gave a description of the effect of the Coulomb correlation on producing localized magnetic states in metals. This paper, which is extremely elegant and clear, gave a great impetus to the study of dilute magnetic alloys, a field which has proved to be full of interesting phenomena and which continues to be of active interest today. Anderson has continued to work in this field and has suggested new approaches to the Kondo problem of the interaction between an isolated moment and the conduction electrons, and to that of disordered systems of localized moments, the so-called "spin-glass" problem, again giving stimulus and direction to the efforts of many experimentalists. The latter problem provides a nice analogy with his work on disordered non-magnetic systems. He has made a major contribution to the great development which has occured in the last two decades in our understanding of the behaviour of localized moments in metals and of disordered systems.

Both Van Vleck and Mott were pioneers in establishing the field of solid state physics and have made vital contributions to the subject. Anderson is from a younger generation, but his work is also widely recognized as being of the greatest importance for our understanding of the solid state. The award of the Nobel prize to these three very distinguished scientists will give rise to great satisfaction and pleasure throughout the physics community.

EPS CONFERENCE REPORTS

Workshops of the Solar Physics Section

A main objective of the Solar Physics Section is to formulate suitable topics for workshops and to arrange for such workshops to be organized. As the idea of a workshop is to bring together a number of specialists to work jointly on problems of common interest, these may come closer to a solution during the workshop itself, and agreements on continued coordinated effort may be reached. A report on the workshop on Pluridimensional Radiative Transfer held in September 1976 appeared in *Europhysics News,* **8** (1977) 4 and short accounts are now given of the three workshops held in 1977. For 1978, two workshops are planned : a workshop on Type I Solar Radio Emission (the so-called noise storms), to be held in March in Toulouse and a workshop on the Sun's Granulation, to be held in the Autumm in Freiburg.

Atomic Data and the Solar Maximum Mission, Zürich, April 1, 1977.

This meeting, organized by M. Huber and H. Nussbaumer, was attended by 33 scientists from Belgium, England, France, Germany, Holland, Italy and Switzerland. The capabilities of the Solar Maximum Mission (SMM) instruments were presented together with a review of the present state of solar physics of relevance to EUV and X-Ray observations. Representatives of individual groups reported about their activities and plans relating to SMM. The information thus exchanged was very valuable to the participants. However, it became obvious that a one day meeting was not of sufficient length to treat problems in any depth but the meeting acted as a first comprehensive European information exchange concerning SMM ; in this respect it fulfilled a very useful purpose which was appreciated by all participants.

Measurements and Interpretation of Polarization arising in the Solar Cromosphere and Corona, Lund, May 9-13.

This meeting dealt with polarization which arises primarily from coherent scattering in spectral lines and from the Zeeman effect in the presence of magnetic fields. The conditions in the chromosphere and the corona are fundamentally different from the lower-lying photosphere, as the radiation and matter are far from a state of thermodynamic equilibrium due to the low density and small collision rate. Particular attention was paid to a new research area, the study of coherence effects in radiative scattering in a magnetic field (the Hanle effect), caused by interference between the wave-functions of the partially overlapping Zeeman sublevels of the excited level. These coherence phenomena may provide a future tool for determining vector magnetic fields in the chromosphere and corona.

Twenty five scientists from 10 countries participated in the workshop. The organizing committee consisted of J.O. Stenflo (chairman), D. Dravins and L.G. Stenholm. The proceedings have been published in a preprint volume which can be obtained free of charge from the Librarian, Lund Observatory, Svanegatan 9, S-222 24 Lund, Sweden. Its title is :
Proceedings of a Workshop on Measurements and Interpretation of Polarization Arising in the Solar Chromosphere and Corona, Ed. J.O. Stenflo, Reports from the Observatory of Lund No. 12, 1977.

Heliography on Coronal Active Regions, Düsseldorf, June 18-23..

This meeting, organized by O. Hachenberg, W. Hirth and E. Fürst, was attended by 24 scientists.
Three topics, introduced by lectures, were discussed :

a) X-ray pictures of the sun, by G. Elwert ;
b) Radio emission from active regions, by M. Pick ;
c) Theoretical aspects of hot active regions, by L.E. Cram.

Keen attention has been paid to the bright cores in active regions the "temperature" being a few million degrees up to 10^7 K when observed at short cm-radio waves. At present, the accuracy of the measurements is not sufficient to decide whether these core temperatures agree with the EUV-ones, derived from satellite observations. There is a slight indication that they are in disagreement, raising the possibility of there being a non-thermal origin of the radio radiation. This has resulted in a proposal for combined EUV- and radio observations in the future.

Besides this problem, the development of the bright cores into flarelike features was considered. This problem is related to the development of the magnetic field structure.

A summary of the workshop is being prepared and will be available towards the end of 1977.

A. D. Fokker

Phase Transitions in Bulk Polymers

The Europhysics Conference on Phase Transitions in Bulk Polymers, the 6th Conference of the Macromolecular Physics Section of the Condensed Matter Division was held September 26-29, 1977, in Golden Sands, near Varna, Bulgaria. Under the chairmanship of M. Mihailov, A. Kovacs, and S. Fakirov, a stimulating programme had been assembled. Two general lectures (Frank, Gutzov), seven main lectures, and about twenty contributed papers dealt with the kinetics of crystallisation, its mechanisms, and structural interpretations. The last subject gave rise — once again, one might say — to the most intensive discussions. This was partly due to the wide range of structures treated: from liquid crystals (Wendorff), crystallizing melts (Godovsky, Berghmans, Pennings), and nascent polymers (Wegner) to single chains (Fischer) and single crystals in bulk (Kovacs).

The intensity of the exchange of views benefitted greatly from the recently, so strongly revived discussion on the extent and kinetics of chain refolding in semicrystalline polymers solidifying from the melt. Ironically, E.W. Fischer, one of the three scientists who, twenty years ago, independently from each other proposed the concept of chain folding, is now among the leading researchers who seriously question the dominant role of the folding mechanism in the crystallisation of long chain molecules from the melt. Based on the analysis of fairly recent small angle neutron scattering (SANS) experiments on deuterated polyethylene, polypropylene and polyethylene oxide, Fischer proposed a "solidification model" of the semicrystalline structure within which the chain molecules maintain conformation comparable to that of the random coil.

The traditional hospitality of the organizers (Bulgarian Academy of Sciences, Central Laboratory for Polymers) was gratefully accepted and did much to compensate for the rather cold and rainy weather. Unfortunately registration, with eighty participants (about forty each from eastern and western countries) was rather low.

Abstracts of the Conference papers appear as Vol. 2E in the second Europhysics Conference Abstracts series.

The Board of the Macromolecular Physics Section (MPS) met in Varna to decide on future meetings which will be given in *Europhysics News.*

H. H. Kausch

Fusion - Oriented Plasma Physics

The Plasma Physics Division of EPS held its 8th Conference on Controlled Fusion and Plasma Physics from 19 to 23 September in Prague. The organization was in the hands of the Institute of Plasma Physics of the Czechoslovak Academy of Sciences, the Czechoslovak Scientific and Technical Society, and the Czech Technical University.

The Conference was characterized by a further increase of emphasis on problems related to magnetic plasma confinement. Much of the work reported on Tokamaks was concerned with impurity effects and heating. In both PLT at Princeton and DITE at Culham, in discharges with a low content of impurity ions of low charge number, temperature profiles have been observed which have a minimum in the discharge centre. This is due to an imbalance between the ohmic power input and the radiation losses from metal ions in the discharge core, and leads to a worsening of the overall energy confinement properties of the discharge. A remedy against such "hollow" temperature profiles has turned out to be cooling of the plasma edge. However, the discharge behaviour depends very sensitively on the power balance in the edge region, so that for ohmically heated discharges there is just a narrow window between the appearance of hollow temperature profiles and situations resulting in a disruption of the discharge as a consequence of an excessive peaking of the temperature in the discharge centre. Nevertheless, in DITE it was shown that some additional heating of the plasma core, as well as the screening out of metallic impurities, so reducing radiation losses from the plasma interior, by using a divertor leads to the avoidance of hollow temperature profiles. In fact, the action of the bundle divertor reduces the fraction of the ohmic input power which is radiated away, from 50 - 100 % down to 20 - 30 %. Similar results have also been found in the DIVA experiment at Tokai which is equipped with a poloidal divertor.

The above conclusion on the importance of the edge region in ohmically heated Tokamaks is also confirmed by results on DITE discharges in the high-density regime. Reducing the edge cooling by impurities of low ionic charge, by means of gettering the torus wall with titanium, leads to an increase of the limiting density of the plasma which can be reached before the discharge disrupts.

As far as the transport of impurity ions is concerned, results from the devices T-4 and T-10 at the Kurchatov Institute in Moscow, as well as from PLT, confirm earlier findings in TFR at Fontenay-aux-Roses which indicated that there was no strong accumulation of impurities in the plasma interior. The origin of metal impurities has been studied in DITE with the result that unipolar arcs on the torus wall must be considered the main production mechanism.

A limited increase of the electron temperature has been achieved in ORMAK at Oak Ridge and DITE by applying additional heating by neutral beams. No power losses specific to neutral injection could be identified. The results are so far limited to plasmas with relatively low electron temperatures, i.e., in the range of some hundreds of eV. Encouraging results were reported on heating the plasma in the WEGA device at Grenoble by high-frequency waves in the range of the lower-hybrid frequency ; ion bulk heating from 100 eV to 200 eV is observed, the useful heating power being about 30 % of the high-frequency power injected. With the Pulsator Tokamak in Garching, the effect of a resonant helical octopole field on the discharge was studied and showed that enhanced transport can be induced that way over a limited range. This effect might be used to produce a magnetic plasma limiter.

From the three large Stellarator devices working (Cleo in Culham, L-2 at the Lebedev Institute in Moscow, and W VII A in Garching) a large number of results were reported which constitute an important point of comparison with Tokamaks. It is generally found that plasma confinement improves with decreasing plasma current. Transport is, however, also

affected by magnetohydrodynamic modes. Preliminary results on filling the W II b Stellarator at Garching by a laser-produced plasma have shown this method to be promising.

As for high-β toroidal systems, further studies have been made of the self-reversal mechanism in the reversed-field pinches HBTX 1 at Culham and ETA-BETA at Padova. In the screw pinch SPICA at Jutphaas the duration of the stable regime of the discharge could be extended to 200 μs.

Further results on the stabilizing effect of the drift-cyclotron loss cone instability in magnetic mirrors by a plasma stream along the magnetic field were reported from the experiments PR-6 in Moscow and 2 X II B. In the latter, plasma densities of 10^{14} particles/cm^3 were reached.

In the field of inertial confinement the effort directed towards analyzing the dynamics of a pellet compressed by beams is continuing, as well as the technical development necessary to provide powerful laser light and particle beam sources.

F. Engelmann

Laser Interactions with Solids

The EPS Quantum Electronics Divisional conference on "Microscopic Physics of Laser Interactions with Solids" was held in Strasbourg Sept. 23-30 1977, with an attendance of over 80 people from a very representative set of European laboratories (including the U.K., Germany, both East and West, Italy, Switzerland, France and others), and from Japan and the U.S. as well. As one charming (lady) participant put it : "the boundary between solide-state physics and nonlinear optics has proved very fruitful as a unifying topic between solid-state and laser scientists".

Newest experimental data and theoretical investigations were presented in three main key areas : excitons and exciton drops in semi-conductors, saturated absorption and fast relaxation processes in infra-red transparent material, and lastly the microphysics aspects of optical non-linearities.

Excitons have been a very active field in the past two decades, considerable interest being devoted to so-called "exciton liquid (viz. plasma) drops" i.e. macroscopic aggregates of electron hole pairs that can maintain themselves stably, at least in a range of indirect-gap semi-conductors, including silicon, germanium and others. Now tunable, short pulse lasers are providing an excellent means of both exciting these unusual liquid-like states, and monitoring their decay. Lasers have also proved useful in monitoring, for instance through Doppler velocity measurements, the motion of such drops. Lasers also provide ways of creating biexcitons, through the simultaneous absorption of two photons, in materials such as cuprous chloride, as well as, here again, monitoring their subsequent decay. Without entering into details, it is clear that the Strasbourg Meeting certainly was a good forum for discussing the latest results in the exciton field, based on the use of tunable and-or pulsed lasers, now available up into the near UV range.

Saturated absorption and fast relaxation processes in infra-red transparent semi-conductors were also prominent in the Strasbourg Meeting and exciting new results reported in different areas :

The frequency dependence of the photon drag effect in germanium was convincingly explained. Let us recall that very useful (i.e. simple and fast) infra-red laser detectors are based on this effect, so that a good knowledge of their spectral response is of primary practical importance.

Also very fast processes in p-type germanium were reported by groups in Essen and Stuttgart using both a "bleaching" (i.e. saturating) infra-red laser and a probing beam, thus leading to an improved knowledge of the valence band structure and of the relaxation processes taking place within it.

Lastly, no less than six new effects pertaining to spin-flip Raman scattering, absorption and self-focusing were unearthed in indium antimonide, from groups in Würzburg, Edinburgh and Paris.

The Strasbourg Meeting also provided a good forum for presenting and discussing the latest theoretical and experimental data on the **microphysics of optical non-linearities.** Up to recent times, optical non-linearities in crystals were only described in terms of macroscopic non-linear susceptibilities. Now, new semi emprical approaches, like the one designed by a group at the French Post Office Research Centre, open the way to synthesizing macroscopic non-linearities in a crystal, using microscopic molecular non-linearities as "building blocks", a technique aptly referred to as "molecular engineering", which indeed has actually led to creating new molecular crystals with high nonlinear susceptibilities. Other topics relating to non-linear optics included the use of guided (inhomogeneous) optical waves for exciting surface polaritons (Italy), and stimulated Raman scattering (France).

In summary, the combination of specialities, many original results, and very lively discussions gave the feeling that the subject will grow excitingly in the coming years, especially due to the availability of new laser wavelengths and shorter pulses. Our thanks to our hosts of the Université Louis Pasteur in Strasbourg, the home of convinced Europeans, for their smooth and successful organization.

S. D. Smith, J. Ernest

The Secretariat and the Editorial Board of Europhysics News wish all readers a Happy New Year