EDITORIAL

Polarization Optics

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This special issue on Polarization Optics contains one review article and 23 research papers, many of which are based on presentations at the International Commission for Optics Topical Meeting on Polarization Optics, held in Polvijärvi, Finland, between 30 June and 3 July 2003. While this issue should not in any sense be considered as a 'proceedings' of this meeting, the possibility of submitting papers to it was widely advertised during the meeting, which was attended by a large fraction of prominent scientists in the field of polarization optics. Thus the quality of papers in this special issue is high.

In announcing both the meeting and this special issue, we emphasized that the concept of 'polarization optics' should be understood in a wide sense. In fact, all contributions dealing with the vectorial nature of light were welcome. As a result, the papers included here cover a wide range of different aspects of linear and nonlinear polarization optics. Both theoretical and experimental features are discussed. We are pleased to see that the conference and this special issue both reflect the wide diversity of important and novel polarization phenomena in optics.

The papers in this special issue, and other recently published works, demonstrate that even though polarization is a fundamental property of electromagnetic fields, interest in it is rapidly increasing. The fundamental relations between partial coherence and partial polarization are currently under vigorous research in electromagnetic coherence theory. In diffractive optics it has been found that the exploitation of the vectorial nature of light can be of great benefit. Fabrication of sophisticated, spatially variable polarization-control elements is becoming possible with the aid of nanolithography. Polarization singularities and the interplay of bulk properties and topology in nanoscale systems have created much enthusiasm. In nonlinear optics, the second harmonic waves generated on reflection and transmission of intense light enable research into the chirality of nanogratings. Pump-probe techniques allow one to visualize the effects of the nanostructure topology on the surface mode excitation. In quantum optics the coherent control of polarization may lead to new and fascinating applications.

Some authors of invited papers at the conference have written review-type introductory sections—they were encouraged to do so—but all contributions are genuine research papers with original results, and were judged according to the normal publication criteria of the journal. It is our pleasure to thank all authors for making this a splendid special issue of *Journal of Optics A: Pure and Applied Optics*.