WELCOME!

Welcome to the second issue of the Plasma Physics Network Newsletter (PPNN). This newsletter was founded by Dr. Manfred Leiser, in coordination with the Third World Plasma Research Network (TWPRN); and the first issue was dated 18 August 1989. The second issue is finally out, after some delay related to the transition from Dr. Leiser's tenure as Head of the Physics Section at IAEA to my own. (Dr. Leiser has returned to work at the U.S. Department of Energy.) It is a pleasure for me to take, as one of my responsibilities and privileges, the editorship of the Plasma Physics Network Newsletter. As editor, I will try to see that the "news" gets distributed. But it is your responsibility to see that I have lots of interesting, informative, accurate information to include in the newsletter. If you do not contribute regularly and faithfully, the newsletter will surely die, deservedly. If you believe that this newsletter is a worthwhile venture, then you can assist in making it a living success by your contributions and by your suggestions for improvement. The target date for the next issue, No. 3, of the PPNN is September, 1990.

Yours truly,
The Editor

IAEA FELLOWSHIPS

You should be aware of the IAEA Fellowship Programme. It provides the possibility for training in any subject relevant to IAEA programmes for periods up to (and occasionally beyond) two years. A scientist from a Member State may spend his fellowship tenure at a host laboratory or university acquiring skills relevant to his work at home, or applicable towards an advanced degree. Also within this programme are "Scientific Visits." These are six- to eight-week tours of several laboratories engaged in programmes that the scientist wishes to establish at home. Scientists interested in this Fellowship Programme should apply on IAEA Form TA-2EW/Rev3(Jan89). (A copy of this form may be obtained by contacting The Editor.)
IAEA RESEARCH CONTRACTS

The Research Contract Programme is intended to provide assistance to laboratories in starting new projects or new lines of research. The contracts are typically for approximately $5000 per year, for about three years. (The major expenses of the projects/research must clearly be born jointly by other funding sources.) The programme has proven useful to many institutions, because often an Agency grant, though small, provides leverage that helps to obtain additional support from local authorities and/or other funding agencies. If you are interested in obtaining a Research Contract, you should apply on IAEA Form N-17/Rev.4(April 89). (A copy of this form may also be obtained by contacting The Editor.)

MEETINGS

We are aware of at least nine meetings that are either entirely about fusion or include fusion as one of the major topics that will occur between the end of June and the end of October:

June 25-29, 1990:
17th EPS Conference on Controlled Fusion and Plasma Heating, Amsterdam, The Netherlands.

July 17-27:
IV Latin American Workshop on Plasma Physics, Buenos Aires, Argentina.

August 27-31:
Joint Varenna-Laussedme International Workshop on Theory of Fusion Plasmas, Varenna, Italy.

September 3-7:

September 16-23:
First South-North International Workshop on Fusion Theory, Tipaza, Algeria.

September 27-28:
IAEA Technical Committee Meeting (TCM) on Research Using Small Tokamaks, Arlington, VA.

October 1-6:
The IAEA biannual conference on Plasma Physics and Controlled Nuclear Fusion Research, Arlington, VA.

October 8-10:
IAEA TCM on Tokamak Transport, Princeton, NJ.

October 15-24:
International School of Plasma Physics "Piero Caldirola" Workshop on Physics of Alternative Magnetic Confinement Schemes, Varenna, Italy.
From our point of view here in Vienna, this is too many meetings with fusion as the topic in too short a time. The Agency can not possibly support all of these meetings (not to imply that it should) nor can we financially support participation at all these meetings by scientists who may be very well-qualified to participate. So many meetings on the same general topic must surely dilute the possibilities for qualified and interested scientists to participate. There is an obvious need for better coordination of meetings with fusion as a topic. We will be pleased to do our part in coordinating, or at least publicizing, future meetings. Please let us know of any meetings you plan to organize or that you hear of others organizing.

**IFRC STATUS OF FUSION REPORT**

The IFRC has nearly completed its latest report on the status of thermonuclear fusion. The report will be composed of three parts: an executive summary, a general overview, and a set of 13 technical reports written by various authors in collaboration with their respective support experts. The full status report is due to be published in the September issue of the journal, *Nuclear Fusion*. The Executive Summary and General Overview are scheduled to be published and distributed separately in mid-June. (If you would like to receive a copy of the stand-alone document, please express your desire to The Editor.)

**COMMUNICATIONS**

Please communicate all contributions, suggestions, requests, etc., to the Editor,

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THIRD WORLD PLASMA RESEARCH NETWORK (TWPRN)

The Third World Plasma Research Network has been set up to provide an international forum for plasma research centres of the Third World countries with the objective of promoting closer interactions among them and strengthening their scientific programmes. The Network also envisages active participation of small scale research programmes from developed countries that pursue basic plasma studies and development objectives.

Objectives of the Network

1. Provide opportunities for intensive cooperation and collaboration between members of the Network.
2. Undertake common projects.
3. Arrange workshops, seminars, symposia and training courses on various topics of common interest.
4. Publish a Newsletter giving information about national, regional and international plasma physics and fusion activities.
5. Set up a bulletin board facility to provide information regarding availability of experimental equipment and other resources.
6. Facilitate exchange of equipment and scientific visits between member organizations of the Network.

Membership of the Network

The membership of the Network is open to:

1. Institutes and organizations of the Third World engaged in plasma research and training activities.
2. Institutes and organizations from developed nations with small scale research programmes oriented towards basic research and development activity.

STEERING COMMITTEE

1. A. Sen (Chairman) India
2. M. Hassan TWAS
3. S. Mahajan ICTP
4. Y.P. Huo China
5. S. Lee Malaysia
6. El Khalafawy Egypt
7. P. Sakanaka Brazil
8. A. Rodrigo Argentina
MINUTES OF THE STEERING COMMITTEE MEETING OF THE
THIRD WORLD PLASMA RESEARCH NETWORK (TWPRN), NEW DELHI
22 NOVEMBER 1989

Members Present: A. Rodrigo (Argentina), Y.P. Huo (China), S. Mahajan (ICTP), A. Sen (India, Chairman), S. Lee (Malaysia)

1. The present meeting of the Steering Committee was held on the occasion of the International Conference on Plasma Physics (ICCP-89) convened in New Delhi from 22-23 November 1989. It was the first meeting after the inaugural meeting in Trieste in June 1989 when the TWPRN was formed. The members were warmly welcomed by the Chairman, who also expressed his appreciation of the support received from the Office of External Activities, ICTP, Trieste for convening this meeting.

2. After a brief recapitulation of the objectives of the Network the members discussed in detail the important activity of publication of the Plasma Research Network Newsletter. It was noted that the first issue had been successfully launched by Dr. M. Leiser, in August 1989. In his editorial, Dr. Leiser had stressed the importance of an International forum (such as the present Network) to promote plasma science activities in the Third World countries, as well as facilitate interaction of Scientists from both third world and developed nations. The Newsletter was meant to serve as an important link between the members of the Network for information exchange and communication. The members agreed to work actively towards regular publication of the Newsletter by providing material on a continuing basis. It was decided that for the second issue, apart from regional news, information on Bilateral and Multilateral agreements on Science and Technology agreements on Science and Technology programmes between various nations would be sent to the Chairman for onward transmission to the editor. Such information can be useful for individual scientists to initiate collaborative work with colleagues in other countries.

3. The Committee also decided to undertake the compilation of a World Directory of Plasma Scientists for which active support would be sought from ICTP and IAFA.

4. The question of the membership of the Network was discussed and it was decided that letters would be sent to various Institutes/Organizations of the Third World engaged in Plasma Research/Training activities as well as to Organizations in developed nations with small scale research programmes oriented towards basic research and development activity. Several names of individuals/Organizations were given to the Chairman for this purpose.

5. There was a brief discussion on the next IAEA sponsored Technical Committee Meeting on Research Using Small
Tokamaks, scheduled for October 1990 in the U.S.A.* The genesis of the Network is intimately tied to this Conference series and it was decided that the Network should actively participate in this meeting and help towards promoting it.

6. Dr. A. Rodrigo spoke about the IV Latin American meeting to be held in Argentina from 16-17 July 1990 and suggested that the next meeting of the Steering Committee be held during that Conference. He also indicated that a Panel Discussion on Third World Research Activities had been planned during the Conference.

7. The Steering Committee expressed its sincere appreciation of Dr. Leiser's contribution towards the formation of the Network and his active role over the past several years in promoting Plasma Science activities in the Third World. The Committee also expressed the hope that the Network would continue to receive such support from the IAEA in the future.

COLLABORATION AND SCIENTIFIC EXCHANGE IN LATIN AMERICAN PLASMA PHYSICS LABORATORIES

A. Rodrigo
Argentina

Bilateral collaboration and exchange of scientific staff have been undertaken for almost two decades in Latin American plasma physics laboratories and proven to be valuable activities for promoting the growth of this field of physics in the region. Except for a few cases where the collaboration was established on a formal basis within the framework of existing research agreements of governmental institutions with their counterpart foreign institutions - such as in the case of most National Research Councils - in most cases the collaboration was established directly between the laboratories or, just as frequently, between the researchers themselves on an informal basis. In these cases, the economic support required to implement the collaborative projects of the scientific staff exchange has to be obtained directly by laboratories or the researchers involved, resorting to their usual funding sources, which are normally local institutions and, in some cases, international institutions.

In view of the lack of a sufficiently wide information basis about the different cooperation/exchange possibilities offered by the various Latin American laboratories active in plasma physics and considering the convenience of distributing this information as soon as possible, only the more basic and general information will be provided here. This information,

*This meeting will now be held in Arlington, VA, USA on 27 and 28 September 1990.
however, should be sufficient to channel specific consultations or proposals by those interested in establishing closer contacts with local laboratories. On this basis, for each country of the region the following data will be provided:

1. Key contact persons.
2. Main areas for collaboration/scientific exchange.
3. List of foreign laboratories having close contacts and, in some cases, collaboration or scientific exchange arrangements with local laboratories (Note: the list is based on available information at the time of writing and is by no means complete).

ARGENTINA

1. Contact persons

   a. Prof. C. Ferro Fontan  
      Laboratorio de Fisica del Plasma  
      Dto. de Fisica-FCEN/UBA  
      Ciudad Universitaria  
      1428 Buenos Aires, ARGENTINA

   b. Prof. Fausto T.L. Gratton  
      Laboratorio de Fisica del Plasma  
      Dto. de Fisica-FCEN/UBA  
      Ciudad Universitaria  
      1428 Buenos Aires, ARGENTINA

   c. Prof. Roberto Gratton  
      PROFET  
      Universidad Nacional del Centro de la Prov. de Bs. As.  
      Pinto 399  
      7000 Tandil, ARGENTINA

   d. Dr. Adolfo Rodrigo  
      Division Fusion Nuclear  
      Comision Nacional de Energia Atomica  
      Avda. del Libertador 8250  
      1429 Buenos Aires, ARGENTINA

2. Areas for collaboration/scientific exchange

   - Plasma Focus experiments (b, c)  
   - Field-Reversed Configuration (FRC) experiments (d)  
   - Fundamental processes in plasma theory (a, b, c, d)  
   - Space and Astrophysical plasmas (a)

3. Contacts/Collaboration/Exchange with foreign laboratories

   - Technische Universitat Graz, AUSTRIA  
   - Institut fur Weltraumforschung, Academy of Sciences, AUSTRIA  
   - University of Campinas, BRAZIL  
   - Pontificia Universidad Catolica, CHILE
1. Contact persons

a. Darcy Dillenburg  
Instituto de Fisica-Lab. Plasmas  
Universidade Federal do Rio Grande do Sul  
Av. Prof. Luis Englert s/n  
9000 Porto Alegre, Rio Grande do Sul, BRAZIL

b. Prof. Gerson O. Ludwig  
Instituto de Pesquisas Espaciais-Lab. Plasmas  
C.P. 515  
Av. dos Astronautas 1758  
12200 Sao Jose dos Campos, SP, BRAZIL

c. Prof. Ivan C. Nascimento  
Instituto de Fisica-Lab. Fisica de Plasmas  
Universidade de Sao Paulo  
Cidade Universitaria, C.P. 20516  
01498 Sao Paulo, S.P. BRAZIL

d. Prof. R. Opher  
Instituto Astronomico e Geofisico/USP  
C.P. 30627  
C.E.P. 01051  
Sao Paulo, S.P., BRAZIL

e. Prof. C. da Cunha Rapozo  
Instituto de Fisica, Lab. Plasma  
Universidade Federal Fluminense  
Outeiro de Sao Joao Batista  
Niteroi 24210, Rio de Janeiro, BRAZIL

f. Prof. Paulo H. Sakanaka  
Instituto de Fisica-Lab. Fisica de Plasmas  
Universidade de Campinas  
C.P. 1170  
100 Campinas, S.P., BRAZIL

g. Prof. Pantuso Sudano  
Instituto de Estudos Avancados  
Centro Tecnico Aeroespacial  
Rodovia dos Tamoios, km 5.5  
CEP 12200, Sao Jose dos Campos, BRAZIL
2. Areas for collaboration/scientific exchange

- Theta pinch experiments (f)
- Tokamak experiments (c)
- Field-Reversed Configuration (FRC) experiments (f)
- RF-plasma heating technology (b0)
- Fundamental plasma physics experiments (b, e, g)
- Fundamental processes in plasma theory (f, c, b, a, e, g)
- MCF computer codes (f)
- Space and astrophysical plasmas (d)

3. Contacts/Collaboration/Exchange with foreign laboratories:

- Centro de Investigaciones Opticas, ARGENTINA
- Comision Nacional de Energia Atomica, ARGENTINA
- Institute for Theoretical Physics (Innsbruck) AUSTRIA
- JET Joint Undertaking, CEC
- Institute of Plasma Physics-Academia Sinica, CHINA
- Centre d'Etudes Nucleaires de Cadarache, FRANCE
- Centre d'Etudes Nucleaires (Fontenay-aux-Roses), FRANCE
- Max-Planck-Institut für Plasmaphysik, FRG
- Istituto Gas Ionizzatti (Padova), ITALY
- Frascati Energy Research Centre, ITALY
- International Centre for Theoretical Physics, ITALY
- Japan Atomic Energy Research Institute TOKAI, JAPAN
- University of Nihon, JAPAN
- University of Nagoya, JAPAN
- University of Tsukuba, JAPAN
- University of Tokyo, JAPAN
- Lund Institute of Technology, SWEDEN
- Institute for Atomic Physics (Stockholm), SWEDEN
- Ecole Polytechnique Federale de Lausanne, SWITZERLAND
- FOM Institute for Plasma Physics "RIJNHUIZEN", THE NETHERLANDS
- Culham Laboratory, UK
- University of Texas at Austin, USA
- MIT-Massachusetts Institute of Technology, USA
- University of Wisconsin, USA
- Columbia University, USA
- Maryland University, USA
- University of Washington, USA
- General Atomics, USA
- University of California, Los Angeles, USA

CHILE

1. Contact Persons

a. Prof. Hernan Chuaqui
   Facultad de Fisica
   Pontificia Universidad Catolica de Chile
   Casilla 6177
   Santiago 22, CHILE

b. Prof. Luis Gomberoff
   Dto. de Fisica, Facultad de Ciencias
   Universidad de Chile
   Casilla 653
   Santiago, CHILE
2. Areas for collaboration/scientific exchange
   - Dense z-pinch experiments (a)
   - Plasma focus experiments (a)
   - Pseudo-spark experiments (a)
   - Rotamak experiments (a)
   - Space and astrophysical plasmas (b)

3. Contacts/collaboration/exchange with foreign laboratories
   - University of Buenos Aires, ARGENTINA
   - University of Malaya, MALAYSIA
   - Imperial College, UK

COLOMBIA

1. Contact persons
   a. Prof. Jaime Castro Blanco
      Departamento de Fisica
      Universidad Industrial de Santander
      Bucaramanga, a.a. 678, COLOMBIA
   
   b. Prof. Ricardo Krikorian
      Departamento de Fisica
      Universidad de Antioquia
      Medellín, a.a. 1226, COLOMBIA

2. Areas for collaboration/exchange
   - Plasma focus experiments
   - Thermodynamics of dense plasmas

3. Contacts/collaboration/exchange with foreign laboratories
   - University of Buenos Aires, ARGENTINA

MEXICO

1. Contact persons
   a. Dr. Armando Bravo
      Departamento de Fisica
      Instituto Nacional de Investigaciones Nucleares
      A.P. 18-1027
      11801 Mexico D.F., MEXICO
   
   b. Dr. Julio Herrera
      Centro de Estudios Nucleares
      Universidad Nacional Autonoma de Mexico
      A.P. 70-543, Deleg. Coyoacan
      04510 Mexico D.F., MEXICO
c. Dr. Jose Valdes
Instituto de Geofisica/Estudios Espaciales
Universidad Nacional Autonoma de Mexico
Circuito de Inv. Cientifica c.u.
Deleg. Coyoacan
04510 Mexico D.F., MEXICO

2. Areas for collaboration/scientific exchange

- Tokamak experiments (a)
- Plasma focus experiments (b)
- Fundamental processes in plasma theory (a, b, c)
- Space and astrophysical plasmas (c)

3. Contacts/collaboration/exchange with foreign laboratories

- Max-Planck-Institut für Plasmaphysik, FRG
- Los Alamos National Laboratory, USA
- Imperial College, UK
- I.V. Kurchatov Institute of Atomic Energy, USSR

VENEZUELA

1. Contact person

Dr. Pablo Martin
Departamento de Fisica
Universidad Simon Bolivar
Apartado 80659
Caracas 1081, VENEZUELA

2. Areas for collaboration/scientific exchange

- Experiments and theory on basic plasma processes

3. Contacts/collaboration/exchange with foreign laboratories

- Imperial College, UK
The Institute of Nuclear Science and Technology (INST) is one of the institutes of Atomic Energy Research Establishment of Bangladesh Atomic Energy Commission. Plasma research is comparatively a recent activity in the institute. The basic objectives of the plasma research programme are:

- To develop a critical number of research scientists to be engaged in plasma, fusion and space research.
- To develop a steady state plasma device to study the basic properties of plasma related to fusion and space.
- To develop a small scale fusion device to study the fusion plasma for going to a comprehensive fusion programme.

Presently, research activities with the above objectives are being done in three ways: theoretically, computationally and experimentally. High Temperature Relativistic Plasma Dynamics is the topic of theoretical research, which has the wider applications in laser fusion, laser-plasma beat wave and wakefield accelerators, microwave heating of TOKAMAK plasmas, pulsar radiation and other stellar phenomenon. Two thesis works are done on the following topics:


The establishment has its own computational facility with an IBM-4341 computer. Particle code ESI with FFT developed in UCLA is implemented in this computer and two stream instability is being investigated. Development of MHD, Hybrid Codes and simulation of Evolution system are in the current programme of computational research.

Experimentally, a Glow Discharge Plasma Device is installed. Plasma parameters are determined by Langmuir probe. This device will be embedded by a strong magnetic field. Plasma properties and Saha equation of ionization and recombination in
the magnetic field, are the topics of current experimental study.

Recently, in the International Symposium on Recent Advances in Physics, 15-19 January 1990, Dhaka, Bangladesh - a full session was devoted to plasma research. An invited talk on the topic "Some Highlights of Current Plasma Research" was delivered by U.A. Mofiz (INST). This talk was supposed to be delivered by Professor A. Sen of the Institute for Plasma Research, India but he could not attend the conference. Furthermore, six contributed papers were read out in the conference:

**Paper 1:** Spiky Solitons and Wakefield Accelerators in Ultrarelativistic Pulsar Plasmas (by U.A. Mofiz, INST, Bangladesh)

**Paper 2:** Computer Simulation of Relativistic Solitons in Plasmas (by U.A. Mofiz and Madhabi Islam, INST and ICS, Bangladesh)

**Paper 3:** 3-Dimensional Modulation of Ultrarelativistic Electromagnetic Wave in a Strongly Magnetized Plasma (by U.A. Mofiz and S.M. Hassanuzzaman, INST and Department of Physics, University of Dhaka)

**Paper 4:** Waves and Oscillations in the Electron-Positron Plasma of the Pulsar Magnetosphere (by U.A. Mofiz and N.U. Bhuiyan, INST, Department of Physics, University of Dhaka)

**Paper 5:** Experimental Study of Cold Plasma in a Glow Discharge Using a Langmuir Probe (by U.A. Mofiz, Zarin Ahmed, A.K.M. Fazlul Hoque and M.A. Asgar, INST, Department of Physics, BUET, Bangladesh)

**Paper 6:** The Influence of Gas Heating on Energy Balance in Plasma column of Surfatron (by P.S. Bulkin, et al., Department of Physical Electronics, Moscow State University, USSR)

**ICPP '89 - A SUMMARY**

**P.K. KAW AND A. SEN**

The 1989 International Conference on Plasma Physics was held in November 1989 at the historic city of New Delhi. The Conference once again demonstrated the immense vigour of this field and the tremendous variety of its topics ranging from fundamental aspects of nonlinear physics, chaos and turbulence to applications like fusion, space and astrophysical phenomena, novel accelerators and radiation sources, etc.

The largest experiments in plasma physics are those devoted to magnetic confinement of thermonuclear plasmas. A report from the Joint European Tokamak showed some very impressive results
in which experimental conditions close to those of scientific breakeven (an effective $Q_{DT} = 0.8$) were achieved. Major improvement in impurity control was achieved by the use of beryllium as a first wall coating material. The other confinement approaches like stellarators, mirrors, pinches, etc. are still trailing tokamaks considerably in terms of parameters achieved. Impressive compression experiments were reported with laser fusion drivers but it appeared that because of low driver efficiencies, pulse repeatability, etc., one is still far from what would be required in a fusion reactor. One talk was also devoted to muonic and cold fusion but concluded that neither looks too promising at the present time.

Some very fascinating theory and experiments on exotic plasmas were reported at the meeting. Strongly correlated pure ion plasmas can be produced in the laboratory by the techniques of laser cooling and then studied using laser fluorescence techniques. Computer simulations and experiments were presented which show formation of pure ion liquids, crystals and liquid crystals. Interesting theoretical studies have also been carried out on dusty plasmas - an exotic plasma with significant component of charged dust particles which are influenced by gravitational as well as electromagnetic forces. Such plasma explains many features of planetary rings around Saturn and other planets. Experiments were also reported on negative ion plasmas which are produced in the laboratory by letting electrons attach themselves to $SF_6$ molecules; various collective phenomena like waves, oscillations, etc. in such negative ion plasmas were also studied. Theoretical work on screening in quark - gluon plasmas which are expected to form in the early stages of the universe and in accelerator experiments when high energy collisions of heavy nuclei takes place, was also presented at the Conference.

The nonlinear phenomena of vortex formation, turbulence and chaos were also well presented at the Conference. Much of the coherent nonlinear wave work is now devoted to multidimensional vortex solutions and various examples were presented. A very interesting approach to turbulent transport was presented which relies on a variational approach and provides one with upper and lower bounds on the transport. New results on chaotic generation of magnetic fields by fast dynamos were also presented. It was demonstrated that chaotic velocity flows in a resistive MHD fluid will lead to an exponential growth of seed magnetic fields with a growth rate which remains finite even in the 'ideal' ($R_m \rightarrow \infty$) limit. The problems of this model are that it is not self-consistent (i.e. it does not take into account the reaction of the generated $B$ fields back on the flow) and that it produces a $B_{\text{random}} \gg B_{\text{coh}}$ which is inconsistent with observations. Another interesting problem related to chaos was an experiment on the non-adiabatic escape of trapped electrons from mirror magnetic fields. An ensemble of such particles with random gyrophases is found to exhibit a variety of interesting phenomena such as multiple life-times, Bragg-like reflections from a multiply periodic magnetic field, etc. An independent verification and interpretation of these novel observations really appears to be worthwhile.

Another important class of papers was on free electron lasers and novel particle accelerators. It appears that beam particle
trapping effects in ponderomotive fields give a reasonably good account of the saturation of the free electron laser instability and the only concerns now are improvement of efficiency, bandwidth, etc. The beat-wave and wake-field particle accelerator were studied in a number of theoretical papers: the chief concern seems to be continued phase matching for acceleration in inhomogeneous plasmas. Some interesting experiments on perpendicular acceleration of particles by EXB trapping mechanism were also reported.

Space and astrophysical phenomena and their interpretation were the topics of a great many other papers. Very interesting theoretical and observational work on ionospheric irregularities and their artificial control by ground based radio wave transmitters were presented. A very interesting report on the artificial comet experiment was also presented. Extremely detailed plasma physics related to formation and dynamics of dense plasma cavities in the magnetosphere has been studied in this experiment.

Other important topics related to cosmic ray acceleration by the pinch mechanism, solar dynamo phenomena, physics of neutral sheet, and pulsar magnetospheres.

Entirely new technologies which may have enormous impact in the future was discussed in the context of developments in X-ray lasers and new methods for plasma production to be used for plasma processing of materials. These technologies are ready to be exploited in a major way in the high-tech industrialized countries of the west.

All in all, the meeting gave one an excellent flavour of the breadth of plasma physics, its wide ranging applications and its future. One came away with the feeling that 'this queen of classical physics' is indeed doing very well and that its frontiers are advancing in all directions.

FIRST SOUTH-NORTH INTERNATIONAL WORKSHOP ON FUSION THEORY
Tipaza, September 16-23, 1990

SCOPE OF THE WORKSHOP

It is now a reality that fusion research is carried out in a number of developing countries and that contributions of their scientists to this research are non negligible.

Therefore a South-North collaboration is needed to achieve an international cooperation in this field and to generate more contacts between North and South laboratories.

One of the main goals of this meeting is to stimulate such cooperation.
MAIN TOPICS OF THE WORKSHOP

The first meeting is mainly devoted to the problems of turbulence and transport phenomena (Kinetic theory, Nonlinear effects, Hamiltonian approach, Microinstabilities approach,....)

WORKSHOP LOCATION

Tipaza is an old antic city on the mediterranean coast, 60 kilometers west of Algiers. Its famous roman ruins nested between forest, mountain and sea are among the most beautiful ones. The weather is cool during this period (20-25°C). Accomodation of the participants would be held at the "TIPAZA CORNE D'OR" touristic resort, the best one in the country.

A shuttle bus service will be organized between Algiers airport and the hotels.

PAPER SUBMISSION

Authors should submit two copies of an abstract covering no more than two typed pages before May 1st 1990.

Notification for acceptance will be given by July 1st 1990. Proceedings of the meeting would be published. If possible you should have a manuscript prepared prior to the meeting.

However, since after discussions during the session, you may wish to make changes in the manuscript a final deadline will be set to December 1st 1990.

NOTE

Please submit the abstract together with your registration form!

REGISTRATION FEE

A fee of 70 US$ for partial coverage of the expenses (proceedings, refreshments and a dinner) for the workshop will be collected at your registration at Tipaza, September 15-16, 1990.

For Ph.D. students, the registration fee is 30 US$.

A social program would be planned.

FINANCIAL SUPPORT

We have a limited funding which we wish to attribute preferentially to participants of developing countries.

Those interested in this support should specify it on the application forms (Plus C.V. and publication list).

The organizing committee will notify the amount of financial support by 15th of July.
LIVING EXPENSES

Accommodation and meals are organized at TIPAZA resort. The cost per person for the duration of the workshop for full board is 300 US$, approximately.

INTERNATIONAL AND NATIONAL ADVISORY COMMITTEE

A. Abdelatif (Algeria)
A. Bendib (Algeria)
H. Bessalah (Algeria)
M. Dubois (France), Co-Chairman
D. Cresillon (France)
P. Hennequin (France)
T. Kerdia (Algeria)
A. Khalfaoui (Algeria)
G. Laval (France)
T. Mendoca (Portugal)
M.S. Mohamed Benkadda (Algeria), Chairman
A. Sen (India)
H. Wilhelmsson (Sweden)
N. Yahia-Bey (Algeria)

All correspondences should be sent to the conference chairman:

Dr. M.S. Mohamed Benkadda
SNIWPT1 - CDTA-HCR
B.P. 245 El-Madania (Alger), ALGERIA
Telex: 65 304 COMEN: Fax: (213) 2 65 33 60

Program and further information will be sent to those who return the attached reply form.
PRELIMINARY REGISTRATION FORM

FAMILY NAME: ____________________________________________

FIRST NAME: ____________________________________________

TITLE: _________________________________________________

INSTITUTION: __________________________________________

MAIL ADDRESS: _________________________________________

TELEX: __________________ PHONE: ___________________ FAX: __________________

THE PROBABILITY THAT I ATTEND THE WORKSHOP IS:

[ ] HIGH [ ] MEDIUM [ ]

[ ] I AM [ ] I AM NOT WILLING TO PRESENT A COMMUNICATION

ABSTRACT TITLE: _______________________________________

EXPECTED NUMBER OF ACCOMPANYING PERSONS: ___________

FINANCIAL SUPPORT APPLICATION

DOES YOUR INSTITUTION REQUEST THAT YOU OBTAIN FINANCIAL SUPPORT FOR:

[ ] TRAVEL [ ] ACCOMODATION
List of Developing Countries with Fusion Activities

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of Institutes with Fusion Programmes</th>
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<tbody>
<tr>
<td>Argentina</td>
<td>3</td>
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<tr>
<td>Bangladesh</td>
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<td>Brazil</td>
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Distribution of Fusion Countries by Region

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Tokamaks in Developing Countries

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