

Contents

List of Contributors	ix
Preface	xi
1 Introduction	1
S. L. Chin	
References	4
2 “Normal” Multiphoton Ionization of Atoms (Experimental)	7
G. Mainfray and C. Manus	
I. Introduction	7
II. Nonresonant Multiphoton Ionization of Atoms	9
III. Resonance Effects in Multiphoton Ionization of Atoms	17
IV. Antiresonance Effects in Two-Photon Ionization of Cs Atoms	27
V. Conclusion and Future Prospects	31
References	33
3 Theory of Multiphoton Ionization of Atoms	35
Y. Gontier and M. Trahin	
I. Introduction	35
II. Theoretical Background	37
III. Nonresonant Ionization	41
IV. Resonant Ionization	45
V. Generalized Implicit Summation Technique	60
VI. Concluding Remarks	61
References	63

4 Calculation of Resonant Multiphoton Processes	65
Michèle Crance	
I. Introduction	66
II. Nonresonant Processes	68
III. Definition of an Effective Hamiltonian	70
IV. Dynamics of Resonant Multiphoton Ionization	77
V. Spatial Distribution of Intensity	94
VI. Calculation of Atomic Quantities	98
VII. Electron Yield	103
VIII. Conclusion	105
References	105
 5 Angular Distribution of Photoelectrons and Light Polarization Effects in Multiphoton Ionization of Atoms	 109
G. Leuchs and H. Walther	
I. Introduction	109
II. Angular Distribution of Photoelectrons in Multiphoton Ionization	111
III. Conclusion	129
References	130
 6 Above-Threshold Ionization: Multiphoton Ionization Involving Continuum–Continuum Transitions	 133
P. Agostini, F. Fabre, and G. Petite	
I. Introduction	133
II. Above-Threshold Ionization Theory	135
III. Above-Threshold Ionization Experiments	141
IV. Discussion	151
V. Conclusion	152
References	153
 7 Multiphoton Free–Free Transitions	 155
A. Weingartshofer and C. Jung	
I. Introduction	156
II. Theory	159
III. Experiment	172
IV. Suggestions for Future Work	184
References	185

8 Multiphoton Autoionization	189
P. Lambropoulos and P. Zoller	
I. Introduction	189
II. Formal Theory	193
III. Autoionizing States in Multiphoton Transitions	205
IV. Concluding Remarks	219
References	222
 9 Creation of Doubly Charged Strontium Ions	 223
D. Feldmann, H.-J. Krautwald, and K. H. Welge	
I. Introduction	223
II. Experiment	224
III. Results and Discussion	226
IV. Conclusion	233
References	233
 10 Many-Electron Processes in Nonlinear Ionization of Atoms	 235
N. B. Delone, V. V. Suran, and B. A. Zon	
I. Introduction	236
II. Specific Features of the Spectra of Alkaline-Earth Atoms	238
III. Many-Electron Photoionization of Atoms	245
IV. Formation of Doubly Charged Ions in Nonlinear Ionization of Many-Electron Atoms	247
V. Study of the Process of Nonlinear Ionization of the Barium Atom	251
VI. The Process of Two-Electron Nonlinear Ionization of Alkaline-Earth Atoms	258
VII. Conclusions	261
References	262
 Index	 265