EDITORIAL

Editorial

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Selected papers from ICO XIX

ICO XIX was the 19th in a series of triennial congresses promoted by the
International Commission for Optics (ICO) and held in conjunction with the
general assembly of the organization. ICO is an affiliated commission of the
International Union of Pure and Applied Physics (IUPAP), and was created in
1947 with the object of contributing on an international basis to the progress and
diffusion of knowledge in optics. ICO I, the first official congress held in Delft
(The Netherlands) in July 1948, saw the participation of 44 delegates from 11
countries. ICO XIX, held in Florence (Italy) in August 2002, was attended by
more than 400 participants from most of the 43 Territorial Committees which are
current members of ICO. The triennial congress moves quite regularly from one
continent to another; thus, the previous one (ICO XVIII) was held in San
Francisco (USA) in 1999, and the next one (ICO XX) will be held in Changchun,
a city in northern China, in 2005.

Optics is growing up fast and healthily. To quote John N Howard, founding
editor of Applied Optics, ‘Optics is almost unique in being both a field of
challenging scientific study and also an important tool that can be applied to many
other fields of science and technology.’ A confirmation of that comes from the
results of a poll on the most beautiful physics experiment, published in Physics
World in September 2002. The top place was awarded to the application of
Young’s double-slit experiment to the interference of single electrons
(demonstrated by C Jonsson in 1961), while two ‘pure’ optical experiments
ranked 4th and 5th—respectively, Newton’s decomposition of sunlight with a
prism (which dates back to around 1665) and Young’s original light interference
experiment (around 1801).

Similarly, if we look to the years since the founding of the ICO, many of the
Nobel Prizes in physics have been awarded for works in optics and spectroscopy,
including, to mention just a few winners, Zernike and Gabor in image formation
and holography, Townes, Kastler, Schawlow and Bloembergen in lasers and
spectroscopy, Mulliken, Herzberg and Polanyi in chemical spectroscopy, Wald,
Granit, Hartline and Cormack in medical optics, and more recently the 1997 prize
to Chu, Cohen-Tannoudji and Phillips for laser cooling and trapping of neutral
atoms, and the 2001 prize to Alferov and Kroemer for semiconductor
optoelectronics.

Thus, it is clear that a congress which, according to ICO traditions, is open to
contributions in every branch of optics, may attract a large number of
contributions of great scientific and/or technical relevance in quite different areas.
A special theme is generally selected for each triennial congress to enlighten
particular aspects of optical science and technology. The theme for ICO XIX was
‘Optics for the Quality of Life’, but the 290 oral presentations (including invited
lectures and ICO prize winners’ lectures) and the 240 posters covered a much
wider area, being subdivided into the following topical sessions:

- Boundaries, traps and vortices
- Computing and communications
- Education in optics
- Femtosecond optics
- Fibre optic devices
- Guided waves and microoptics
- Holography
- Images and image processing
- Lasers and applications
Nonlinear optics and applications
- Optical and innovative microscopy
- Optical design
- Optical instruments and systems
- Optical materials
- Optical physics, interference and applications
- Optics for biology and medicine
- Optics in art conservation
- Optics in the atmosphere and in space
- Optics in information systems
- Photonic crystals
- Photonic glasses
- Photorefractive materials and applications
- Random media and statistical optics
- Sensing and metrology
- Spectroscopy.

Two-page summaries of the accepted presentations were collected in *SPIE Proceedings*, volume 4829.

This special issue of *Journal of Optics A: Pure and Applied Optics* contains a selection (less than one tenth of those presented at the Congress) of papers based on presentations given at ICO XIX or, in one or two cases, related works by congress participants. Despite the rigorous selection criteria necessary to maintain an optimum size of this special issue (for which we express our regret to the authors of those papers which did not rank in the top group), we believe that this issue is well representative of the current work in optics, both on a topical and a geographical basis.

We take this occasion to thank the sponsors of the Congress, who contributed to make ICO XIX a successful event, the editorial office of Institute of Physics Publishing, and in particular Claire Bedrock whose hard work made this issue feasible, all the authors for their valuable contributions and, last but not least, the members of the Advisory and Program Committees as well as all the reviewers for their dedicated work.