

# **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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# Contents

## Part A

	<b>Diffraction Investigation of Photorefractivity of <i>LiNbO<sub>3</sub></i> Crystals</b>	1
<b><u>Chapter 1</u></b>	<b>Standard model describing the photorefractive phenomena</b>	3
<b><u>Chapter 2</u></b>	<b>Investigation of photorefractive effect by monitoring the light diffraction</b>	8
	2.1 Homogeneous harmonic phase grating - diffraction integral	15
	2.2 Amplitudes of higher-order diffraction maxima	16
	2.3 Experimental results	16
	2.3.1 Influence of the circular aperture	18
	2.3.2 Influence of grating anharmonicity	20
	2.3.3 Repeated recording	21
<b><u>Chapter 3</u></b>	<b>Two-level model</b>	26
	3.1 Rate equations	26
	3.2 Solution of the rate equations – saturation of the record due to depletion of the donor level	27
	3.2.1 Experimental results	30
	3.3 Solution of the rate equations – saturation of the record due to mutual compensation of the diffusion and drift current	32
	3.3.1 Experimental results	34
	3.4 Influence of $n_{D0}$	36
	3.5 Influence of amplitude grating	38
	3.6 Discrepancies	42
	3.6.1 Weak anharmonicity	42

3.6.2	Phase of the amplitude grating	43
3.6.3	Electric field value	43
<b><u>Chapter 4</u></b>	<b>Side effects</b>	<b>44</b>
4.1	The competitive mechanisms	44
4.2	Influence of the change in domain structure	47
4.3	Holographic scattering	48
4.4	The record of the standing wave	50
<b>Conclusion</b>		<b>52</b>
<b>Part B</b>		
	<b>Interference Imaging</b>	<b>55</b>
<b><u>Chapter 1</u></b>	<b>Imaging of records</b>	<b>55</b>
1.1	Imaging of amplitude records	57
1.2	The interference imaging of the phase records	61
1.2.1	The interference of waves reflected from surfaces of the sample	62
1.2.2	Utilization of interferometers	64
1.3	Advantages of utilization of the interferometers	66
1.4	Influence of the distance of the screen on the interference image distribution	68
1.5	Advantage of the maximal contrast of the interference field	69
<b><u>Chapter 2</u></b>	<b>The connection between the interference image and refractive index distribution</b>	<b>71</b>

2.1	Ambiguity of determination of the interference order	73
2.2	Decrease or increase of the value of the refractive index?	75
2.3	The influence of the wavelength on the interference image and its interpretation	77

## Part C

<b>On origin of photorefractive effect</b>	81
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<b><u>Chapter 1</u></b>	<b>Discrepancies between observed features and features following from the standard model</b>	82
1.1	Maximal (saturated) value of refractive index modulation	84
1.2	Low anharmonicity at long exposures	85
1.3	Independence of the steady state on the intensity of the recorded periodical field	86
1.4	Records created by photogalvanic effect	86
	1.4.1 Harmonic illumination	88
	1.4.2 Stripe-like illumination	89
1.5	Conclusion	89
<b><u>Chapter 2</u></b>	<b>Diffusion without electric field</b>	91
2.1	Spatial dependence of refractive index modulation at aperiodic illumination	91
2.2	Linear approximation	92
	2.2.1 Restriction of validity of linear approximation	96
2.3	Time dependence of strip-like record	98
2.1	Periodic illumination	99
2.2	Steady state solution	101

2.6	Determination of parameters of photorefractive medium	104
2.7	Calculation of carrier distribution at arbitrary illumination (Green's function)	105
2.8	Example of utilization of the Green's transformation	108
2.9	Circumstances when influence of electric field on diffusion can be neglected	111
2.9.1	High polarizability of centres with trapped carriers	111
2.9.2	Bipolar diffusion	112
2.9.3	Compensation of internal electric field by rearrangement of ions	113
<b><u>Chapter 3</u></b>	<b>Experimental verification of the model</b>	<b>115</b>
3.1	Spatial dependence of refractive index in record	115
3.2	Determination of the time dependence of the record formation	117
	<b><u>Conclusion</u></b>	<b>120</b>
	<b><u>References</u></b>	<b>123</b>