

Contents

Electromagnetic Interactions of Nucleons and Nuclei at Low Energy and Momentum Transfer

By H. Arenhövel

1	Introduction	1
2	The Electromagnetic Interaction	6
3	Exchange Currents as Effective Operators	20
4	The Model of Nuclear Isobar Configurations	31
5	Electromagnetic Processes	35
6	Summary and Outlook	57
	References	58

Electro-Excitation of Nucleon Resonances and Meson Production

By R.M. Davidson

1	Introduction	61
2	General Formalism	62
3	Construction of the Amplitude	70
4	Single-Nucleon Results	79
5	Results from Nuclei	91
6	Conclusions	99
	References	99

Present Electron and Photon Scattering Experiments up to GeV Energies

By B.H. Schoch

1	Introduction	103
2	The Electromagnetic Interaction	106

3	Consequences for Experiments	108
4	Selected Experiments	109
	References	120

Partons and QCD: Hadron Structure and Basics of the Standard Model

By W.J. Stirling

1	Introduction	121
2	Basics of Perturbative QCD	121
3	Deep-Inelastic Scattering	125
4	Parton Distributions in Hadrons	130
5	Hard Processes in Hadronic Collisions	139
	References	144

Electroweak Reactions in the Non-Perturbative Regime of QCD

By U.-G. Meißner

1	Introduction	147
2	Chiral Perturbation Theory with Nucleons	148
3	The Quark Structure of the Nucleon	157
4	Summary and Outlook	170
	References	172

Polarized Structure Functions and the Spin of the Proton

By E. Reya

1	Introduction	175
2	The Structure Function g_1 and the Spin of the Nucleon	176
3	The Transverse Spin Structure Function g_2	198
4	Transverse Chiral-Odd ('Transversity') Structure Functions	204
5	Summary and Conclusions	208
	References	209

Small x Physics

By J. Kwieciński

1	Introduction	215
2	Small x Limit of Parton Distributions in Perturbative QCD	216
3	Small x Physics in Deep-Inelastic Lepton-Hadron Scattering	227
4	Shadowing in Lepton-Nucleus Scattering at Small x	242
5	Summary and Outlook	252
	References	253

Nucleon Structure Functions

By A. Milsztajn and M. Virchaux

1	Introduction	257
2	Present Status of Structure Function Measurements	257
3	QCD Analyses of Structure Function Data	284
4	Future of Structure Function Measurements	314
5	Conclusions	317
	References	319

The Standard Electroweak Theory and Its Experimental Tests

By G. Altarelli

1	Introduction	323
2	Gauge Theories	325
3	The Standard Model of the Electroweak Interactions	327
4	The Higgs Sector	333
5	Basic Relations for Precision Tests	342
6	Input Parameters	343
7	Large Contributions to Radiative Corrections	344
8	Determination of $\sin^2\theta_W$ from m_Z	345
9	Improved Born Approximation	348
10	The Z Line-Shape	349
11	Precision Tests of the Standard Electroweak Theory	352
12	Toward a Model-Independent Analysis of the Data	361
	References	377

First Results from HERA

By G. Wolf

1	Introduction	383
2	The HERA Collider	383
3	The Experiments	387
4	Running Conditions	395
5	Deep Inelastic Electron-Proton Scattering	400
6	Leptoquarks	419
7	Total Photoproduction Cross Section	422
8	Hard Scattering in Photoproduction	429
9	Concluding Remarks	437
References		437
Seminars		441