

---

## Contents

<b>1</b>	<b>Lenses: Basic Optics</b> .....	1
1.1	Simple Transfer Matrices .....	4
1.2	Passage of Charged Particles Through a Uniform Electrostatic Field .....	7
1.3	Transfer Matrix of the Uniform Field .....	13
1.4	Acceleration of Charged Particles Emitted from a Planar Surface .....	14
1.5	Transfer Matrix of Electrostatic Field Between Spherical Concentric Equipotential Surfaces ...	16
1.6	Acceleration of Charged Particles Emitted from a Spherical Surface .....	16
1.7	Passage of Charged Particles Through an Electrode with Round Aperture .....	18
1.8	General Aperture .....	21
1.9	Passage of Charged Particles Through an Electrode with Slotted Aperture .....	24
1.10	Emission Lenses .....	26
1.11	Immersion Lenses .....	34
1.12	Einzel Lenses .....	39
<b>2</b>	<b>Electrostatic Deflection</b> .....	45
2.1	Parallel Plate Condenser .....	45
2.2	Cylindrical Condenser .....	47
2.3	Spherical Condenser .....	55
2.4	Toroidal Condenser .....	59
<b>3</b>	<b>Magnetic Deflection</b> .....	67
3.1	Small Deflection Angles .....	67

3.2	Magnetic Sector Fields .....	69
3.3	Axial Focusing with Uniform Magnetic Sector Field .....	74
3.4	Non-Uniform Magnetic Sector Fields .....	78
<b>4</b>	<b>Image Aberrations</b> .....	<b>89</b>
4.1	Lenses .....	89
4.2	General Toroidal Condenser .....	91
4.3	Spherical Condenser .....	95
4.4	Cylindrical Condenser .....	96
4.5	Uniform Magnetic Sector Fields .....	98
4.6	Non-Uniform Magnetic Sector Fields .....	101
<b>5</b>	<b>Fringe Field Confinement</b> .....	<b>105</b>
<b>A</b>	<b>Applications</b> .....	<b>109</b>
A.1	Emission Lens Combined with Optical Mirror Objective Lens .....	109
A.2	Combined Objective and Emission Lens .....	110
A.3	Dynamic Emittance Matching .....	117
A.4	Energy Analyzer for Parallel Beam with Coinciding Entrance and Exit Axes .....	117
A.5	Elimination of Transverse Image Aberrations of Sector Fields .....	123
A.6	Energy-Focusing Mass Spectrometers .....	124
	<b>References</b> .....	<b>127</b>
	<b>Index</b> .....	<b>129</b>



<http://www.springer.com/978-3-540-71924-3>

Applied Charged Particle Optics

Liebl, H.

2008, X, 131 p., Hardcover

ISBN: 978-3-540-71924-3