centrate in the GaAs layers where their mobility can be considerably larger than in bulk GaAs. The mobility in the layers is larger than in Si, leading to the prospect of higher switching speed than in conventional devices. Not only are superlattices candidates for the further development of miniaturization, they also reveal many (new) physical phenomena occurring at the submicron level. The quantum localization in thin wires and films discussed above constitutes one example; the resistivity of the thin wires (measurements on wires with diameters as small as 300 Å have been performed) is no longer proportional to the length of the wire (as in the microscopic case) but grows exponentially as a function of length.

Other physical phenomena observed in superlattices include the semiconductor-semimetal transition in InAs-GaSb superlattices, which occurs with increasing layer thickness and manifests itself as a sharp rise in carrier concentration. This transition occurs at a layer thickness of about 100 Å. Investigations have also been devoted to the study of cyclotron resonance, Hall effect and magnetic properties of the two-dimensional electron gas confined in the GaAs layer.

In Istanbul, in addition to the plenary invited talks on VLSI and "The Impact of Microelectronics", there will be sessions on ion implantation and laser annealing.

Other Vital Topics

It is quite impossible to treat the recent developments in a field as vast as solid state physics in any detail in one article. In what follows, I simply mention a few topics of current interest,

The application of modern physical concepts to biology

Spin effects and impurities

The use of muons in solid state physics

Convective instabilities and the onset of turbulence

Local field effects in semiconductors

Superconductivity

Some Omitted Trends

Fundamental research:
- the extension of neutron inelastic scattering to energies larger than 0.1 eV
- mixed valence
- atomic and electronic structures of small aggregates
- n photon excitations in crystals
- magnetism in metallic and non-metallic substances
- time resolved spectroscopy, picosecond spectroscopy in the optical region, nanosecond spectroscopy in spin resonance
- the calculation of radiation pressure as derived from microscopic electromagnetic theory and statistical mechanics so as to obtain reliable macroscopic expressions

Applied research:
- new superconductivity alloys
- developments in integrated optoelectronics (optical fibre communications)
- plasticity of metglasses and ionocovalent solids
- recrystallisation kinetics of polymers
- solid state displays
- Josephson junctions
- power devices
- metal-semiconductor contact devices
- light emitting devices
- amorphous soft magnetic materials, hard magnetic materials, etc. ...

What's New in Computational Physics

F. James, CERN

As computers become more versatile, faster, and more easily accessible, so do the applications of computers to physics research become more varied and important each year. This is nothing new; it has been true ever since the use of computers in physics became widespread about twenty years ago.

The amazing thing is that it remains true despite the constant acceleration of progress in computing technology. Current advances are so great that one can really talk about qualitative changes in the way computers are used (even perhaps changes in the definition of a computer!), and we are now led to speculation as to when the acceleration will come to an end. Indeed only in a few areas are we approaching known physical limits; in all other domains there is still no known barrier to progress.

A striking example of the effects of technological progress was offered recently at the Europhysics Conference on Computing in High Energy and Nuclear Physics, held in Bologna in September, 1980 (*Europhysics Conference Abstracts,* Vol. 4G, *Europhysics News,* **11** (1980) 10, p. 6). In the session devoted to online data processing, a series of 12 contributed papers described highly sophisticated systems, based on both microprocessors and minicomputers, driving vast heterogeneous arrays of detectors, making complex triggering decisions, filtering and recording data at megabit rates. What made these presentations especially impressive was that for the most part they were describing not plans for the future, but real experiments already taking data.

At the same conference it was pointed out that the revolution in microcircuitry has not yet made its main impact on large computer systems, and that when it comes, central computing facilities will be even more in demand than now, in spite of some gloomy predictions about their declining role. Certainly the astronomical complexity of nuclear physics calculations, far from making the large computer obsolete, are ready to absorb all the increased capacity that the new technology can supply.

Magic of VLSI

Of course the magic component in all this is VLSI — the Very Large Scale Integration of thousands of circuit elements on to one chip, with the resulting possibilities of enormously increased speed and capacity of logical and arithmetic operations and data storage. This will be one of the major topics to be treated at the EPS General Conference in Istanbul. Plenary sessions and studies organized by the Physics and Society Advisory Committee will allow both the technical and social implications to be explored. These should be of great interest to all physicists. VLSI technology brings us not only new dimensions in speed and capacity, but through modularity and microprogrammability, unprecedented flexibility and reliability.

But the price we have to pay for all this, at least temporarily, is that the most modern devices are delivered naked, and so we find ourselves interfacing and programming those wonderful chips at the very lowest level, sometimes even altering or extending their basic instruction set through microcode. This situation, reminiscent of the early days of large computers, discourages even some experts from getting too involved in microprocessors now. (One eminent computer physicist has remarked: "I enjoy *studying* history, but I am reluctant to *relive* it".) On the other hand, it is this very aspect which fascinates many others. In any case, no matter at what level you interact with the new technology, it can no longer be ignored.

Memory Systems

Progress in magnetic storage has also exerted a great influence on the use of computers in physics. At one end of the scale, the widespread use of floppy disks has made this technology accessible to even the most modest computer system, and at the other end of the scale, advances in high-capacity disks have been steady and spectacular over several years. The capacity, transfer rates, access times, reliability, and local "intelligence" of disk units have all made dramatic increases in recent years, all of which have had a significant impact on computer systems.

A very exciting recent breakthrough, still being developed into a practical device, is the ability to record data optically by means of laser-drilled spots of less than 1 micron diameter, giving the possibility of recording (once-only, of course) nearly 10^{10} bits on a single 30 cm diameter disk surface. Reading can be achieved with arbitrarily low error rate, access time of 50 ms, and transfer rate of 10 megabits/s. We look forward to mass-storage devices based on this technology which should be commercially available in the very near future.

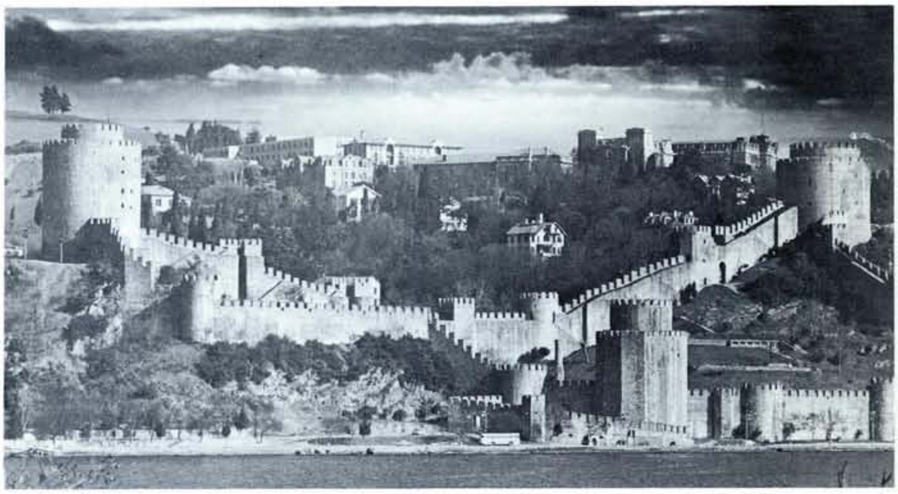
Communications

In the area of data communications, networking is finally becoming common in Europe, mostly on a local scale, but also to some extent internationally. At the Bologna conference, we heard of the problems in international data transmission, and the status of the Stella project which is now sending data by satellite between several ground stations in different European countries. Of course a lorry full of magnetic tapes, even if it takes a day or two to reach its destination, can still equal the data-transfer rates of the fastest long-distance networks, but for more reasonable amounts of data, the superiority of direct data links is indisputable. In many cases it is now easier (and cheaper) to solve your problem on someone else's computer via a network than to convert his program to run on your own computer.

Another area where the computer is changing the working habits of some physicists is that of data bases, both for bibliographic and numerical data. Good data bases and convenient systems to interrogate them now exist in many fields of physics, but often remain under-used and even unknown to the majority of physicists. Many participants at Bologna were surprised to hear of the power and convenience of existing systems, although it has to be admitted that access to such systems is difficult for physicists not working in large centres. One hopes that this situation will soon improve.

Coming Events

Let me end this short review by recalling some of the coming events in Europe of interest to computational physicists in addition to Istanbul. The next EPS Summer school on computational physics will be held in the High Tatra mountains of Czechoslovakia from 19-28 May, 1981, and will be devoted to microprocessors for the first part and algebraic manipulation using REDUCE for the second part. On 25-28 August, the conference on Vector and Parallel Processors in Computational Science will be held in Chester, England. In 1982 the EPS Computational Physics Group will organize a conference in Warsaw on computers in the design and control of accelerators, another field where it is now unthinkable to build a major piece of apparatus that is not entirely computer-controlled.



Bogaziçi University where the 5th General Conference will be held. Situated a few kilometres to the East of Istanbul on the banks of the Bosphorus, seemingly protected by the ancient fortress below, the University has grown out of what was formerly Roberts College. With its well-equipped lecture theatres, surrounded by lawns and shady avenues, a studious and relaxed detachment reigns, contrasting with the noise and bustle of the city on its doorstep. Easy communication with Istanbul however, will ensure an optimum balance between the serious purpose of the Conference and those other cultural pursuits which may be physical but are not exactly physics. (Photo by courtesy of Mustafa Niksarli)

Committees of CMD Sections

Proposals for members of the Committees of three Sections of the **Condensed Matter Division** correspond to the numbers laid down in the regulations. Elections will thus be held in the remaining three only. The new Committees that will take office immediately are:

Macromolecular Section
G. Bodor, Polymer Res. Inst., Budapest
H.H. Kausch, EPFL, Lausanne
A. Keller, University, Bristol
J.P. Mercier, High Polmer Lab., Louvain-la-Neuve
L. Monnerie, ESPCI, Paris
G. Zerbi, University, Trieste

Magnetism Section
L.J. de Jongh, Kammerlingh Onnes Lab., Leiden
R. Elliott, University, Oxford
P. Erdös, University, Lausanne
A. Hubert, University, Erlangen
G.M. Kalvius, MPI, Munich
V. Kambersky, Acad. of Sci., Prague

Semiconductors and Insulators
F.W. Ainger, Plessey Co., Towcester
D. Bäuerle, University, Linz
F. Beleznay, University, Erlangen
R. Blinc, Josef Stefan Inst., Ljubljana
H. Grimmeiss, University, Lund
G. Harbeke, RCA, Zurich

Formal Announcement to Members

The triennial General Meeting of the members of EPS will be held at Istanbul on Tuesday, 8 September, 1981, beginning at 18h30. Applicants for membership awaiting acceptance will be admitted provided that the first membership fee has been paid.

Members are invited to make proposals for topics to be placed on the Agenda in time for publication in the May issue of *Europhysics News*.

Preliminary Agenda

1. **Report of the President**
2. **Report of the Secretary**
3. **Report of the Treasurer**
4. **Discussion of subjects of general interest according to suggestions and proposals put forward by members.**

A NATO Advanced Study Institute is being arranged on Electron Correlations in Solids, Atoms and Molecules (with emphasis on metals) 7-11 July by J.T. Devreese of Antwerp.

EPS Divisions, Sections and Group

Astronomy and Astrophysics Division
Solar Section
Atomic Physics Division
Atomic Spectroscopy Section
Chemical Physics
Electronic and Atomic Collisions
Molecular Physics
Computational Physics Group
Condensed Matter Division
Low Temperature Section
Macromolecular Physics
Magnetism
Metals
Semiconductors and Insulators
Surface and Interface
High Energy & Particle Physics Division
Nuclear Physics Division
Plasma Physics Division
Quantum Electronics Division

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