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Volume 42



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# Principles of Phase Conjugation

With 70 Figures

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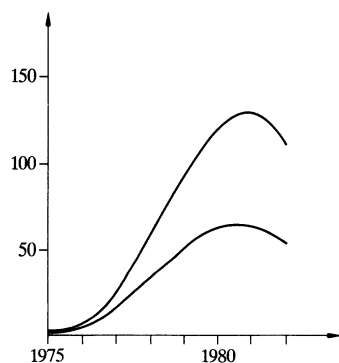
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## Preface

This book has been prompted by our desire to share with others our appreciation of the harmony and beauty in a particular sphere of modern optics known as “optical phase conjugation”. Practical applications of the phase-conjugated wave are likely to be far-reaching. Optical phase conjugation (OPC) combines in itself aesthetic and pragmatic attractiveness, a synthesis that has made OPC a subject of general attention. The figure presents the approximate rate of publications (number of articles per year) on OPC in the world literature for recent years, the lower curve denoting the work carried out in the USSR. The efforts of a large unofficial international collective have yielded an impressive result.



At present, the physical processes underlying various OPC methods are quite understandable, and it is the physics of OPC to which our book is devoted. Practical and scientific applications of phase-conjugated waves, which are of no less interest, have been touched upon in short, as major achievements in this sphere are a matter of the future.

Today there are two main methods of OPC: i) by backward stimulated light scattering, ii) by four-wave mixing. Naturally, much attention is given to these methods in our book which, after the introductory Chap. 1, can be divided into two almost independent parts – Chaps. 2–5, and Chaps. 6–8.

We have made every endeavor to present the basic ideas and theoretical material as comprehensively as possible so that the reader does not need to refer to

the original papers. In discussing experimental work we have confined ourselves to the main results, avoiding particularities. We do not refer to theoretical work in the body of the book, which, in our opinion, makes the reading (and writing) of the book much easier. However, we do refer to original experimental work so that the reader may become acquainted with necessary details.

We express our deep gratitude to Academician N. G. Basov and Academician A. Yu. Ishlinsky for their support of our investigations into the OPC problem. We are thankful to Associate Member of the Academy of Sciences of the USSR D. M. Klimov, Professor V. B. Librovich, Professor Yu. P. Raizer, and Professor I. I. Sobelman for their help, attention, and interest in our work.

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Moscow, December 1984

*B. Ya. Zel'dovich  
N. F. Pilipetsky  
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