ON IAEA ACTIVITIES IN ATOMIC, MOLECULAR AND
PLASMA-MATERIAL INTERACTION DATA FOR FUSION**

(Period: September 1998 - June 1999)

I. Co-ordinated Research Projects (Active)

- (1) "Atomic and plasma-wall interaction data for fusion reactor divertor modeling"
(12 participating laboratories)
3rd RCM held on March 8-9, 1999
CRP termination date: end of 2000.
- (2) "Charge exchange cross section data for fusion plasma studies"
(14 participating laboratories)
1st RCM held on 24-25 September, 1998
CRP termination date: end of 2001.
- (3) "Plasma-material interaction data for mixed plasma facing materials in fusion reactors" (10 participating laboratories)
1st RCM held on 19-20 October, 1998
CRP termination date: end of 2001.

II. Database Establishment Programme

A) Numerical databases completed in reporting period

- (1) "Elastic and related transport cross sections for collisions among isotopomers of $H^+ + H$, $H^+ + H_2$, $H^+ + He$, $H + H$ and $H + H_2$ " (collaboration with ORNL A+M data centre),
- (2) "Particle induced erosion of Be, C and W in fusion plasmas. Part A: Chemical erosion of carbon-based materials"
(Outcome of the CRP on "Particle induced erosion rates", terminated in 1997),
- (3) Up-graded and completed atomic database for Li-beam edge plasma diagnostics (in collaboration with IPP, Garching, and Technical University, Vienna).

B) Numerical databases in progress

- (1) "Particle induced erosion of Be, C and W in fusion plasmas. Part B: Physical sputtering and radiation enhanced sublimation"
- (2) Compendium on thermo-mechanical properties data for fusion reactor materials,
- (3) Recommended radiative power losses for major plasma impurities,
- (4) Compendium on electron-impact inelastic cross section data for vibrationally excited hydrogen molecules and their isotopes.

III. A+M Data Information System (AMDIS)

- The completed databases under A.1 - A.3 above have been added to the numerical databank ALADDIN.
- A Web-site was created for ALADDIN allowing direct, interactive on-line access to the numerical A+M/PMI databases of the A+M Data Unit.
- The numerical and bibliographical data contained in AMDIS can be also on-line accessed via Internet through a telnet session.

IV. Data Related Publications

- (1) International Bulletin on A+M Data for Fusion Vols. 54-55, 1998,
- (2) CIAMDA '98: A bibliographic computerized index for A+M data for fusion for the period 1988-1998. (IAEA, Vienna, 1998),
- (3) "Atomic and Plasma-Material Interaction Data for Fusion"
Vol. 7 Part A: Chemical erosion (see above, II, A.2)
Vol. 8: Elastic and related cross section data (see above, II. A.1),
- (4) Up-graded atomic database for Li-beam edge plasma diagnostics (At. Data Nucl. Data Tables, 1999; in press).

V. Experts Meetings in 1998, 1999 and 2000

1998: One TCM, two RCMs (see Attachment)

1999: One TCM, two AGMs, one RCM (see Attachment)

2000: Two TCMs, two RCMs (see Attachment)

**Atomic and Molecular Data Unit
Meetings for Fusion: 1998**

IFRC No.	IAEA Code	Name of Meeting	Dates	Place	Country	Description
001	G.1.02	TCM: 10 th Meeting of the IFRC A+M Subcommittee	May 27-28	Vienna	Austria	A review of the Agency A+M data activity for fusion was carried out and recommendations regarding its future A+M fusion related data programme were given.
002	G.1.04	1st RCM on Charge-exchange data for fusion plasma studies	Sept. 24-25	Vienna	Austria	To review the results obtained during the first year of co-ordinated work within the CRP.
003	G.1.04	1st RCM on Plasma-material interaction data for mixed plasma materials in fusion reactors	Oct. 19-20	Vienna	Austria	To review the available data, identify the needs and agree on a co-ordinated joint effort to produce the required erosion data for mixed plasma facing fusion reactor materials.

**Atomic and Molecular Data Unit
Meetings for Fusion: 1999**

IFRC No.	IAEA Code	Name of Meeting	Dates	Place	Country	Description
001	G.1.04	RCM: Atomic and plasma-wall interaction data for divertor modeling	March 8-9	Vienna	Austria	To review the overall accomplishments of the CRP on this subject and define the format of presentation of the results obtained within this CRP.
002	G.1.01	TCM: 11th Extraordinary Meeting of the IFRC Subcommittee on A+M data for fusion	May 3-4	Vienna	Austria	To review the IAEA programmes on A+M data for fusion and provide recommendations for the 2000-2001 Agency programme plan in this area.
003	G.1.04	AGM: Critical review of the data on tritium retention in fusion reactor plasma facing components	June 7-8	Vienna	Austria	To review and critically assess the available information on tritium retention in fusion reactor plasma facing components and provide recommendations for the further Agency activity in this field.
004	G.1.02	AGM: 14th A+M Data Centre Network Meeting	Sept. 6-7	Vienna	Austria	To review the work done and co-ordinate the planned activities for the next two year period of the A+M/PMI data centre network members (15 data centres).

**Atomic and Molecular Data Unit
Meetings for Fusion: 2000**

IFRC No.	IAEA Code	Name of Meeting	Dates	Place	Country	Description
001	G.1.01	TCM: 12th Meeting of IFRC Sub-committee on A+M Data for Fusion	tbd	Vienna	Austria	To review the IAEA programmes on A+M data for fusion and provide recommendations for future activities
002	G.1.04	2nd RCM on charge exchange cross section data for fusion plasma studies	tbd	Vienna	Austria	To review the work done since the last RCM and coordinate the work plans for the next two year period
003	G.1.04	2nd RCM on plasma-material interaction data for mixed plasma facing materials	tbd	Vienna	Austria	To review the work done since the last RCM and coordinate the work plans for the next two year period
004	G.1.04	TCM on A+M data for fusion plasma and alpha particle diagnostics	tbd	Vienna	Austria	Review the A+M data needs for fusion plasma (including alpha particle) diagnostics and formulate the scope of a CRP activity

Revised (1993)

ATTACHMENT

TERMS OF REFERENCE

IFRC Subcommittee on Atomic and Plasma-Material Interaction Data for Fusion

The International Fusion Research Council (IFRC) Subcommittee on Atomic and Plasma Material Interaction Data for Fusion will serve as a continuing Subcommittee within the framework of the International Atomic Energy Agency. Its function will be to review periodically the planning and execution of the agency's Atomic and Plasma-Material Interaction Data programme for Fusion and to advise the Director General on its direction in accordance with the needs of fusion research and reactor design.

Composition: the Subcommittee shall be composed of fusion and atomic scientists nominated by IFRC.

Methods of Work: the Subcommittee shall determine its own methods of work. The IAEA Nuclear Data Section shall provide the secretariat services to the Subcommittee.

Meetings: the Subcommittee shall be convened at a frequency not exceeding two years, and shall normally meet at IAEA Headquarters. The cost of participation of Subcommittee Members will be borne by the Government or sponsoring institute of the member. No interpretation will be required.

November 1993

METHODS OF WORK

IFRC Subcommittee on Atomic and Plasma-Material Interaction Data for Fusion

Under the Terms of Reference of the IFRC Subcommittee on Atomic and Plasma-Material Interaction Data for Fusion (hereinafter referred to as the Subcommittee), as approved by the IAEA Administration on November 1993, the Subcommittee is authorized to determine its own Methods of Work.

I. Scope and Responsibilities

In addition to the general functions of the Subcommittee, stated in the terms of Reference, the Subcommittee shall

- periodically review the IAEA programme on A+PMI for Fusion
- review A+PMI data needs and recommend their priorities
- assist in specifying and planning topical data meetings and coordinated research programmes
- assist in maintaining contacts between the IAEA A+PMI Data Unit and the fusion community
- assist in the coordination of data centres

II. Organization

1. Chairman: the Chairman shall be a member of the Subcommittee and shall serve for 2 meetings. The Chairman may be renominated by the Subcommittee. The responsibility of the Chairman shall remain in effect between meetings, until the following meeting, and he shall be kept informed by the Subcommittee members and the Scientific Secretary of relevant activities and developments.
2. Scientific Secretary: the Scientific Secretary shall be the Head of the A+PMI Data Unit of the IAEA Nuclear Data Section, and shall serve as a member of the Subcommittee.
3. Membership: should it become necessary for a Subcommittee member to be relieved of his membership, it shall be his responsibility to arrange for his replacement in collaboration with the pertinent IFRC member, and to inform the Chairman and the Scientific Secretary of the Subcommittee of the membership change in writing.

III. Meetings

1. Preparation: the preparation of the meetings shall be done timely by the Scientific Secretary of the Subcommittee in collaboration with the incoming and outgoing Chairman.

2. Frequency: the time between meetings of the Subcommittee shall be determined by progress in the field of fusion research and technology pertinent to A+PMI data and development within the IAEA, but shall not exceed two years.
3. Proceedings: the proceedings of the meetings shall be written by the Scientific Secretary, and shall be issued as an IAEA report after having been approved by all Subcommittee members. The proceedings of every meeting shall be distributed to the IFRC and INDC committees, the A+PMI data centres and to the director of all major fusion laboratories in member states.
4. Observers: all meetings of the Subcommittee shall be open to observers.

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FENDL2 for FTP file transfer of FENDL-2.0;
RIPL for FTP file transfer of RIPL;
NDSOVL for FTP access to files sent to NDIS "open" area.

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