broadening. The advantages of using adaptive optics to improve drastically the resolution of modern optical telescopes were explained by F. Merkle (ESO, Garching).

Notable also was a report by E.O. Göbel (Marburg) of the observation, using femtosecond spectroscopy, of coherent coupling of free and bound excitonic transitions, as well as transitions arising from spatially separated quantum-well structures. There was also a first report (by W. Ertmer, Bonn) of the measurement of the scalar Aharonov-Bohm effect using atom interferometry with trapped neutral atoms. He presented as well first results for the diffraction of a metastable neon beam by a standing evanescent wave.

A morning session was devoted to a tribute to Veniamin Chebotayev by W.R. Bennett (Yale, USA), B. Cagnac (Paris), P. Franken (Tucson, USA), and K.M. Evenson (NIST, Boulder, USA).

EQEC is organized by the Quantum Electronics and Optics Division of EPS. It represents the main European forum for the growing number of European scientists wishing to discuss and present work concerned with the various aspects of quantum electronics, laser physics and its applications. The conference started to be held biennially in 1989 and this year it was combined with the 7th Italian Conference on Quantum Electronics (EQUAP '93). Organized by M. Inguscio and G.C. Righini (Conference Co-Chairs) and J. Mlynek, with M. Inguscio as the Programme Co-Chair. The 362 participants from 25 countries included an encouragingly large number of students and young scientists. Despite the fact that the attractions in Florence represented strong competition, the level of participation remained remarkably good — maybe owing to the rewarding cultural events. Last but not least, Italian charm reconciled a few technical problems arising mainly due to the age of the venue — the impressive and picturesque Villa del Poggio Imperiale.

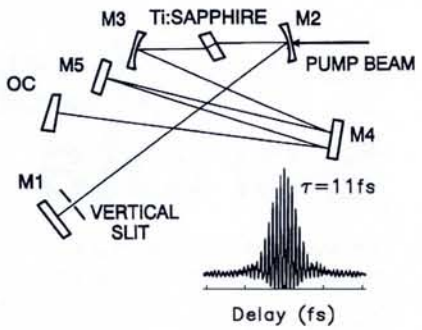
EQEC '94 will be held on 28 August - 2 September 1994 in parallel with the CLEO-Europe '94 at the RAI Congress Centre, Amsterdam. For information, contact: J. Mlynek, Chairman, EPS QEO Division, Fakultät für Physik, Universität Konstanz, Postfach 5560, D-78434 Constance (tel./fax: +49-7531-88 38 18 / 88 30 72).

FEMTOSECOND Ti: SAPPHIRE LASERS

New Workhorses for Ultrafast Spectroscopy

The last few years have brought about significant advances in the physics and applications of ultrashort-pulse lasers. The recent appearance of ultrabroad-band, high quality Ti:sapphire laser crystals motivated the development of new ultrafast optical modulation techniques that are capable of shaping optical pulses of down to a few femtoseconds duration. The discovery of "self-mode-locking" by Spence et al. [*Opt. Lett.* **16** (1991) 42] and the exploitation of a "soliton-like" interplay between self-phase modulation and anomalous dispersion [see, *e.g.*, Krausz F. *et al., IEEE J. Quantum Electron.* **QE-28** (1992) 2097] represent major steps towards a powerful, new femtosecond laser technology based on solid-state gain materials.

The principle pulse-shaping effects in the self mode-locked Ti: sapphire laser are self focusing and self-phase modulation (SPM), both induced by the optical Kerr effect in the laser crystal. In combination with an intracavity aperture and negative group delay dispersion (GDD), they can result in efficient shortening and stabilisation of the mode-locked pulse circulating in the cavity. The shortest achievable pulse duration is primarily determined by the bandwidth over which the negative intracavity GDD is nearly constant. Improving the dispersion properties of the intracavity prism pair, which has been the only low-loss source of broadband negative GDD until recently, led to a significant improvement in mode-locking performance. This work culminated in the development of quartz prism controlled Ti: sapphire lasers capable of generating optical pulses significantly less than 15 fs in duration.



A schematic illustration of the mirror-dispersion controlled Ti:sapphire laser, and an interferometric autocorrelation trace of 11 fs pulses generated by the laser. The mirrors M1, M4 and M5 are the dispersive mirrors described in the text.

A new physical concept that can be exploited for broadband, essentially loss-free GDD-control uses multilayer dielectric mirrors. A "chirped" quasi-quarterwave dielectric coating is fabricated by modulating the multilayer period during the deposition process. The variation of the optical thickness of the layer gives a field penetration depth that depends on the optical frequency, as is the group delay which is experienced by different frequency components upon reflection at the mirror. Careful design ensures that a nearly constant negative GDD can be realised over a frequency range as broad as ≈ 80 THz [Szipöcs R. *et al., Opt. Lett.*, in press].

A Ti: sapphire laser which produces stable and reproducible pulses down to 11 fs in duration has been constructed using these mirrors. The absence of intracavity elements other than the gain medium and an aperture leads to unprecedented stability in the sub-20 fs regime [Stingl A., *et al., Opt. Lett.*, in press]. Once mode-locked, the laser automatically delivers pulses in the 10-15 fs range without any further optimisation owing to a cavity GDD that is completely insensitive to resonator alignment, in strong contrast with prism-controlled systems. These features make this mirror dispersion-controlled Ti:sapphire femtosecond laser ideally suited for use as a front-end oscillator in complicated, femtosecond amplifier systems. The new technique also removes a constraint set by the minimum prism separation on the resonator length, and thus opens the way towards the development of high repetition rate, femtosecond self-mode-locked systems. Further improvements in engineering the cavity mirror dispersion will allow the development of a reliable sub-10 fs oscillator technology for the entire visible and near-infrared spectral range.

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Letter to the Editor

***Eur. J. Phys.* Coverage**

I must ask for space to comment on the account, in the *Europhysics News* 25th EPS Anniversary issue, of the launching of the *European Journal of Physics*. The background your contributor paints for the journal is almost exclusively devoted to the activity of the EPS Advisory Committee on Physics Education but, as you are well aware, the journal was an enterprise embarked upon jointly by the EPS and The Institute of Physics in the UK. "The IOP had proposed to EPS that they publish jointly a new journal on physics education at university level", you report, and that EPS agreed the IOP's recommendation of myself as Editor-in-Chief (p. 151).

Now, I was not a party to the exchange of correspondence between the IOP and the EPS, but "a journal on physics education at university level" does not describe what I believed I was being asked to work on. After a number of years of service on the Editorial Boards of *J. Phys. B* and of *Reports on Progress in Physics* I had come to realise that the Institute had no vehicle for the publication of articles representing unconventional views on received topics in physics, for reflections, for alternative approaches: something other than primary research, on the one hand, or scholarly reviews, on the other. I made this point in correspondence with the Publications Committee of the Institute. When, some time later, I was informed of the discussions between the two bodies and that the points I had made might be incorporated in the subject coverage of a new journal, I felt honoured to be invited to act as Editor and accepted with enthusiasm. I believed that, since I was at that time an Individual Ordinary Member of the EPS (and have remained so ever since), the invitation was being made partly on account of my separate membership of the the two participating bodies.

The Agreement between the two bodies, made the 30th March 1979, included under "Title and Subject Coverage" the following statement: "The journal will publish articles in the following categories:
a) articles which are explicitly educational, that is, of a tutorial or pedagogical nature on particular topics in physics, or relating to methods of teaching physics as practised in

particular institutions or countries, or relating to the university training of school teachers: also occasionally on topics in physics at the interface between school and university;
b) articles of a reflective or speculative nature that bear on the fundamentals of physics or that offer new insights into known phenomena in physics;
c) articles concerned with the inter-relation between physics and other scientific disciplines;
d) the journal may include occasional articles on the cultural implications of physics."

That was the journal I agreed to "drive", as you put it, and that is what the members of the first Editorial Board stood behind. "The Editorial Board consists of members nominated separately by the EPS and the IOP", I wrote in my foreword to the first issue, in June 1980, "but who have begun their work more conscious of their unity than of the different routes by which they came together."

Your readers must judge for themselves how well we kept to our brief. I am sorry that, seen from Geneva, "a disquieting feature that emerged was the scope of the contents, as education seemed to take second place to more general articles." Seen from the editorial side, the acceptability of articles was determined by their standard in the context in which they were written, provided the subject matter lay within the categories set down in the Agreement. We made efforts to solicit articles in the various categories and tried — and, I believe, succeeded — to have them all represented. At the conclusion of my term as Editor (after five volumes had been published) I reported: "I believe I speak for the whole Board... that we have come to see *reflection* as the key-word which largely determines our decision on the suitability of MSS for acceptance: in whatever category articles are submitted, *reflection* must be an element in their conception and execution." Following that report the order of topics in "Subject Coverage" as it appears on the back page of the journal was amended so that the first is "Articles of a reflective nature that bear on the fundamentals of physics or of physics education". I trust that Geneva finds that neither disquieting nor meretricious.

G.W. Series
Oxford

EXECUTIVE COMMITTEE
Meeting Report
Budapest, 12-13 November 1993

***Europhysics News* Editorial Board**

The Executive Committee approved the appointment of J. Schacher and S. Ciliberto to the Editorial Board of *Europhysics News*. Jürg Schacher, an experimental high-energy physicist, has been a Titular-Professor in the Institut für Physik, Bern University, since 1991. He studied in Basel and has worked at PSI and at CERN where he specialized in Drell-Yan physics. Sergio Ciliberto, a solid-state physicist, has been a Director of Research in the Laboratoire de Physique, ENS, Lyon, since 1991 where he works on nonlinear dynamics. He studied at the University of Florence and worked there in 1979-80 until joining the Istituto Nazionale di Ottica in Florence. The new members will strengthen