

Photorefractivity of Lithium Niobate

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Preface

There are great numbers of papers devoted to the photorefractive effect (PRE). However, they are, as a rule, devoted to its utilization for some technical purposes, mainly as a tool for optical high-density memories. In these papers, there are discussed possibilities of application of PRE, obtained results and so on, but only seldom the mechanism of PRE itself is the subject.

All the papers are based on model of PRE assuming that the refractive index is modulated by the electrooptic effect. In spite of it, very soon after our experiments with PRE started, we have met with some features, which could not be explained using the model based on electrooptic effect. That was the reason why we have been oriented on searching what is the real model of photorefractivity.

When the PRE is used for performing records of optical fields, it is important that the records were unambiguous and the parameter by which is the record created depended linearly on the optical field. Apparently, it is why the authors of papers dealing with technical aspects of PRE have been restricting themselves to short exposures when the PRE behaves linearly and the features appearing at long exposures have not been studied.

At small exposures, when the effect behaves linearly, the investigation may give only pure information. It was the reason for which we started investigation of the PRE mainly at long exposures. The main results of this investigation we present in this book.

Investigation of the PRE, the results of which are presented here, has been performed in its beginning as study connected with post-gradual study of one of us and the other one acted as the supervisor of the first one. Later, the study was performed as a part of a project of Faculty of Electrical Engineering of university of Žilina and the last part devoted to the problem of origin of PRE was a part of project APVT No. 20-013504 of Slovak *Science and Technology Assistance Agency*.

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