

# Preface to Russian Edition

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Laser metrology as a link between fundamental science and modern production ranks high among numerous applications of lasers.

Wide use of lasers in different measurements owes to their high monochromaticity, coherence, and narrow radiation beams, high power and possibility of continuous or pulsed generation. These features have promoted quick development of laser metrology, the potential of which is far from being exhausted. Naturally, a transition to a new laser standard of a meter will stimulate improvement of the old and design of new effective measuring methods and systems.

In metrology, laser diagnostics of liquid and gas flows holds a particular place. In this fields, most effectively used are the basic properties of laser radiation which have given rise to such new measurements techniques as holography, Doppler anemometry, speckle-interferometry, etc.

The goal of the present monograph is to help researchers in mastering flow laser diagnostics methods which essentially differ from those applied earlier and are even advantageous with respect to many parameters. The author is among the pioneers in this field of laser application, has a great deal of experience in development and use of laser techniques, in particular, of the Doppler local flow velocities measuring.

The present book is the generalization of the author's multiyear experience and the results produced by the scientific group which he headed. Also, it covers the most important results of research studies conducted in our country and abroad. A particular attention is paid to the analysis of optical aspects of flow laser diagnostics. Alongside the widely used Doppler velocity measurements technique

and the other methods essentially complementing it are under discussion.

In flow diagnostics, laser Doppler anemometers manufactured by many firms are most widely employed. The flow laser diagnostics is recognized as the main experimental technique in some fields of science and technology. Laser Doppler anemometers have become the necessary tool in aerohydrodynamic laboratories. Introduction of the Doppler measuring systems into commercial practice has been restricted by the complexity of their service. At present the situation changes for the better. Use of semiconductor lasers, fiber optics and computing facilities gives a hope that the nearest years will see a new generation of laser Doppler anemometers both reliable in operation and simple in use.

Computing facilities occupy a particular place in development of flow laser diagnostics. Rational combination of optical techniques with high potentialities of computer and, particularly, personal computer are a vivid example of a new generation highly intellectual laser measuring system development.

The book will be useful for scientists developing and using the laser flow diagnostics techniques in research practice of their laboratories. It may be recommended to all those who tend to master and bring into practice the new advanced measurement technique. The monograph will be of help as well to students and post-graduate students of the relevant specialties.

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