Europhysics Conference Reports

Optical Systems and Applications

The 1980 European Conference on Optical Systems and Applications which was held in Utrecht, 23-25 September, 1980, is a biennial conference that came into being through a merging of the European Electro-Optics and Ecosa Conferences. The aim of the organizers was to provide scientists and engineers with a platform where they can discuss their problems in the field of optical systems (including both engineering and applications) and expose their achievements. They should feel gratified by the response to their efforts.

The Conference attracted about 350 participants (many of whom expressed a positive reaction afterwards); 120 papers were presented, and in the evening, poster sessions were held which had, in part, a social character that stimulated lively discussions. Apart from the standard subjects such as non-linear optics, anemometry, optical metrology, the scientific programme included sessions on medical and biological applications and one that focused on industry in which exhibitors could give a scientific account on some of their products.

The exhibition accompanying the Conference contained 30 stands. A number of new products were on show and both attendance and business were above expectations. Particularly interesting were the mini CO_2 laser of Ferranti and the ring laser stabilizer of Spectra Physics.

In an invited paper, Huignard (Thomson-C S F) described work on adaptive optics by phase conjugation in $Bi_{12}SiO_{20}$ (B S O) non-linear electro optic crystals. High resolution and sensitivity with relatively long storage times (~ 30h) were obtained. The electric field bias adds an extra dimension in time-dependent applications. Tiziani (Stuttgart) used these crystals for real time holographic vibration and deformation analyses as an extension to previous speckle techniques.

Andersen (Texas Techn. Univ.) described an efficient way of infared detection by conversion up to the visible in doped GaP, and Koch (Hannover) talked on colour centre lasers in a wavelength region that was not available until now (0.8-1.8 μm). It would be interesting to have a comparison between the merits of these lasers and those using transition metal ions, such as Co^{2+}, Ni^{2+}, etc.

An ingenious method for measuring micro vibrations down to 1 nm, in-plane and out-of-plane, by heterodyne speckle interferometry was presented by Dändliker (Neuchatel) (Fig. 1) while Collins and Hulme (R.S.R.E.) discussed well-engineered range and velocity meters using a mini CO_2 laser (c.w.). Included was a heterodyne system where the laser is modulated with a chirp wave-form centred on 60 MHz, generated by a surface acoustic wave dispersive filter. Airborne fluorescence Lidar systems (Gehlhaar, Oldenburg) were shown to be suitable for detection of fluorescent layers (oil, tracers, chlorophyll) on ocean waters.

There was much interest in the sessions on medical and biological applications. The papers were all of high standard, but one might mention laser coagulation of dermal lesions described by van Gemert (Eindhoven) and microfluorimetry with time resolution by Sacchi (Milan).

Anemometry and particle sizing have become full grown laser application fields for which subtle techniques and measurements were described by Pusey, Pike (R.S.R.E.) and Schulz-Dubois (Kiel). The present state of the art in semiconductors lasers was well described by Maslowski (A.E.G., Ulm) and that in optical recording by Carasso (Philips, Eindhoven). By skilful coding high bit densities and low error probabilities are achieved.

The application of optical fibres as sensors of current, voltage, temperature and mechanical stresses and vibrations has become an important field of study. In low-loss fibres, the interaction length can be made very large but ingenuity is required to measure only the parameter desired. Ulrich (Hamburg) gave an overview and Smith and Rodgers (Leatherhead) covered some field-tested examples.

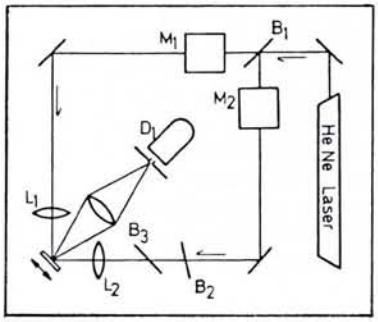

Fig. 1 - System arrangement for measuring in-plane displacements.

The above is merely a sample of a most impressive collection of papers. No mention is made for example of the non-linear work of Smith's group (Edinburgh), laser annealing (von Allmen, Bern), V.L.P. mastering (Olijhoek, Philips) and other important results that were presented. For those interested in more information, the abstracts of the papers are available as *Europhysics Conference Abstracts,* Volume 4I.

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Nuclear Methods for Solid State Physics and Materials Research.

Based on contributions from H. Jex and G. Mauck (Frankfurt)

In these days of highly specialized conferences covering restricted fields, it is unusual to find one that is concerned with such apparently diverging interests as materials research, solid state physics and nuclear physics. This was, nevertheless, the background to the "Europhysics Conference on Nuclear Physics: Methods in Materials Research" that was held in Darmstadt, 23-26 September under the auspices of the Nuclear Physics Division, with K. Bethge of the Johann Wolfgang Goethe-Universität, Frankfurt am Main, chairing the organizing committee.

The Conference, which it is hoped will have the long term effect of stimulating collaboration between the different groups of physicists represented, attracted the participation of approx. 180 materials scientists, solid state and nuclear physicists with a good attendance from eastern European countries and a sprinkling from farther field. In the four morning sessions, 19 invited papers were presented, and on three afternoons, 67 contributed papers were discussed in poster sessions; the abstracts appear in *ECA* Volume 4K and the Proceedings will be published by Vieweg-Verlag, Wiesbaden in January.

The tone of the Conference was set early on, as being concerned with practical problems and with the delineation of those areas of research where solutions are of importance to materials scientists. There seemed to be a consensus that the key areas concerned both the structure and microstructure and comprised:

- phases, their crystal structure and chemistry,
- phase boundaries,
- grain boundaries within phases,
- precipitates within phases, their crystal structure and lattice coherence within the host lattice,
- precipitates at boundaries,
- solute segregation at boundaries,