



The Third International Topical Meeting on Neutron Radiography

New Detectors, Imaging Techniques and Applications

The Hotel Continental-Park, Murbacherstr. 4, CH-6002, Luzern
March 16 to 19, 1998, Luzern, Switzerland

Chairman E. Lehmann, Switzerland
Co-Chairman H. Kobayashi, Japan
G.M. MacGillivray, Canada

Scientific Secretary
H. Pleinert, Switzerland

Administrative Secretary
R. Bercher, Switzerland

Treasurer H.U. Aebersold, Switzerland
Program-Committee

M. Balaskó, Hungary
N. Boulding, United Kingdom
J.S. Brenizer, USA
S. Cluzeau, France
C.-O. Fischer, Germany
S. Fujine, Japan
K. Kanda, Japan
J.T. Lindsay, USA
J. Rant, Slovenia
J. Stade, Germany
K. Viswanathan, India

March 16(Monday)

16:00-19:00 Registration
17:00-19:00 Meeting of the Conference Committee
19:00-20:00 Welcome Cocktail

March 17(Tuesday)

08:00-09:00 Registration
09:00-09:25 Opening
09:25-09:30 Statement on WCNR-6
09:30-10:50 Session 1: Detectors I
10:50-11:10 Coffee Break
11:10-12:30 Session 2: Detectors II
12:30-13:50 Lunch Break
13:50-15:30 Session 3: Imaging Techniques I
15:30-16:50 Poster Session & Coffee Break
16:50-18:30 Session 4: Imaging Techniques II

March 18(Wednesday)

09:00-10:20 Session 5: Applications I
10:20-10:40 Coffee Break
10:40-12:20 Session 6: Applications II
12:30-14:00 Lunch Break
13:50-18:00 Excursion to PSI

March 19(Thursday)

09:00-10:20 Session 7
10:20-10:40 Coffee Break

10:40-12:20 Session 8
12:30-13:50 Lunch Break
13:50-15:30 Session 9
15:30-16:00 Closing remarks
20:00-23:00 Conference Dinner

March 20(Friday)

Optional excursion to scenic places of interest

Abstract

The dead line of the abstract will be on the end of October.

Conference fee: SFr. 350.-

If you are interested in receiving further information on ITMNR-3, Contact directly to:

Renate Bercher
Administrative Secretary, ITMNR-3
Paul Scherrer Institut
CH-5232 Villingen PSI
Fax: +41 56 310 31 31
E-mail: Renate.Bercher@psi.ch

The Sixth World Conference on Neutron Radiography

Osaka, Japan, May 16-21, 1999



Topics:

- 1) Introductory Reviews
- 2) Neutron Sources
- 3) Detectors
- 4) Imaging Technology
- 5) Image Processing
- 6) Applications
- 7) Computed Tomography
- 8) System Characterization and Standards
- 9) Personal Qualification
- 10) Miscellaneous Technology Advances

WCNR-6 Secretary

Shigenori Fujine
Research Reactor Institute, Kyoto University
Kumatori-cho, Sennan-gun, Osaka 590-04, Japan
Fax: +81-724-51-2603
E-mail: sfujine@kuca.rri.kyoto-u.ac.jp

CIRCULATION

This newsletter is being mailed to all who participated at WCNR-4 & 5 and ITMNRSDC-2. Please pass copies to others or they can write to be added to the distribution list or the member's list of the international society (address at end).

5TH WORLD CONFERENCE ON NR(WCNR-5)

The Fifth World Conference on Neutron Radiography (WCNR-5) was held at Siemens Training Center, Berlin, Germany, June 17-20, 1996. The president of WCNR-5 was Dr. C.-O. Fischer (HMI), Co-chairman Dr. J. Stade (BAM) and Technical Chairman Dipl.-Ing. W. Bock (DGZfP).

113 participants from 22 countries attended the Conference to present 116 papers in oral sessions, 65 papers, and a poster session, 51 papers. Radiographers from South Africa came for the first time to the World Conference.

The post conference tour for Dresden, Nürnberg and München was memorable one. Many thanks to Dr. and Mrs. C.-O. Fischer for their wonderful guide and also to those concerned the Conference. Congratulations on a great success with the Fifth Conference and post conference tour!

W. Bock, Technical Chairman of QWCNR-5, wrote to J.P. Barton that the Proceedings of the WCNR-5 should be published very soon.

INTERNATIONAL SOCIETY FOR NEUTRON RADIOLOGY (ISNR)

The International Society for Neutron Radiology (ISNR) was founded by the election for the officers during WCNR-5 on Wednesday June 19, 1996.

The officers are;

President: K. Kanda (Japan), Deputy President: S. Fujine (Japan), Vice President: J.T. Lindsay (USA), Secretary: J. Rant (Slovenia), Board: M. Balaskó (Hungary), J. Brenizer (USA), P. Chirco (Italy), S. Cluzeau (France), C.-O. Fischer (Germany), H. Kobayashi (Japan), R. Lanza (USA), E. Lehmann (Switzerland), H-U. Mast (Germany), V.I. Mikerov (Russia), Y. Murata / K. Mochiki (Japan).

The **CONSTITUTION** was proposed in the previous NR News (No. 4) by J. P. Barton and approved as shown in the last page (logo is tentative yet).

PROCEEDINGS OF ITMNRSDC-2

The Proceedings of the Second International Topical Meeting on Neutron Radiography System Design and Characterization (ITMNRSDC-2) (Shonan Village Center/Rikkyo University, Japan, November 12-15, 1995) have been published by Elsevier Science B.V., Amsterdam, The Netherlands, as a special issue of Nuclear Instruments & Methods in Physics Research, Section A, Vol. 377(1996), No. 1, edited by H. Kobayashi and K. Mochiki. Among the submitted 57 papers, 41 papers were included in the Journal. This issue is available from the Atomic Energy Society of Japan

by ¥6,000 (+postage on all Foreign orders) in Japan. (Toshin Buldg. 4F, 1-1-13, Shinbashi, Minato-ku, Tokyo 105, Japan, Tel: +81-3-3508-1261, Fax: +81-3-3581-6128) The supplement has been published in June 1996 as "Proceedings of the Seminar at JAERI in ITMNRSDC-2" edited by M. Matsubayashi (JAERI-memo 08-154).

ITMNR-3

At first, the Third International Topical meeting on Neutron Radiography (ITMNR-3) was planned to be held in Budapest, Hungary, however, for certain reasons the plan was examined to be held by E. Lehmann in Switzerland.

In the recent letter, ITMNR-3 will be held in Luzern, Switzerland, March 16-19, 1998. The title of the conference will be "New Detectors, Imaging Techniques and Applications", and the First Announcement was mailed in May, 1997. It highlights the topics mentioned in the title as the main themes of the conference, but also states that contributions on other advances in neutron radiography are welcome. A three-day scientific program is planned, including two sessions for each of main topics, three sessions for other topics, a poster session and an excursion to the spallation source SINQ at PSI. The committee chairman is E. Lehmann, Switzerland, co-chairmen H. Kobayashi, Japan and G.M. MacGillivray, Canada, and scientific secretary H. Pleinert, Switzerland.

The first meeting of the Conference Committee took place in Bologna during the Fifth meeting of the ENRWG, June 25th, 1997. The next Meeting of the Conference Committee will take place in Luzern on March 16, 1998.

The proceedings will be published in Nuclear Instruments and Methods, Section A.

7TH ECNDT

The Seventh European Conference on Non-Destructive Testing will be held in Copenhagen, The Netherlands, 26-29, May, 1998. The first announcement and call for papers have already been sent in September, 1996. The deadline of abstracts and full papers are May, 1997 and October, 1997 respectively.

Correspondence address:

7th ECNDT, Copenhagen 1998
Park Allé 345
DK-2605 Broendby, Denmark

WCNR-6

The Sixth World Conference on Neutron Radiography is planned to be held at the conference room of Rinku Gate Tower Building and ANA Gate Tower Hotel Osaka (close to Kansai International Airport (KIX)) in Osaka, Japan, May 17-21, 1999. Spouse program and post conference tour are considered. The First Circular will be mailed in this year.

If there is any request about the Conference, please contact with S. Fujine.

EXPERT'S MEETING FOR NATIONAL PROGRAMMES FOR NEUTRON RADIOGRAPHY

The Experts' Meeting for National Programmes for Neutron Radiography (IAEA Project Number:RAS/4/011-9001-01) was held at the site of multi-purpose research reactor PSG-GAS center, at Serpong, Tangerang, Indonesia, May 12-19, 1996. It was attended by 8 experts from 7 RCA Member States: Bangladesh, India, Indonesia, Malaysia, Thailand, Vietnam, and two experts from Japan and Canada. There was no representative from China and Korea, while others were not invited as they did not have an ongoing program in neutron radiography. The IAEA Project Technical Officer was K.M. Akhtar (India) and the meeting was chaired by Bakri Arbie (Indonesia).

Lectures by the experts invited for meeting were;

G. MacGillivray: "Commercializing neutron radiography, from laboratory to the industry", "Material for neutron radiography collimators" and "Imaging technology - where neutron radiography is going", and S. Fujine: "The status of neutron radiography research activities in Japan" and "Neutron radiography research activities at KURRI".

Country reports presented by the RCA national experts were;

- Md. Nurul Islam: "Neutron radiography facility, Institute of Nuclear Science & Technology, Atomic Energy Establishment, Bangladesh Atomic Energy Commission".
- A.M. Shaikh: "Neutron radiography in India: An overview on NR methods, facilities and applications".
- Mardiyanto: "Recent status of neutron radiography in Indonesia".
- Huhn-Jun Kim: "Neutron radiography Activity at KAERI".(Korea)
- Azali Muhammad: "The current status of neutron radiography programme in Malaysia".
- Mirza Muhammad Ashraf: "Neutron radiography facility at Pinstech, Pakistan".
- Sunanta Patrashakorn: "Neutron radiography in Thailand".
- Vuong Huu Tan: "Status report on neutron radiography in Vietnam" and "Neutron beam utilization at the Dalat Nuclear Research Reactor, - Progress report -".

IONIZING RADIATION VOL. 22, NO. 1, JAN. 1996.

A special issue (ISSN 0285-3604) entitled "Status of NR Techniques" includes the following 10 papers (in Japanese):

1. H. Kobayashi: "Determinations of Beam Quality and Transmission Character for Continuum Neutron Beam", pp.3-10.
2. K. Yoshii: "Fundamental Study of Fast Neutron Radiography", pp.11-18.
3. M. Matsubayashi: "Current Status of Cold and Thermal Neutron Radiography Facilities", pp.19-26.
4. K. Mochiki: "Present Situation of the Development of Real-Time Neutron Radiography Image Processing Systems", pp.27-34.
5. T. Hibiki, K. Mishima: "Development of High-Frame-Rate Neutron Radiography and Its Application to Flow Measurements", pp.35-42.

6. N. Niimura: "Neutron Radiography Using an Imaging Plate Neutron Detector", pp.43-48.

7. H. Kobayashi: "Studies on Tomography in Neutron Radiography", pp.49-56.

8. M. Tamaki: "Status of NR Applications to Science and Technology", pp.57-62.

9. N. Takenaka: "Visualization and Measurement of Flow Phenomena by NR Methods", pp.63-70.

10. S. Fujine: "Status and Prospect of Industrial Application on Neutron Radiography", pp.71-78.

RESEARCH COMMITTEE ON NR IN JAPAN

The 53th meeting was held at the JAERI meeting room in Tokyo on 13 May, 1997. 2 lectures about the Imaging Plate manufactured by Fuji Photo Film Co., Ltd. were given by M. Etoh and S. Tazaki. At the 54th meeting on August 20, 1997, a lecture about high speed camera was presented by S. Yamada, Director of R&D, Photron Ltd.. In this meeting, the committee organized the Sixth WCNR preparation committee. The 55th meeting is planned in November, 1997.

14TH WORLD CONFERENCE ON NDT

Dr. M. Balaskó, KFKI Atomic Energy Research Institute, Laboratory of High Reliability Systems, in Budapest, Hungary, wrote about the 14th World Conference on NDT to editor. It was held in New-Delhi, India, on 8-13, December, 1996 and was a real MEGA-Organization. It had about 3000 participants. The number of the oral- and poster presentations were more than 700. Five parallel sessions worked simultaneously. The proceedings consist of five books. The 15th WCNDT will be organized by Italy, in Roma, October, 2000.

ENRWG NEWS

Dr. M. Balaskó wrote ENRWG News to editor. The annual meeting of the ENRWG was held on June 25-27 in Bologna in Italy. The following papers were presented at the meeting:

1. H. pleinert: "CCD LLL TV Camera at the SINQ".
2. M. Balaskó: "Dynamic Neutron- and X-Ray Radiography in Development of Sound Proof Environmental Friendly Compression Refrigerators".
3. J. Rant: "Activities in NR at J. Stefan Institute".
4. M. Dinca: "The Neutron Radiography of TRIGA ACPR Nuclear Fuel".
5. J. Brenizer: "Current Neutron Imaging Activities at the University of Virginia".
6. E. Lehmann: "First Tests at the Neutron Radiography Station in Construction at the Spallation Source SINQ".
7. B. Schillinger: "Fast Neutron Radiography and Tomography Based on a CCD Detector".
8. E. Sváb: "Water uptake, distributions and Accumulation as Determined by Dynamic Neutron Radiography During Germination of Bean Seeds".
9. S. Cluzeau: "Portable Sources for NR".
10. M. Zanarini: "Development of a Novel CCD Camera".

11. J. Rant: "Radiography with Monoenergetic Neutrons at a Research Reactor; New Possibilities in Fast NR".
12. F. Peterka: "Contribution for Czech NR".
13. P. Chirco: "NCT in Italy".

The articles will be published by the Journal of NDT in Italy.

One of the special session of conference was the ISO meeting. The participants heard a survey by Prof. Brenizer on the standardization work in the ISO/TC135/SC5/WG4.

Second special session was the organization meeting of the Third International Topical Meeting. Dr. E. Lehmann summarized the preliminary works. The list of the invited speakers were desired by the Organizing Committee. The following list of invited speakers is agreed on: H. Kobayashi (Detectors I), J.T. Lindsay (Detectors II), V. Mikerov (Imaging Techniques I), B. Schillinger (Imaging Techniques II), G. Bayon (Applications I), K. Viswanathan (Applications II). The second announcement of the conference will come soon. The dead line of the abstract will be on the end of October.

Survey of the ENRWG social meeting:

1. P. Chirco gave many useful information about COST project, which provides some possibilities to increase the efficiency of the international scientific cooperation in "Neutron Imaging Techniques for Detection of Defects in Materials" topic. It is planned as a long range (6 years) joint work. Every research works from COST member countries are welcome to join to this project. (#20 pages summarized written material will be posted to the coordinators of interested countries by the speaker.) The decision is very urgent because the data of the final agreement will be in October, 1997.
2. S. Cluzeau showed another facility for the common work: "Advanced Integrated NDT Concepts for Unified Life Cycle" - membership only for EC countries.
3. He suggested to organize a special committee to draft a by-law of the ENRWG in the next time. The member of the willing committee consist of Dr. M. Balaskó, Dr. P. Chirco, and Dr. J. rant.
4. F. Peterka call for cooperation the participants to the INCO-Copernicus project. Unfortunately we hadn't any EC member who ought to undertake the role of the coordination.
5. S. Cluzeau resigned about the chairmanship because the circumstance in his company will be changed in the future. Thank for his former activities.
6. The new leadership of the ENRWG were voted by the members. They are the follows; Dr. M. Balaskó (Hungary) Chairman, Mr. G. Bayon (France) Co-chairman, Dr. P. Chirco (Italy) Secretary.
7. The next ENRWG meeting will be organized by Czech Republic in Prague on November 1998. The coordinator of the Organizing Committee is Dr. F. Peterka.

RADIOISOTOPES VOL.46

No.7, JULY, 1997

In the lecture entitled "Neutron Beam Analysis and Its

Application, X. Neutron Radiography", following papers (in Japanese) were included:

1. S. Fujine: "Fundamentals of Neutron Radiography", pp.480-487.
2. K. Mishima: "Visualization and Measurement of Thermal and Fluid Phenomena", pp.488-494.
- 3.1 K. Yoshii: "Fast Neutron Radiography and Applications", pp.495-499.
- 3.2 M. Tamaki: "Thermal and Cold Neutron Radiography and Applications", pp.500-503.

No.8, AUGUST, 1997

4. I. Ishikawa: "Neutron Radiography with Radioactive Source", pp.567-572.
5. H. Matsunaga, Y. Toda, S. Yamazoe: "Nneutron Radiography Using Small Cyclotron - Domestic Pyrotechnics for Rocket", pp.573-578.
6. T. Nakanishi: "Application of Neutron Radiography to Plant Research", pp.579-585..
7. H. Kobayashi: "Prospects of Neutron Radiography", pp.586-591.

Please send your business card to the editor in Japan to make a perfect member's list of International Society for Neutron Radiology, including e-mail address and home page address if available, and also your passport-size photograph.

Any news about neutron radiography in your countries is cordially welcomed. Please send them to editors.

Editors:

Joze J. Rant:

Jozef Stefan Institute,
 1001 Ljubljana, Jamova 39, P.O. Box 100, Slovenia
 Tel: +386-61-1885-450, Fax.: +386-61-374-919
 E-mail: RANT@eros.ijs.si

Shigenori Fujine:

Research Reactor Institute, Kyoto University,
 Kumatori-cho, Sennan-gun, Osaka 590-04, Japan.
 Tel: +81-724-51-2359, Fax.:+81-724-51-2603
 E-mail: sfujine@kuca.rii.kyoto-u.ac.jp

Imaging Plate Neutron Detectors (BAS-ND)
NOW AVAILABLE !!
For Neutron Radiography

Imaging Plate (BAS-ND)

BAS-2040 20x40 cm
 BAS-2025 20x25 cm

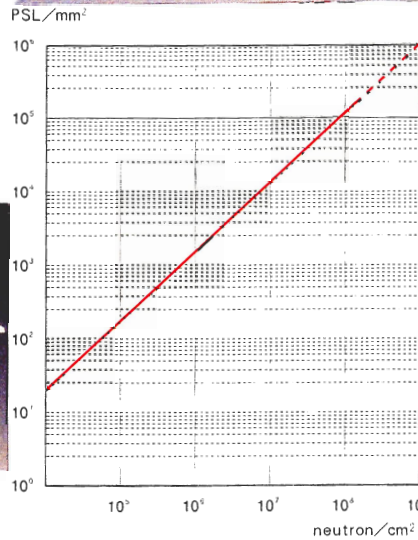
Scanners

BAS-2500, -2000, -1500, -1000
 BAS-5000, -2000

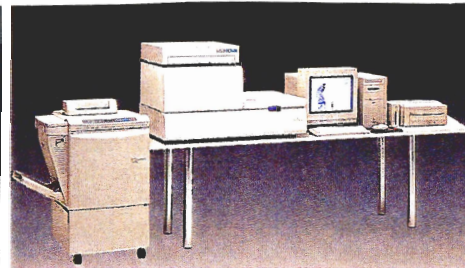
Imaging Plate Photostimulate Material: BaFBr:Eu²⁺
 Neutron converter Material: Gd₂O₃

SOFTWARE

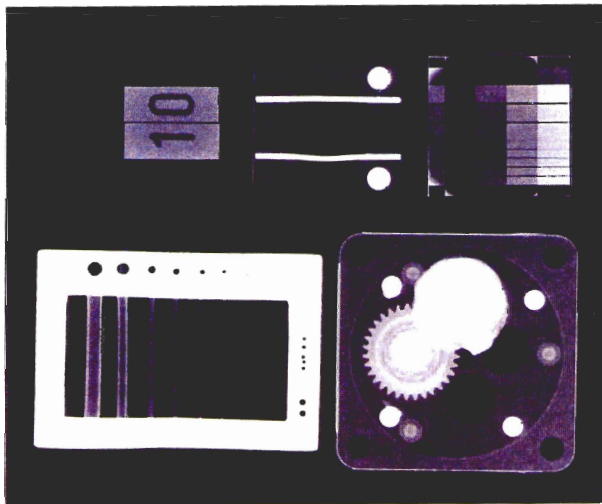
MacBAS Software (BAS: Bio-image Analyzer System)



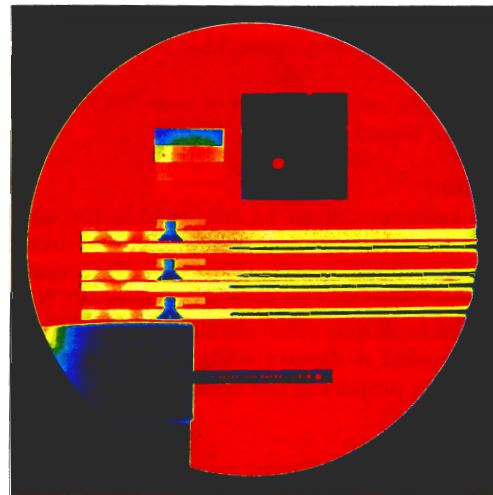
BAS-5000



BAS-2500



Neutron Radiograph with a BAS-2500Mac
 (1.44x10⁸ n/cm² at the KUR-E2 Facility)



Location of Burnable Poison in Fuel Side Plates
 (0.72x10⁸ n/cm² at the KUR-E2 Facility)



• Fuji Photo Film Co., Ltd. 26-30, Nishiazabu 2-Chome, Minato-ku, Tokyo 106, Japan. Tel: +81-3-3406-2201 Telex: J24306, J24240 Fax: +81-3-3406-2158 • Fuji Medical Systems U.S.A., Inc. Tel: +1-203-353-0300 Fax: +1-203-327-6485
 • Continental Europe: Fuji Photo Film (Europe) GmbH Tel: +49-211-5089-174 Fax: +49-211-5089-344 • Germany/Austria/Switzerland/Benelux: Raytest Isotopenmeßgeräte GmbH Tel: +49-7082-92550 Fax: +49-7082-20813
 • Sweden/Norway/Denmark: Fuji Film Sverige AB Tel: +46-8-729-1400 Fax: +46-8-33-9830 • France: raytest France S.A.R.L. Tel: +33-1-43343333 Fax: +33-1-47892388 • Spain: Fujifilm España S.A. Tel: +34-3-4511515 Fax: +34-3-4515900
 • Finland/Baltic countries/Russia (St. Petersburg): Oy Tamro AB Tel: +358-204-45-4963 Fax: +358-204-45-4970 • Italy: Immagini & Computer snc Tel: +39-2-9350-5251 Fax: +39-2-9350-5253
 • Pan U.K.: Fuji Photo Film (U.K.) Ltd. Tel: +44-71-586-9351 Fax: +44-71-483-1264 [• U.K./Ireland: Raytek Ltd. Tel: +44-1142-749575 Fax: +44-1142-749407]
 • Australia/New Zealand/Singapore/Indonesia/Thailand/Malaysia: Berthold Australia Pty Ltd. Tel: +61-3-467-6277 Fax: +61-3-467-7493 • Israel: Dinco & Rhenium Ltd. Tel: +972-2-5335599 Fax: +972-2-5335590
 • India: Instruments Corporation & Agencies Tel: +91-40-83365 Fax: +91-40-830144 • Taiwan: Hung Chong Corp. Tel: +886-2-794-7189 Fax: +886-2-794-2248 • Korea: Shin Ki Commercial Co., Ltd. Tel: +82-2-573-8778 Fax: +82-2-573-7370
 • Hong Kong/China: Fuji Photo Products Co., Ltd. Tel: +852-2-4088663 Fax: +852-2-4075811

Reference: K. Takahashi et al., "Imaging performance of imaging plate neutron detectors", Nuclear Instruments and Methods in Physics Research, A377, pp.119-122 (1996).

International Society for Neutron Radiology

CONSTITUTION

Name:

International Society for Neutron Radiology

Purposes:

World Conference on Neutron Radiography
NR Newsletter
NR Directory
Electronic Communication - Client/Server
Other, as may be proposed and voted.



Membership:

All interested attendees to WCNR. All others whose application form is submitted by mail and approved by the "Board".

Fees:

No fees for membership. Costs such as conference organization, and mailing will be covered by volunteers.

General Election:

A general election to elect the Board and also to elect the Officers shall be held amongst those members present on the closing day of each WCNR.

The Officers:

- Shall consist of President, Vice President and Secretary.
- Shall serve until the close of next WCNR.
- Shall be Board Members.

President:

The president shall be responsible for and ensure satisfactory organization of the next WCNR (WCNR N+1). The President shall chair the Board and shall preside over WCNR N+1. Immediately after election the President shall appoint a deputy with whom to work together in preparing the next WCNR.

Vice President:

- Shall be from a different geographical region and shall assist in identifying candidates for election to President at WCNR N+1 in order to host WCNR N+2. Note, however, that because of the long 6 or 8 year interval likely before WCNR N+2 the elected Vice President is not automatically President Elect for WCNR N+2.

The Board (composition)

- Shall consist of up to 12 persons, plus the 3 officers. From the 12 one shall be the President of the present WCNR (or appointed by that person), and one shall be appointed by the President elected to host the next WCNR. For the remaining 10 who are elected, no more than 3 may

be from the country with most papers at the present WCNR, no more than 2 may be from the next country in terms of papers, and no more than 1 elected person shall be from each other country.

The Board (function)

- Shall replace the provisional steering committee.
- Shall serve until close of next WCNR and meet the day before that WCNR.
- Shall organize and supervise the next general election.
- Shall motion and vote on changes to constitution (2/3 majority).
- Shall motion and vote on other specific proposals (simple majority).

Operation of Constitution:

This constitution has become operational since June, 1996.

Officers (1996.6-1999.5):

President: Keiji Kanda (Japan)
Deputy President: Shigenori Fujine (Japan)
Vice President: John T. Lindsay (USA)
Secretary: Joze J. Rant (Slovenia)
Board: Márton Balaskó (Hungary)
Jack S. Brenizer (USA)
Piero Chirco (Italy)
Serge Cluzeau (France)
Carl-Otto Fischer (Germany)
Hisao Kobayashi (Japan)
Richard Lanza (USA)
Eberhard H. Lehmann (Switzerland)
Hans-Ulrich Mast (Germany)
Vitali Mikerov (Russia)
Yutaka Murata/Koh-ichi Mochiki (Japan)

Correspondence Address:

Shigenori Fujine
Research Reactor Institute, Kyoto University
Kumatori-cho, Sennan-gun, Osaka 590-04, Japan
Tel: +81-724-51-2359 Fax: +81-724-51-2603
E-mail: sfujine@kuca.rri.kyoto-u.ac.jp