

## PREFACE

The regular topical issue of the journal "Atmospheric and Oceanic Optics" is dedicated to the problems of using the adaptive optical systems in the atmosphere, it is already the fifth such issue of the journal. At present it consists of four parts.

The first part is devoted to the International NATO Summer School "Adaptive Optics for Astronomy." The NATO Summer School was held in June–July 1993 in France on the island of Corsica. The organizers of the School are the professors of the Mendon observatory (Paris, France) Daniella Alloin and Jan–Marie Mariotti. The School Program was prepared by known scientists in adaptive optics: Dr. Dariel Greenwood (Lincoln Laboratory, MTI, U.S.A.), Prof. Pierre Lena (Mendon Observatory, France), Dr. Fritz Merkle (European Southern Observatory, FRG). The Program included the lectures by leading scientists in different aspects of the adaptive optics as well as a series of scientific seminars and poster sessions where the School participants presented their original papers.

Sponsors of the School took a decision to publish the lectures as a separate book entitled "NATO ASI Series" in the publishing house "KLUMER Academic Publishers", and the materials of scientific seminars should be sent to the journal "Atmospheric and Oceanic Optics".

In this connection we have a pleasure of bringing to the readers notice four papers on the use of adaptive optics in astronomy. Among them there are two papers from Italy describing the results of measurements carried out at the Padova observatory. The authors of these papers describe their work on the use of adaptive optics at the national telescope of Italy "Galileo". The paper by the French authors covers the same problem under study at the Nice University. The paper by Dr. V.P. Lukin generalizes the results of many years study at the Institute of Atmospheric Optics, on the adaptive formation of optical beams and images through the turbulent atmosphere. This material was used by the author for his lecture and poster presentation at the NATO School.

The second part of this issue presents a selection of papers concerning the analysis of adaptive optical elements and systems performed by well-known scientists from different centers in Russia. Here the following scientific centers are presented: Rostov–na–Donu, Irkutsk, Kazan', Moscow.

The third part of the issue includes four papers by scientists from Laboratory of Applied and Adaptive Optics at the Institute of Atmospheric Optics SB RAS. These papers discuss the problems of creating numerical dynamic model of adaptive optical systems operating in the atmosphere as well as the results obtained using this model. Some fragments of this model have been thoroughly studied in the leading scientific centers of Russia, USA, and China. To develop the theory of adaptive optical systems the papers analyze the dependence of occurrence of wave front dislocations, the manifestation of instabilities of both the process of forming high–power laser beams and the operation of adaptive systems of radiation focusing under conditions of thermal blooming.

And, finally, the last part of this issue presents a number of papers describing some peculiarities of the optical waves fluctuations. The problems of measuring optical fields under conditions of fluctuations in the detected signal are discussed in the papers by V.A. Tartakovskii, N.N. Maier (Tomsk) and V.M. Loginova (Kyzyl). In his two papers Dr. I.P. Lukin discusses the problems on an increase in resolution of the optical ground–based telescopes by applying of special processing algorithms. Dr. V.A. Banakh, Dr. R.Sh. Tsvyk, and Dr. V.M. Sazanovich (Tomsk) describe the problems of high–power laser radiation transfer in the atmosphere.

The authors of the papers and the compilers of the present issue believe that the problems discussed would be interesting both for the scientists and for the engineers developing modern optoelectronic systems.

Prof. V.P. Lukin