

# Preface

The interest in nonlinear optics was initially mostly related to practical applications of those findings, such as efficient frequency conversion of laser radiation in “nonlinear” crystals toward the visible and ultraviolet ranges. Later it became a useful method of study of the nonlinear optical response of the media during interaction with ultrafast laser pulses. Currently, it is a well-developed branch of optics where various nonlinear optical processes are studied in many laboratories worldwide.

The topics presented in this book are mostly concerned with experimental research of the nonlinear optical characteristics (such as nonlinear refraction and absorption) of various media, low- and high-order harmonic generation in different materials, and formation and nonlinear optical characterization of clusters. These topics became the area of interest from the very beginning of my career. The motivation in writing this book was based on my willingness to show the inter-connection between these areas of nonlinear optics and demonstrate the experimental achievements in this field.

I carried out these studies in collaboration with many researchers from Japan, India, Uzbekistan, France, Canada, Germany, Ukraine, United Kingdom, Russia, Spain, and other countries. The studies presented in this book are based on my collaboration with those researchers and could not be realized without their generous efforts. I would like to thank all of them for long lasting scientific ties and discussions of various aspects of nonlinear optics.

The book is generally based on studies carried out in the Institute of Electronics (Tashkent, Uzbekistan), Institute for Solid State Physics, University of Tokyo (Kashiwa, Japan), Raja Ramanna Centre for Advanced Technology (Indore, India), Institut National de la Recherche Scientifique (Montreal, Canada), and Imperial College London (London, United Kingdom). I thank T. Usmanov, H. Kuroda, P. D. Gupta, P. A. Naik, T. Ozaki, J. P. Marangos, and J. W. G. Tisch for the fruitful discussions and support during our joint collaborative studies.

I would like to emphasize the role of my colleagues from Institute of Electronics, Uzbekistan, Tashkent, where I started and initiated some of these studies. I appreciate the collaboration with I. A. Kulagin, V. V. Gorbushin, S. T. Khudaiberganov, S. R. Kamalov, V. I. Redkorechev, A. A. Gulamov, G. S. Boltaev, N. K. Satlikov, R. I. Tugushev, I. A. Begishev, I. A. Khusainov, and my other colleagues from Laser-Matter Interaction Laboratory who stayed at the beginning of this research and currently continue the nonlinear optical studies of various media.

An important component of this research is the collaboration with many researchers involved in these studies outside the above-mentioned laser centers. I enjoyed the discussions with A. L. Stepanov (Physics-Technical Institute, Kazan, Russia), M. Danailov (ELETTRA, Trieste, Italy), H. Zacharias (Westfälische Wilhelms-Universität, Münster, Germany), M. K. Kodirov (Samarkand State University, Samarkand, Uzbekistan), N. V. Kamanina (Vavilov State Optical Institute, Saint Petersburg, Russia), M. Castillejo (Instituto de Química Física Rocasolano, Madrid, Spain), D. B. Milošević (University of Sarajevo, Sarajevo, Bosnia and Herzegovina), A. A. Ishchenko (Institute of Organic Chemistry, Kiev, Ukraine), M. Lein (Leibniz Universität Hannover, Hannover, Germany), E. Fiordilino (University of Palermo, Palermo, Italy), and V. Strelkov (General Physics Institute, Moscow, Russia) regarding the past, present, and future joint experimental and theoretical studies of the nonlinear optical properties of materials.

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