



International Advisory Board for the International Microgravity Plasma Facility

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16 Nov. 2001

Minutes of the Meeting of the International Advisory Board 23-24 May 2001 Iowa City, USA

Present at the meeting were:

Prof. John E. Allen, Prof. Laifa Boufendi, Prof. Lin I, Prof. John Goree, Prof. O. Havnes, Prof. G.M.W. Kroesen, Prof. A. Mendis, Prof. Fortov, Prof. G. Morfill, Prof. A. Nefedov, Prof. N. Sato, Dr. Hubertus Thomas, Prof. Watanabe.

Absent were: None.

Also present were: Maria Roth of the DLR, Jorge L. Vago of ESA, four representatives of Kayser Threde, and two scientist observers from the Max Planck Institute, Germany.

The meeting lasted 8 hours, beginning 13.00 May 24 and ending 12.00 May 25.

The agenda included the following:

- The meeting was called to order by John Goree.
- Maria Roth of DLR and Jorge L. Vago of ESA briefly reviewed the results of the International Announcement of Opportunity, which included a number of proposals to use IMPF. These proposals came from various countries.
- A presentation by Kayser-Threde of its progress, including:
 1. Overview, including a timeline which has now been shifted back, with a flight in 2006.
 2. Update on design of rf chamber, including optics, gas, chamber cleaning, cameras, rf voltages, particle dispensers
 3. Kayser Threde asked questions of the board re. Requirements for gas
- A presentation by Prof. Piel of IMPF Langmuir probe design progress. It now appears that a probe can be made sufficiently compact to fit into the experimental drawer. Lin I reminded experimenters that as always, they should be aware that a Langmuir probe disturbs a particle cloud with they are inserted into the plasma.

- A presentation by H. Thomas of IMPF Activities at MPE in Germany.
- A presentation of DC chamber concepts, by Molotkov and Popov.
- A presentation by H. Rothermel of lessons from PKE relevant to the design of IMPF. This included emphasis on attention to pumping speed and water vapor contamination.
- A presentation by O. Petrov of dc chamber experiments at the High Energy Density Research Center in Moscow.
- A discussion led by G. Morfill of future PKE-related activities that could help prepare software and other needs for IMPF.
- A discussion led by J. Goree of instrument-related issues. Lin I identified three practical problems that require engineering attention: accumulation of reactive gases in exhaust, testing is required of oxygen cleaning to determine if etch products re-deposit elsewhere in chamber and contaminate it, water vapor contamination can be improved by glow discharge cleaning but deposition plasmas will make this worse. J. Goree identified the following issue that is unanswered: does the potential scientific return merit the large engineering effort required for use of reactive gases. It was discussed how the manipulation and ellipsometry lasers might be decoupled so that a more efficient IR laser can be used for particle manipulation; however, there is a lack of information that is required because no institutes have plans to test IR lasers for this purpose to see if they will work as well as current-generation visible lasers. L. Boufendi indicated that he will organize a simulation of gas flow in an IMPF chamber.
- It was decided that the Advisory Board should meet next in Moscow. (After the meeting, the dates were chosen to be Dec. 4-5).

**Meeting of the International Advisory Board
7-8 December 1999
Munich, Germany**

The advisory board voted on each of the following items, and approved them:

1. The Advisory Board notes with satisfaction that:
 - (a) Kayser-Threde has made significant progress in the pre-development phase of IMPF.
 - (b) Multiple scientific institutions, in various countries, have presented test results that are valuable in the development of the IMPF instrument. The number of institutions performing tests and simulations has increased in the past year.
 - (c) The on-orbit experimental results from PKE are proving to be a valuable test of IMPF instrument and operating concepts.
2. The Advisory Board made the following recommendation regarding experiments and testing that should take place before IMPF is launched:
 - (a) The Advisory Board believes that substantial resources are required to refine instrument concepts and to develop software to carry out IMPF-user experiment procedures.
 - (b) The Board believes that using actual experiments will introduce more realism into the tests of hardware and software, and make them more successful for IMPF. This requires scientist participation.
 - (c) If an opportunity arises to carry out flight experiments before IMPF, for example within the PKE program, the Advisory Board believes it would be valuable to utilize the opportunity for development and testing of IMPF-related hardware and software.
 - (d) The Advisory Board notes that it would be attractive to include international and multi-institution participants in these experiments.
3. The Board recommends to the EPSRC, or other United Kingdom agencies, that they consider proposals for ground-based studies related to IMPF.

Sincerely,

John Goree

Professor of Physics, The University of Iowa
and
Chairman, International Advisory Board of IMPF