



# **Technical Meeting on Atomic, Molecular and Plasma–Material Interaction Data for Fusion Science and Technology**

**Hosted by the  
Government of the Republic of Korea**

**through the  
National Fusion Research Institute**

**Daejeon, Republic of Korea  
(Daejeon Convention Center)**

**15–19 December 2014**

**Ref. No: IAEA-T4-TM-47136**

## **Information Sheet**

### **A. Background**

Atomic and molecular processes have a central role in the simulation and diagnostics of fusion plasma. Plasma–material interaction (PMI) processes determine the erosion rate and lifetime of plasma-facing materials. Plasma–material interaction in combination with material microstructure properties is the key to the hydrogen (tritium) inventory in walls. Therefore, there is a continuing need for better understanding and improved data on atomic, molecular and PMI (A+M+PMI) processes and properties in fusion devices and on relevant material microstructure properties.

On several occasions over the past 40 years the International Atomic Energy Agency (IAEA) has organized meetings to review the status of A+M+PMI research for fusion, bring fusion scientists together with specialists in atomic, molecular and materials science, and develop an outlook on major

A+M+PMI research and data needs to advance the cause of fusion energy. The first such meeting was held in 1976 at the Culham Laboratory, UK, and it formulated for the first time a comprehensive scope for A+M data needs for fusion. The second meeting was held in 1980 in Fontenay-aux-Roses, France, to review the status of data needs in relation to experimental programmes involving large tokamaks. The third meeting was held in Cadarache, France, in 1992 with the objective to review and identify new data needs for large operating fusion machines. The fourth meeting was held at the Jülich Research Centre, Germany, in 2002 to reconsider data needs in the light of the further increase in size and power of fusion machines and the early use of deuterium–tritium fuel in these machines. With the International Thermonuclear Experimental Reactor (ITER) now under active construction, and in view of the expanded interest in issues facing the next-step demonstration fusion power plant (DEMO) or fusion nuclear science facility (FSNF) as well as the current generation of long-pulse experiments, it seems appropriate to convene again a broad meeting on A+M+PMI processes and data for fusion.

## **B. Objectives**

Like the indicated earlier meetings, the present meeting is meant to advance data-oriented research on A+M+PMI processes and properties that are important for fusion plasma simulation, fusion plasma diagnostics and fusion energy technology. As part of this goal, the meeting is meant to promote collaboration among fusion energy researchers and researchers in atomic, molecular and materials science, raise awareness in the A+M+PMI community of the continuing need for A+M+PMI data to support fusion research, and highlight the contributions that can be made by the A+M+PMI sciences to fusion energy science and technology.

## **C. Format**

The meeting will feature invited and contributed oral presentations as well as a poster session. It is expected that the duration of invited talks will be 30 minutes and that of contributed talks will be 20 minutes. An electronic projector connected to a computer with a slot for a USB flash drive or memory stick will be available for the presentations (PDF or Power Point format).

In addition to the presentations, there will be expert working sessions and discussion sessions dedicated to data research needs for atomic and molecular processes, PMI processes and materials structure properties. A tentative schedule will be issued later on.

## **D. Invited Speakers**

### **Fusion Sciences and Plasma Spectroscopy**

- Robin Barnsley (ITER, Cadarache, France)

- David Campbell (ITER, Cadarache, France)
- Ursel Fantz (Max Planck Institute of Plasma Physics (IPP), Garching, Germany)
- Shin-ichiro Kado (Kyoto, Japan)
- Keeman Kim (National Fusion Research Institute (NFRI), Daejeon, Republic of Korea)
- Kerry Lawson (Culham Centre for Fusion Energy (CCFE), Abingdon, UK)
- Detlev Reiter (Jülich Research Centre, Germany)

### **Atomic and Molecular Physics**

- Roger Hutton (Fudan University, China)
- Gregor Karwasz (Nicolaus Copernicus University, Poland)
- Annarita Laricchiuta (Bari, Italy)
- Yuri Ralchenko (National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, USA)
- Howard Scott (Lawrence Livermore National Laboratory (LLNL), Livermore, California, USA)
- Phillip Stancil (University of Georgia (UGA), Athens, Georgia, USA)
- Jonathan Tennyson (University College London (UCL), London, UK)
- Pascal Quinet (Mons, Belgium)

### **Data Needs**

- Hyun-Kyung Chung (IAEA, Vienna, Austria)
- Valery Kurnaev (Moscow Engineering Physics Institute (MEPhI), Russian Federation)
- Nigel Mason (Open University, UK)
- Martin O'Mullane (CCFE, Abingdon, UK)

### **Plasma–Material Interaction Physics**

- Russell Doerner (University of California, San Diego (UCSD), La Jolla, California, USA)
- Suk-Ho Hong (NFRI, Daejeon, Republic of Korea)
- Predrag Krstic (Stony Brook, USA)
- Heun Tae Lee (Osaka, Japan)
- Guang-Nan Luo (Institute of Plasma Physics (IPP)/Chinese Academy of Sciences (CAS), Hefei, China)
- Guang-Hong Lu (Beihang University, China)
- Takuji Oda (Seoul National University (SNU), Seoul, Republic of Korea)

- Teppei Otsuka (Kyushu, Japan)
- Klaus Schmid (IPP, Garching, Germany)

## E. Participation

### (a) Submission of abstracts

Participants wishing to present a paper during this meeting must submit an abstract to the organizers. A one-page abstract must be submitted as an email attachment **between 15 August and 24 September 2014**. The abstract submission email must contain the author's name, affiliation and email address. The filename should be in the following format: Lastname.Initials.ShortTitle.filetype. The abstract should be submitted by email to: [B.J.Braams@iaea.org](mailto:B.J.Braams@iaea.org).

Please use page size A4 (21 cm by 29.7 cm), vertical orientation and margins of 25 mm on all sides. Please use Times New Roman (TNR) font throughout and then:

- Title: centered, single-spaced, 14-point size, bold, first letters capitalized
- Authors: centered, single-spaced, 12-point size, bold
- Affiliation: centered, single-spaced, 12-point size, italics
- Text: single spaced, 12-point size

The length is limited to one page. Authors must make sure that the files do not include copyrighted fonts or other impediments to reproduction. Authors are urged to make use of the Abstract template available from the IAEA web page for the meeting (see Section L below).

### (b) Acceptance of papers/posters

Authors will be informed by **6 October 2014** as to whether their abstract has been accepted by the Scientific Advisory Committee. At the same time, authors will be advised as to whether their paper has been accepted for oral presentation or for presentation as a poster.

### (c) Documents and Publications

A preliminary programme of the meeting will be made available on the meeting web page. The final programme and the Book of Abstracts will be available upon registration at the meeting.

A meeting report will be produced on the basis of the proceedings of the meeting. The report will summarize presentations, discussions and recommendations contributed by the meeting participants.

## F. Expenditures

No registration fee is charged to participants.

As a general rule, the IAEA does not pay for travel and living expenses of participants. However, limited funds are available to help meet the cost of attendance of selected specialists, mainly from developing countries with low economic resources. If governments wish to apply for a grant on behalf of one of their specialists, they should address specific requests to this effect to the Scientific Secretary of the meeting. Governments should ensure that applications for grants:

- are received by the IAEA before **1 October 2014**;
- are accompanied by a duly completed and signed Grant Application Form (Form C); and
- are accompanied by a duly completed and signed Form for Submission of a Paper (Form B) and abstract.

Awards will be announced after **6 October 2014**.

## **G. Working Language**

The working language of the meeting will be English. All communications must be sent to the IAEA in English.

## **H. Venue and Accommodation**

The meeting will be held in the Daejeon Convention Center (DCC). Detailed information on accommodation and other administrative details will be made available on the meeting web page (see Section L below) well in advance of the meeting.

## **I. Visas**

Designated participants who require a visa to enter the Republic of Korea should submit the necessary application to the nearest diplomatic or consular representative of the Republic of Korea as soon as possible. The official letter of invitation from the IAEA usually serves to assist with visa arrangements.

## **J. Key Deadlines**

- Submission of Forms A and B (transmitted to IAEA via national authority): **1 October 2014**
- Submission of Abstracts (one page, sent to organizers): **24 September 2014**
- Notification of acceptance of papers/posters: **6 October 2014**

## **K. Scientific Advisory Committee**

- B.J. Braams (**Scientific Secretary**), H.K. Chung, IAEA
- J.S. Yoon, J.G. Kwak, National Fusion Research Institute (NFRI), Republic of Korea
- W.H. Choe, Korea Advanced Institute of Science and Technology (KAIST), Republic of Korea
- K.S. Chung, Hanyang University, Republic of Korea
- D. Kato, National Institute for Fusion Science (NIFS), Japan
- T. Nakano, Japan Atomic Energy Agency (JAEA), Japan
- G. N. Luo, Chinese Academy of Sciences (CAS), China
- B. Kukushkin, Kurchatov Institute, Russian Federation
- Yu. Tolstikhina, P.N. Lebedev Physics Institute of the Russian Academy of Sciences, Russian Federation
- R. Guirlet, Euratom–CEA Association, France
- W. Jacob, Max Planck Institute of Plasma Physics (IPP), Germany
- G. Mazzitelli, Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Section for the Management of Large Experimental Facilities, Italy
- K.-D. Zastrow, Culham Centre for Fusion Energy (CCFE), UK
- J.W. Davis, University of Toronto, Canada
- D.R. Schultz, University of North Texas, USA

## **L. Meeting Web Page**

Please visit the following IAEA web page regularly for new information regarding this meeting:

<https://www-amdis.iaea.org/meetings/AMPMI14/>

# Participation Form

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To be completed by the participant and sent to the competent official authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 1 October 2014**

Family name:		Given name(s):		Mr/Ms
Institution:				
Full address:				
For urgent communications please indicate:		Tel.:		
		Fax:		
		Email:		
Nationality:		Nominating Government or organization:		
Mailing address (if different from address indicated above):				
Do you intend to submit a paper?		Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Would you prefer to present your paper as a poster?		Yes <input type="checkbox"/>	No <input type="checkbox"/>	
Title:				



# Form for Submission of a Paper

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### Deadline for receipt by IAEA through official channels: 1 October 2014

Title of the paper:		
Family name(s) and initial(s) of author(s)	Scientific establishment(s) in which the work has been carried out	City/Country
1.		
2.		
3.		
Family name of author who will present the paper	Mailing address:	
Initial(s):		
Mr/Ms		
For urgent communications please indicate	Tel.:	
Email:	Fax:	
<p>I hereby agree to assign to the International Atomic Energy Agency (IAEA):</p> <p><input type="checkbox"/> the copyright or</p> <p><input type="checkbox"/> the non-exclusive, royalty-free licence (this option is only for those authors whose parent institution does not allow them to transfer the copyright for work carried out in that institution) to publish the above-mentioned paper,</p> <p>and certify that no other rights have been granted which could conflict with the right hereby given to the IAEA.</p>		
<b>Date:</b>	<b>Signature of main author:</b>	



# Grant Application Form

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**Deadline for receipt by IAEA through official channels: 1 October 2014**

Family name:	Given name(s):	Mr/Ms:
Mailing address:	Tel.:	
	Fax:	
	Email:	
Date of birth (yy/mm/dd):	Nationality:	

### 1. Education (post-secondary):

Name and place of institution	Field of study	Diploma or Degree	Years attended	
			from	to

### 2. Recent employment record (Starting with your present post):

Name and place of employer/ organization	Title of your position	Type of work	Years worked	
			from	to

### 3. Description of work performed over the last three years:

### 4. Institute's/Member State's programme in field of meeting:

**Date:** \_\_\_\_\_ **Signature of applicant:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Name, signature and stamp of responsible Government official:**

\_\_\_\_\_