## CONTENTS

	perimental Investigation of Emission and Scattering of Light by Relativistic Electrons O. F. Kulikov	
	eword oduction	1 2
Chap	pter I	
Prop	perties of Synchrotron Radiation and Its Effect on Electron Motion in Cyclic	
	Accelerators	5
1.	Intensity and Spectral Composition of the Radiation	5
2.	Angular Distribution of Radiation Intensity	8
3.	Radiation Polarization	10
4.	Features of Radiation from a Beam of Accelerated Electrons	14
<b>5.</b>	Effect of Radiation on Limit of Achievable Energy and Radiation Damping	
***	of Electron Oscillations in Accelerators	17
6.	Effect of Quantum Nature of Synchrotron Radiation on Electron Motion	20
Char	pter II	
Expe	erimental Study of Polarization and Angular Characteristics of Synchrotron	
-1-	Radiation	23
7.	Review of Experimental Work	23
8.	Investigation of the Angular Distribution of Synchrotron Radiation	26
9.	Investigation of the Polarization Properties of Synchrotron Radiation	30
10.	Discussion of Experimental Results	34
Chap	oter III	
Ехре	erimental Investigation of Effect of Synchrotron Radiation on Electron Motion	
	in Cylic Accelerators	36
11.	Review of Experimental Work.	36
12.	Method of Investigation	38
13.	Results of Experimental Study of Radiation Damping and Quantum	
	Buildup of Electron Oscillations in a Synchrotron	41
14.	Investigation of Electron-Beam Dynamics	47
15.	Investigation of Resonances of Electron Oscillations in a Synchrotron	54
16.	Discussion of Experimental Results	60
Chap	pter IV	
Phot	on Scattering by Relativistic Electrons	61
17.	Theoretical Results for Scattering of Photon Beams by Relativistic	
	Electrons	61

18.	Review of Experimental Work	66
19.	Experimental Study of Laser-Photon Scattering by Relativistic	
	Electrons	69
20.	Results of Experimental Studies of Photon Scattering by Relativistic	
	Electrons	77
21.	Discussion of Experimental Results for Scattering of Laser Photons by	
<b>+ -</b> 4	Relativistic Electrons	85
Lite	rature Cited	87
Und	lulator Radiation	
	D. F. Alferov, Yu. A. Bashmakov, and E. G. Bessonov	
Tntn	advation	97
1	oduction Theory of Undulator Radiation in a Vacuum	98
2.	Dynamics of Particles in an Undulator	101
3.	Characteristics of Particle Radiation in Various Undulators	105
4.	Use of Special Reference Systems for Calculating Undulator Radiation	111
5.	Radiation of Charged Particles in a Crystal	114
6.	Undulator Radiation in an Optically Transparent Medium	116
7.	Quantum Aspects of Undulator Radiation	118
Cone	clusion	120
Appe	$\mathbf{endix}_{i}$	121
Lite	rature Cited	121
	Pakhra Accelerator, Physics Institute, Academy of Sciences of the USSR D. F. Alferov, K. A. Belovintsev, L. V. Keldysh, V. V. Mikhailin, E. I. Tamm, and P. A. Cherenkov	
1.	Basic Properties of SR	125
2.	Pakhra Synchrotron Radiation	127
3.	Optical Channels in the Pakhra Accelerator	129
4.	Use of SR	131
<b>5.</b>	Possible Uses of Pakhra SR	133
Con	clusions	136
Lite	erature Cited	137
	Luminescence of Crystals V. N. Meleshkin, V. V. Mikhailin, V. E. Oranovskii, P. A. Orekhanov, I. Pastrnák, S. Pacesova, A. S. Salamatov,	
	M. V. Fok, and A. S. Yarov	
Intra	oduction	139
1.	Study of the Optical Properties of Solids, and the Excitation of	
	Luminescence in Solids Using Synchrotron Radiation	139

CONTENTS	7/11
	V11
O O 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

2.	Properties of the Synchrotron Radiation Obtained from the Physical	
9 <u>—</u>	Institute 680-MeV Accelerator	143
3.	Optical Channel of the Ultraviolet Radiation of the Physics Institute	
	680-MeV Synchrotron: Experimental Apparatus for Studying the	
	Reflection and Luminescence Spectra of Solids in the 300-2500	146
241	À Range	146
4.	Technique of Measuring Optical Characteristics and Exciting the	140
_	Luminescence of Solids Using Laboratory Sources of Radiation	149
5.	Reflection and Luminescence Excitation Spetra of ZnS Phosphors in the	4 5 4
•	Fundamental Absorption Region	151
6.	Electron Structure and Luminescence of IIA-VIB Crystal Phosphors	153
7.	Reflection and Steady Luminescence Excitation Spectra of Alkaline-Earth	41
0 <u>000</u>	Sulfates Activated with Eu and Mn in the Energy Range 5-40 eV	155
8.	Optical Characteristics and Excitation of Luminescence in Crystal	
	Phosphors Based on Tungstates and Phosphates	158
9.	Optical Properties of Sapphire and Fluoride Single Crystals in the	
	Region of Fundamental Absorption	163
10.	Excitation of the Luminescence of Alkali Halide Crystals in the	
	Fundamental Absorption Range	167
11.	Optical Properties of Aluminum Nitride Single Crystals in the Energy	
	Range 3-40 eV	169
Conc	elusions	172
Lite	rature Cited	172
on 1		
	ory of Nonlinear Galvanomagnetic Phenomena in	
A	nisotropic Many-Valley Semiconductors	
	V. A. Chuenkov	
Intro	oduction	175
1.	Calculation of the Electrical Conductivity Tensor of an Anisotropic Many-	
	Valley Semiconductor in Which the Electron Energy Depends in an	
	Arbitrary Manner on the Momentum	176
2.	Calculation of the Tensor $[T_{kn}^{(\alpha)}(\epsilon)]$ in the Case of a Nonparabolic	
	Anisotropic Relationship between the Electron Energy and Momentum	184
3.	Calculation of the Tensor $[T_{kn}^{(\alpha)}(\epsilon)]$ in the Case of a Parabolic Anisotropy	
	of the Momentum Dependence of the Electron Energy	191
4.	Galvanomagnetic, Thermoelectric, and Thermomagnetic Effects in Lead	
	Chalcogenides	192
5.	Nonlinear Galvanomagnetic Effects in n-Type Germanium	200
6.	Nonlinear Galvanomagnetic Effects in n-Type Silicon	216
	elusions	222
	rature Cited	223
and the second of the second o		