

International Colloquium on Diffractive Optical Elements – DOE'91 May 14–17, 1991, Szklarska Poręba, Poland

The DOE'91 International Colloquium was organized by a group of physicists affiliated with the Technical University of Wrocław, Institute of Physics, and sponsored by International Commission for Optics (ICO), Polish Chapter of the International Society for Optical Engineering (PL Chapter of SPIE), Optics Section of Polish Physical Society, Kidger Optics Ltd., Crowborough, England, and Consultronix Sp. z O.O., Cracow, Poland.

I believe that this colloquium was very fruitful and may be qualified as a deep insight into the diffracting optical elements, their theories, technologies, and applications. It provided indeed an international forum for the exchange of experience in both theoretical and applied diffraction optics.

About 40 invited and regular papers were presented at six half-day sessions during four days. Among these papers, four invited lectures and more than twenty five extensive contributions were given by the authors from Czechoslovakia, England, Finland, Germany, Hungary, Spain, Switzerland, and the USSR.

In my opinion, all papers were presented at a high scientific and technical level. They covered a variety of problems: theoretical, practical, and even commercial ones. However, imaging or focusing diffractive optical elements (DOEs) or holographic optical elements (HOEs) prevailed.

In particular, a number of new DOEs such as those with an anisotropic structure (profile) which can transform and separate light according to its polarization state, that termed as the "light sword", zone plates of the kinoform-type used for correction of aberrations of hybrid optical systems (bulk lenses combined with a DOE-corrector), computer generated DOEs for producing focal lines, and zone plates for metrological applications using moiré patterns were predominant at this topical meeting.

Another specific feature of the DOE'91 conference was created by several papers dealing with highly advanced techniques developed recently for the design of computer generated HOEs and their fabrication. Especially, the authors from the USSR, England, Czechoslovakia, and Switzerland attracted the audience by their highly practical contributions dealing with photolithography, electron beam lithography, ion etching technology, and interferometric recording in dichromated gelatin or photoresist, or silver halide sensitized gelatin.

Also DOEs for optoelectronic instrumentation systems, optical information processing systems, and optical neural networks were emphasised by several speakers. Holographic lenses suitable for optical Fourier transformation, transmission sphero-chromatic lenses or reflecting kinoforms used as spectral dispersion elements for compact monochromators, some specific matched filters for shift- and scale-invariant pattern recognition, crossed gratings and their applications (e.g., for collection of solar radiation), computer generated holograms for producing rectangular focal spots, and DOEs for XUV and X spectral regions were also welcomed with a high interest.

Moreover, a number of purely theoretical papers, such as those dealing with boundary diffraction wave in imaging by means of a small hologram, inverse grating diffraction problems, and resolution problems in holography supplemented well this rather practical conference.

The conference papers will be published as Volume 1574 of the highly recognized series: *Proceedings of SPIE*. I believe that this volume will be an extremely useful material for further progress in applied diffraction optics.

It is also worth noting that the participants were able to familiarize themselves with highly advanced computer program DEMOS for design evaluation and modelling of optical systems with HOEs, described and demonstrated by M. A. GAN affiliated with GOI (State Optical Institute, Leningrad), the biggest optical institute in the world. Another computing program for optical design was demonstrated by Kidger Optics Ltd., Crowborough, England.

A small exhibition of beautiful holograms of the Denisyuk type must be mentioned as well. This was additionally arranged by Z. V. WORDOSANIDZE (Tbilisi, Republic Georgia, USSR) who presented two fascinating papers. One of them dealt with the possibility of creating spectral nonselective reflecting objectives by using bichromate gelatin layers and the Denisyuk holographic method, and was closely associated with the mentioned exhibition.

A panel discussion of the round table (in fact, the table was square) was organized in the day before last. A provocative introduction on the relative merits of bulk and surface relief diffracting components was given by M. C. HUTLEY (NPL, Teddington, England). This discussion may be summarized as "to be or not to be" for DOEs. The answer was not quite clear during the discussion, but my answer is "to be" for DOEs and for the next like or similar meeting in the near future.

There was also an attractive half-day excursion into the Sudety Mountains, then followed by a palatable Conference Dinner.

Finally, I wish to thank the Programme and Organizing Committees and all those who so well organized and arranged the DOE'91 meeting. In particular, I thank Professor JERZY NOWAK, Chairman of the DOE'91, and Dr MAREK ZAJAC, tireless secretary of the conference, for their enormous work. I thank also Dr BOGUSŁAWA DUBIK, the leading lady of the conference, and M.Sc. JAN MASAJADA, a leading technical assistant to lecture facilities, and all those nice people responsible for the great success of the DOE'91 in Szklarska Poręba.

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