European Physical Society

Published by *Europhysics News* to inform members. Editor: C.C.J. Schneider, EPS, 34 rue Marc Seguin, F-68060 Mulhouse
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The Annual Council of the European Physical Society, was held from Friday, 21 March to Saturday, 22 March in the Council Chamber of the Université de Haute-Alsace, Mulhouse. This was the first Council of EPS to be held in Mulhouse, the seat of the Secretariat since the beginning of 1997.

Fifty physicists from all over Europe met to hear reports on EPS actions to promote physics in Europe in the last twelve months, and what EPS is planning for the future. These participants included representatives of the various National Physical Societies which constitute EPS – from the small ones, such as the Armenian Physical Society, but also the larger German Physical Society and the Institute of Physics.

The Council was opened by the President of EPS, Prof. Herwig Schopper, and a speech of welcome was made by Prof. Gresser of the Université de Haute-Alsace: *"Au nom de l'Université je souhaite la bienvenue à l'ensemble des représentants des Sociétés Nationales de Physique et des représentants des Comités et des Divisions de l'EPS. Votre présence nous honore"*. Prof. Gresser went on to express the hope, now that EPS was installed in Mulhouse and would eventually be moving to the campus of the university, that both the EPS and the Université de Haute-Alsace, which is already a well-known research centre, would develop further together: *"L'Université de Mulhouse possède un grand pole de recherches en Chimie et en Physique des matériaux. Elle possède deux Ecoles d'ingénieurs, en Chimie et en Textiles, qui ont été crées, il y a plus de 150 ans, par des industriels visionnaires. L'EPS et le développement de la Physique à Mulhouse, doit nous permettre de d'accompagner notre développement"*.

It is the duty of Council, the highest decision-making body in the EPS, to elect members of the Executive Committee. Professor Dennis Weaire (Dublin) was elected President of EPS. Professor Weaire holds the Erasmus Smith Chair of Natural and Experimental Philosophy at Trinity College, Dublin, Ireland. His interests include solid state theory, materials science, soft condensed matter, computational physics, the history of physics, and the restoration and conservation of scientific instruments.

Executive Committe: A new Executive Committee was elected during the Council; its members are: G. Morrison (Birmingham), Vice-President; J.-P. Ansermet (Lausanne), Secretary; C. Sébenne (Paris), Vice-Secretary; J. Lewis (Malvern, UK), Treasurer; Ana Marie Eiro (Lisbon), Vice-Treasurer; G. Benedek (Milan); P.J. Brussaard (Bilthoven); R. Klein (Konstanz); P.-A. Lindgard (Copenhagen), and R. Sosnowsky (Warsaw).

During the Council meeting reports, both oral and written, were presented from the various Divisions and Interdivisional Groups, and also from the Action Committees of EPS. Below are the summaries of activities in EPS, and the decisions taken during the meeting.

A short report on the Secretariat of EPS was given by the Secretary General, Gero Thomas. He described how the contents of the old office in Geneva had been carefully packaged and, after delivery to the new office in Mulhouse, it had been a straightforward task, with the appropriate contents-list, to find any desired file or document.

The staff in the old Secretariat were thanked for their hard work and efficiency. The staff of the new Secretariat were introduced during the course of the Council.

Finance: To approve the 1996 accounts which showed a surplus of 8176 CHF. The 1997 budget was presented with the allocation of funds to diverse Action Plans and Programmes within EPS. The Treasurer explained that not all the money saved by moving the Secretariat from Geneva to Mulhouse had been allocated, and that further sums would be made available later this year if sufficiently good proposals where received by the Executive Committee. However, it was estimated that there would be an excess of income over expenditure of 37 833 FRF for 1997.

No change of the unit fee was envisaged. The unit fee will remain at 9.1 ecu until the next Council. A lively discussion followed on the slow payment of some countries' national subscriptions; for example, at the end of 1996 the money owing for 1996 subscriptions amounted to almost 15% of the total subscription budget. This made it difficult for the EPS to plan its financial commitments. It was agreed to distribute a list of defaulting nations and the sums owed.

Action Committee on Conferences: During 1996, 40 meetings (including conferences, symposia and workshops), which had been referred to this committee, were considered for approval or sponsorship. The final statistics were: 17 approved meetings (organised by a Division, Interdivisional Group or Section of EPS), 21 sponsored meetings (conferences organised by groups of physicists who apply to EPS for sponsorship), and two proposals which were rejected as not being sufficiently broadly based. During the same period, a comparable number of future meetings, for 1997 or 1998, were referred to the Committee.

The observed increase in the number of applications for sponsorship in 1996 resulted, in part, from the publicity surrounding the Solidarity Fund which provides scholarships to young participants (under 35 years of age) working primarily in Eastern Europe, to attend "small events". Applications to the Solidarity Fund can, however, only be made by those wishing to attend approved events.

During a recent meeting, the Committee proposed to extend the support from the Solidarity Fund to young scientists who wished to attend sponsored conferences – depending upon the availability of funds. This possibility will, however, be accompanied by a stricter regulation of sponsorship to ensure that, when a conferences gains the title "Sponsored by EPS", this is recognised as a seal of approval.

The Committee also acted as referee and scientific policy adviser in physics for the EURESCOs – these are the Gordon-like conferences organised by the European Science Foundation. In 1996, five such physics conferences were organised, among which two were directly proposed by an EPS Division.

Action Committee on Physics and Society: A Study Conference on "Economy-Energy-Entropy" was held at CERN in May 1996, attended by about 60 parti-

1997 Hewlett-Packard Europhysics Prize

The Selection Committee of the Hewlett-Packard Europhysics Prize decided at its meeting in Geneva of 14 March, 1997, to award the 1997 Prize to:

Prof. Albert Fert (Université Paris-Sud)
Prof. Gruenberg (Forschungszentrum, Julich)
Prof. S.P. Parkin (IBM Research, Almaden)

for "their Discovery and Contribution to the Understanding of the Giant Magnetoresistance Effect in Transition Metal Multilayers and their Demonstration of its Potential for Technological Applications".

Background

In 1986, Peter Gruenberg and co-workers demonstrated that two thin single crystalline Fe layers separated by a thin Cr layer, 4 to 5 monolayers thick, displayed antiferromagnetic coupling of the Fe layers. At the time, it was unclear if this coupling was intrinsic or whether it resulted from some sort of magnetostatic coupling of the Fe layers. Subsequently in 1988, Gruenberg and co-worker, and Baibich, Fert and co-workers showed independently in molecular beam epitaxially deposited crystalline Fe/Cr/Fe and Fe/Cr multilayers that these structures exhibit enhanced magnetoresistance (MR) over plain Fe layers.

This phenomenon is commonly referred to as Giant Magnetoresistance (GMR). In this work, using thin crystalline layered structures, both Gruenberg *et al.* and Fert *et al.* showed a monotonic variation of GMR with the thickness of the non-magnetic spacer (Cr) layers. Moreover, the enhanced MR was observed at low temperatures and in very large magnetic fields. In 1989, Parkin *et al.* demonstrated that it was possible to observe both antiferromagnetic coupling and GMR in polycrystalline multilayers prepared by simple sputtering deposition techniques, thereby opening the door to relatively cheap technological applications and the exploitation of diverse materials.

Parkin demonstrated that GMR and antiferromagnetic coupling is common to virtually all transition metal systems. He showed that in sputtered multilayers the coupling of the ferromagnetic layers, mediated by non-magnetic spacer layers, oscillated in sign between antiferromagnetic and ferromagnetic coupling. These observations prompted much work, and more than a year later the oscillatory coupling was confirmed in epitaxially deposited single crystalline Fe/Cr/Fe wedges by a group at NIST who had also observed a short oscillation period of just 2 monolayers of Cr in addition to the longer period of approximately 10 monolayers discovered by Parkin. Parkin also discovered that the largest GMR effects are shown by Co/Cu multilayers which at room temperature exhibit GMR effects of 90% or higher. By ingenious "spin engineering", Parkin and co-workers demonstrated the possibility of obtaining enhanced MR at low fields suitable for device applications, such as MR read sensors for magnetic recording heads. IBM, for example, has announced plans to use these structures in disk drives as soon as the end of 1997.

The three recipients of this year's Hewlett-Packard Prize have continued to be the leading scientists in the field of magnetic multilayers, and all three have continued to make important contributions. Fert has developed theoretical models of the GMR effect, particularly for structures in which the current flows perpendicular to the layers.

Gruenberg has concentrated on the study of interlayer coupling in crystalline wedged sandwiches and, together with Demokritov and co-workers, has discovered the phenomenon of biquadratic coupling, whereby the magnetic moments of two magnetic layers separated by a certain thickness of non-magnetic material have a tendency to orient their magnetic moments perpendicular to one another.

Parkin demonstrated the universality of oscillatory coupling and GMR for virtually all transition and noble metal spacer layers. Parkin also demonstrated that, contrary to early models, GMR arises almost purely from interface scattering. This has led to improved models of GMR and improved device structures which display greater sensitivity to small fields by suitable interface engineering. Parkin's work using simple sputtering deposition has now been emulated by numerous other groups. Indeed, Parkin has recently demonstrated the possibility of preparing single crystalline sandwiches and multilayers using sputtering, with a structural quality comparable to molecular beam epitaxially grown films.

All three scientists have long and distinguished scientific records, and have played leading roles in recent developments in the field of thin film structures. Their work has lead to an explosion of interest in these materials with a continuing increase in activities world-wide.

cipants. The Proceedings have been printed at CERN and distributed *inter alia* to National Societies. The proceedings (edited by Dr. E.W.A. Lingeman, 169 pp) are also available from the EPS Secretariat, Mulhouse, at a price of FF 160 .

Professor Sir Arnold Wolfendale, who had been nominated by the Action Committee on Physics and Society, gave the Cecil Powell Memorial Lecture at EPS-10 in Seville.

On the initiative of Stefan Kubsky (Bochum, Germany), the Action Committee on Physics and Society supported the convening at EPS-10 of a meeting of "Young Physicists" which made useful proposals concerning employment of physics graduates.

The Workshop on Solar Energy, arranged jointly with the Interdivisional Group Physics for Development, has been

postponed from September 1996 and is now planned to be held at ENIA (near Naples) in May 1997. This meeting will be financially supported by UNESCO and the Italian national electricity company, and will have about 40 participants from over 20 coun-tries, including those in North Africa.

European Mobility Scheme for Physics Students: Since the last EPS Council Meeting in Lisbon, where an extensive report on the origin, status and future of EMSPS was given, the following new developments have occurred:
- The total number of participating institutions is now 179.
- The committee directing the Mobility Scheme unanimously decided to recommend the move of the EMSPS Secretariat to the University of Gent, a move which was subsequently approved by the Executive Committee of EPS.

In view of the fact that TEMPUS support for student mobility is restricted to the countries Hungary, Latvia, Poland (MJEPs 1994/97), and Lithuania and Romania (MJEPs 1995/98), and since no further support from the Soros Foundation will be available, there is a lack of grants for the seven CEE countries Czech Republic, Croatia, Moldavia, Russia, Slovenia, Slovakia and Ukraine, where at least one institution keen to participate in EMSPS is located. Furthermore, the situation with regard to all the above mentioned CEE countries will become much worse in the academic year 1997/98: firstly, the main TEMPUS MJEPs have ended, and no continuation will be possible; secondly, the SOCRATES programme will not come into effect for these countries before 1998/99. The student flow involving these countries amounts to about 40% of the total current EMSPS flow – and that will come to an abrupt end if no provision for financial support from other sources is made. Therefore a request for two one-year grants for each one of the seven CEE countries within EMSPS was presented to the Executive Committee in connection with the EPS Strategy Plan. In addition, the EPS Executive Committee was asked to earnestly consider a sizeable increase in the number of grants to be foreseen for the academic year 1997/98, since almost 80% of the EMSPS institutions in CEE countries will then be without support for student mobility.

For the academic year 1995/96 the total number of students moving within EMSPS was 359, the flow for 1996/97 is about the same, i.e. 342 students have currently taken advantage of this EPS scheme. With regard to the coming year, the situation is still quite unclear since the effects of the change from the previous ERASMUS ICP to the new SOCRATES programme cannot yet be estimated.

Task Force: In 1996, the EPS founded a new body, East-West Task Force (EWTF), at the meeting of the Council in March 1996 in Lisbon to support activities of physicists from the reforming countries of Central and Eastern Europe (CEE). The kernel of the Task Force consists of only three people (J. Nadrchal, Czech Republic, nadrchal@fzu.cz, D.L. Nagy, Hungary, nagy@rmki.kfki.hu, and H. Szymczak, Poland, szymh@beta1.ifpan. edu.pl), but it collaborates with represent-atives of National Physical Societies from this region in the implementation of various activities (National Societies from Albania, Armenia, Estonia, Lithuania, Macedonia and Slovenia have not yet nominated their representatives).

Last year the Task Force organised financial support for several physicists from the region of CEE at conferences organised or sponsored by EPS, and has prepared its Action Plan for this year.

However, there is one way how physicists from the developed countries could easily support the work of their colleagues in the CEE region. It is not a new idea, but needs to be continually restated. The equipment in physical laboratories, institutes and universities in the CEE countries is not yet, and for a long time will not be, so good that some of the equipment and computers being replaced by new ones in the workplaces in Western Europe, or in the USA, could not help to improve their working conditions. EWTF has had several more or less specific wishes for help of this kind (e.g. a request for some measuring equipment for spectroscopy from Bosnia or personal computers for e-mail and Internet connections from Russia). Apart from this present reminder, EWTF has, unfortunately, no other means of pointing out the importance of such technology transfer.

Thus, should there be a piece of equipment in your laboratory that you plan to throw away, think of donating it to someone in CEE. You may know appropriate recipients personally, and this is the easiest way of proceeding, but otherwise you may contact a member of the EWTF (see e-mail addresses above), who will try to find a partner for you.

Physics Education: The Interdivisional Group on Physics Education (IGPE) comprises three sections: Forum on Education (Co-Chair: G. Tibbell, Uppsala; G. Marx, Budapest); University Teaching Section (Chair: H. Ferdinande, Gent); European Mobility Scheme for Physics Students (Chair: H. Latal, Graz).

The Interdivisional Group on Physics Education organised a Symposium on Physics Education at EPS-10, in Seville, which was attended by many participants. The Symposium included oral presentations by a number of speakers, and a Poster Presentation.

The Board of the Forum on Education held its first meeting in London, 22 February 1997, hosted by the IOP. A. Olme presented a paper on an initial survey of current practice in physics education in different countries, based on replies to a questionnaire from 32 people. This work will be extended to collate further details of differing current national teaching practice. Several members of the Board volunteered to provide accounts of physics teaching practice in their respective countries. There was unanimous agreement on the importance of teacher exchange, and money was allocated to start a modest exchange programme.

It was agreed that a liaison should be established with other bodies involved in physics education, and with the various competitions and Olympiads currently organised for students.

EUPEN – European Physics Education Network: EUPEN is a permanent forum created by the Scientific Committee of the Conference "Physics Studies for Tomorrow's Europe/*L'enseignement de la physique pour l'Europe de demain*" held in Gent (Belgium) on 7 and 8 April 1995, in the series of ERASMUS Thematic Evaluation Conferences.

A Steering Committee prepared a proposal for a "Thematic Network" in the framework of the SOCRATES programme. A project outline has been submitted for support to the European Commission. In the first phase of the selection process the application has been retained. EUPEN has been accepted as a "Thematic Network Project" in the framework of the SOCRATES Programme, under reference 25929-CP-1-96-1-BE-ERASMUS-ETN, as one of the 28 Thematic Networks approved for Community support in 1996/97.

EUPEN is managed by an Executive Committee. The Working Groups are headed by Executive Groups. A Consortium Agreement has been approved by the Executive Committee of the EPS. EUPEN operates in close connection with the EPS and more specifically with the EPS Interdivisional Group on Physics Education, comprising the Forum on Education, the University Teaching Section and the European Mobility Scheme for Physics Students (EMSPS).

EUPEN Questionnaire: In February 1997, EUPEN sent a questionnaire drawn up by the Executive Groups to all contact persons involved in the operation of the programme. This questionnaire is designed to identify the different national strengths in physics teaching with a view to adopting similar strategies in other countries.

A first EUPEN General Forum is planned for Friday, 29 August and Saturday, 30 August 1997 in the Natienhuis Grand Hotel Oude Burg, Brugge (Belgium). Besides presenting and discussing the results of the questionnaires, this forum will offer an open platform for problems and solutions to educational and mobility topics related to the whole of Europe.

The e-print archive in Los Alamos, and its mirror sites, has recently implemented a new subject classification scheme, including "Physics Education". The website http://xxx.lanl.gov/ can be reached for general information. You can be linked to "Physics Education" via the URL http://xxx.lanl.gov/archive/physics/.

Physics for Development: It was reported that in the last year the Board of the Physics for Development Interdivisional Group has been renewed by elections. The new Board has representatives from 10 countries and will be involved in joint activities with the Division of Condensed Matter and Physics and the Society Action Committee. These are meetings planned in Italy and Portugal in 1997, together with projects involving scientists in Africa in 1997 and 1998.

Joint Astrophysics Division: The second meeting of the Board of the Joint Astrophysics Division took place at CERN in November 1996. At this meeting, the Board was informed that the Solar Physics Section of EPS had decided to join the Joint Division and wished to have two representatives on the Board. The Board also welcomed the proposal by Bernard Schutz of the Albert Einstein Institute, Potsdam, to set up a new Section dealing with "Gravitational Waves and Fundamental Gravity Theory" – the activities of this new Section will begin with a Workshop, the precise details of which have yet to be established.

It was also decided to co-opt several new members to the Board of the Joint Astrophysics Division in order to acquire greater expertise in the area of cosmic rays, astroparticle physics and the detection of dark matter, both by use of ground and space based observations.

Atomic and Molecular Physics Division: In 1996, no major meetings of the Division, such as ECAMP, took place. However, the field was well represented at EPS-10 in Seville with symposia on "Bose-Einstein Condensation", and on "Physics with Ion Storage Cooler Rings".

High Energy and Particle Physics Division: The next Divisional Conference (HEP97) will take place in Jerusalem, August 20-26, 1997. The conference will be located at the Hebrew University, and the adjacent conference centre.

The HEPP Board has expressed concern about the decreasing support for basic research in several member countries, and also within the European Union, favouring applied research with industrial partners. The following two actions were taken:
– The Board proposed a more active role for the EPS in the European Union funding of networks and fellowships.
– The Board was especially worried by recent proposals for heavy cuts in the support of the established and very successful international laboratories, for example CERN, where future programmes may have to be severely trimmed, and issued the following statement on 9 November, 1997:

The Board of the EPS HEPP Division expresses its satisfaction that the member states of CERN unanimously support the Large Hadron Collider (LHC) programme and wish the project to be completed in a single step in 2005.

Nevertheless, we are very concerned about the dramatic changes proposed at rather short notice for the budget of CERN. We strongly hope that the CERN Council during its next meeting in December will agree to long term budgetary measures which will allow CERN to complete the LHC in the foreseen timetable in a safe and responsible manner, and without reducing drastically the general support of the overall programme of CERN which makes use of unique frontline facilities, such as LEP, in which member states have invested heavily.

Quantum Electronics and Optics Division: In 1996, the Quantum Electronics and Optics Division (QEO) organised the second joint European Quantum Electronics Conference and Conference on Lasers and Electro-optics (EQEC/CLEO Europe) in Hamburg.

The EQEC/CLEO Europe meeting was a great success with 1270 attendees, including 500 students. The industrial exhibition organised during this meeting was fully booked with 147 exhibitors. The first EPS Quantum Electronics Prize was awarded, in Hamburg, to Claude Cohen-Tannoudji (Paris) and Sune Svanberg (Lund). All these activities, as well as the lectures given in 1996 throughout Europe by Anton Zeilinger (Innsbruck), the travelling EPS lecturer, and the regular publication of the QEOD newsletter in *Optics Communications*, implement the Division's policy of visibility and public awareness of the Quantum Electronics and Optics community in Europe.

Discussions are underway with the Optical Society of America with a view to establishing some joint programmes which, it is hoped, will be mutually beneficial.

Interdivisional Group on Experimental Physics and Control Systems: The Interdivisional Group on Experimental Physics and Control Systems (EPCS) has decided to create a prize – the Experimental Physics Control Systems Prize of the European Physical Society (EPS-EPCS). The prize will normally be awarded every two years, at the biennial International Conference on Accelerators and Large Experimental Physics Control Systems (ICALEPCS) which are co-organised by the EPCS. The prize will be awarded to one or more persons who have made outstanding contributions to the field of Experimental Physics Control Systems.

Next Meeting: The next Council will be held in Amsterdam on 27–28 March, 1998.

Jeffrey H. Williams, EPS Mulhouse