

Contents

Part I Laser Light Sources

1 Self-Referenced Scheme for Direct Synthesis of Carrier-Envelope Phase Stable Pulses with Jitter below the Atomic Time Unit	3
Günter Steinmeyer, Christian Grebing, Bastian Borchers, and Sebastian Koke	
2 Single Shot Carrier Envelope Phase Stabilization of a 10 kHz, 10 W Regenerative Amplifier	9
Chengquan Li, Alex Schill, Florian Emaury, Jack Chu, Philippe Féru, Jean-Marc Héritier, and William Tulloch	
3 Intense Few-Cycle Mid-Infrared Laser Pulse Generation and Applications	15
Ruxin Li, Chuang Li, Liwei Song, Ding Wang, Canhua Xu, Cheng Gong, Yuxin Leng, Peng Liu, Zhinan Zeng, and Zhizhan Xu	
4 Few-Cycle, Phase-Locked, Octave IR OPA Using BIBO and 800-nm Pump	27
N. Ishii, K. Kitano, T. Kanai, S. Watanabe, and J. Itatani	
5 CEP-Stable, Few-Cycle, kHz OPCPAs for Attosecond Science: Energy Scaling and Coherent Sub-Cycle Pulse Synthesis	33
Kyung-Han Hong, Shu-Wei Huang, Jeffrey Moses, Xing Fu, Giovanni Cirmi, Chien-Jen Lai, Siddharth Bhardwaj, and Franz X. Kärtner	

6	Dual-Chirped Optical Parametric Amplification for Generating High-Power Infrared Pulses	41
	Q. Zhang, E.J. Takahashi, O.D. Mücke, P. Lu, and K. Midorikawa	
7	Development of High Power Infrared Optical Parametric Amplification Laser System Seeded by Self-difference Frequency Generation Pulses	45
	Tsuneto Kanai, Sébastien Weber, Amelle Zaïr, Christopher Hutchison, Thomas Siegel, Malte Oppermann, Simon Hutchinson, Tobias Witting, Leonardo Brugnera, Rashid A. Ganeev, Toshiyuki Azuma, Katsumi Midorikawa, and Jonathan P. Marangos	
8	Spatially Resolved Characterization of Sub-4-fs Laser Pulses Using Spectral Shearing Interferometry	49
	T. Witting, F. Frank, C.A. Arrell, W. Okell, J.P. Marangos, and J.W.G. Tisch	
9	Enhancement of the Photon Flux of a Time-Compensated Monochromator by Phase Matching in a Hollow Fiber	53
	H. Igarashi, A. Makida, and T. Sekikawa	
10	Temporal Optimization of the Time-Delay-Compensated Monochromator	57
	A. Makida, H. Igarashi, and T. Sekikawa	
11	Characterization of Extreme Ultra-Violet Free-Electron Laser Pulses by Autocorrelation	61
	A. Senftleben, T. Pfeifer, K. Schnorr, K. Meyer, Y.H. Jiang, A. Rudenko, O. Herrwerth, L. Foucar, M. Kurka, K.U. Kühnel, M. Kübel, M.F. Kling, A. Yamada, K. Motomura, K. Ueda, R. Treusch, C.D. Schröter, R. Moshhammer, and J. Ullrich	
Part II High-Order Harmonics and Attosecond Pulse Generation		
12	Formation of Attosecond XUV Pulses via Resonance with Hydrogen-Like Atoms Irradiated by Intense Laser Field	71
	V.A. Polovinkin, Y.V. Radeonychev, M.Yu. Ryabikin, and Olga Kocharovskaya	
13	Exploration of Below-Threshold Harmonic Generation Mechanisms of Cesium Atoms in Intense Mid-Infrared Laser Pulses	79
	Y.-J. Chen, C. Laughlin, and S.-I. Chu	

14	XUV Supercontinuum Generated by Incommensurate Two-Color Mid-IR Optical Parametric Amplifier	85
	M. Negro, C. Vozzi, K. Kovacs, C. Altucci, R. Velotta, F. Frassetto, L. Poletto, P. Villoresi, S. De Silvestri, V. Tosa, and S. Stagira	
15	Ionization Gating for the Generation of Tunable XUV Radiation and Isolated Attosecond Pulses	91
	F. Calegari, M. Lucchini, K.S. Kim, C. Vozzi, S. Stagira, G. Sansone, and M. Nisoli	
16	Efficient Generation of Isolated Attosecond Pulse with CEP-Unstabilized Multicycle Infrared Double Optical Gating	97
	Pengfei Lan, Eiji J. Takahashi, and Kastumi Midorikawa	
17	Frequency-Controlled Isolated Attosecond Pulses Characterized by Both 750 and 400 nm Wavelength Streak Fields ...	101
	H. Mashiko, M.J. Bell, A.R. Beck, M.J. Abel, K.R. Siefermann, P.M. Nagel, J. Robinson, D.M. Neumark, and S.R. Leone	
18	Generation of Highly Phase-Matched Isolated Attosecond Pulses Using Multi-mJ, Carrier-Envelope Phase Stabilized, Few-Cycle Laser Pulses	105
	Tsuneto Kanai, Yuxi Fu, Yasuhiro Kamba, Samuel Bohman, Hiroshi Yoshida, Takuya Kanai, Shigeru Yamaguchi, Eiji J. Takahashi, Yasuo Nabekawa, Akira Suda, and Katsumi Midorikawa	
19	Route to One Atomic Unit of Time: Development of a Broadband Attosecond Streak Camera	109
	Kun Zhao, Qi Zhang, Michael Chini, and Zenghu Chang	
20	Quantum Path Interference in HHG: Impact on Harmonic Polarization and Molecular Imaging	121
	M.Yu. Ryabikin, A.A. Gonoskov, I.A. Gonoskov, and V.V. Strelkov	
21	XUV Interferometry of Attosecond Pulses	127
	Yasuo Nabekawa, Eiji J. Takahashi, Yusuke Furukawa, Tomoya Okino, Kaoru Yamanouchi, and Katsumi Midorikawa	
22	Exploiting Energetic XUV Super-Continua	137
	P. Tzallas, E. Skantzakis, L.A.A. Nikolopoulos, and D. Charalambidis	
23	The Influence of Plasma Defocusing in High Harmonic Generation.....	145
	Chien-Jen Lai, Kyung-Han Hong, and Franz X. Kärtner	

24	Beam Splitters for High-Order Harmonics Using Transparent Materials to Visible Light	151
	Yosuke Kojima, Yuske Furukawa, Yasuo Nabekawa, Eiji J. Takahashi, Fumihiko Kannari, and Katsumi Midorikawa	
25	Enormous Amplification of Full-Coherent Radiation in the Extreme Ultraviolet Region with a Free-Electron Laser	155
	Eiji J. Takahashi, Tadashi Togashi, Makoto Aoyama, Koichi Yamakawa, Takahiro Sato, Atsushi Iwasaki, Shigeki Owada, Kaoru Yamanouchi, Toru Hara, Shinichi Matsubara, Takashi Ohshima, Yuji Otake, Hitoshi Tanaka, Takashi Tanaka, Hiromitsu Tomizawa, Takahiro Watanabe, Makina Yabashi, Katsumi Midorikawa, and Tetsuya Ishikawa	

Part III Ionization of Atoms

26	Breakdown of the Independent Electron Approximation in Sequential Double Ionization	165
	C. Cirelli, A.N. Pfeiffer, M. Smolarski, X. Wang, J.H. Eberly, R. Dörner, and U. Keller	
27	Sequential Double Ionization: The Timing of Release	169
	A.N. Pfeiffer, C. Cirelli, M. Smolarski, R. Dörner, and U. Keller	
28	Study of Asymmetric Electron Emission in Two-Color Ionization of Helium (XUV-IR)	173
	G. Laurent, W. Cao, I. Ben-Itzhak, and C.L. Cocke	
29	Control the Electron Dynamics in Nonsequential Double Ionization with the Orthogonal Two-Color Field	179
	Yueming Zhou and Peixiang Lu	
30	Sideband and Angular Distribution Oscillation of Photoelectrons Observed with XUV/IR 3D Momentum Imaging Spectroscopy	183
	A. Sperl, H. Rietz, M. Schoenwald, A. Fischer, K. Simeonidis, and J. Ullrich	
31	Attosecond Pump-Probe of Doubly Excited States of Helium through Two-Photon Interferometry	187
	Johannes Feist, Stefan Nagele, Christopher Ticknor, Barry I. Schneider, Lee A. Collins, and Joachim Burgdörfer	
32	Controlling and Reading Interference Structures Created by Strong Field Ionizing Attosecond Electron Wave Packets	193
	X. Xie, S. Roither, D. Kartashov, L. Zhang, E. Persson, S. Gräfe, M. Schöffler, J. Burgdörfer, A. Baltuška, and M. Kitzler	

33	Electron Wavepacket Interference Observed by Attosecond Transient Absorption Spectroscopy	199
	L. Gallmann, M. Holler, F. Schapper, and U. Keller	
34	Observing the Real-Time Evolution of Helium Atoms in a Strong Laser Field	203
	Niranjan Shivaram, Henry Timmers, Xiao-Min Tong, and Arvinder Sandhu	
35	Electron Correlation and Interference Effects in Strong-Field Processes	209
	Markus C. Kohler, Carsten Müller, Christian Buth, Alexander B. Voitkiv, Karen Z. Hatsagortsyan, Joachim Ullrich, Thomas Pfeifer, and Christoph H. Keitel	
36	Adiabatic Theory of Ionization of Atoms by Intense Laser Pulses	219
	Toru Morishita and Oleg I. Tolstikhin	
37	Trajectory-Based Coulomb-Corrected Strong Field Approximation	221
	T.-M. Yan, S.V. Popruzhenko, M.J.J. Vrakking, and D. Bauer	

Part IV Molecules in Intense Laser Fields

38	Classical Models of H_3^+ Interacting with Intense Laser Fields	233
	E. Lötstedt, T. Kato, and K. Yamanouchi	
39	Electron-Scattering and Photoionization of H_2^+ and HeH^{2+}	239
	H. Miyagi, T. Morishita, and S. Watanabe	
40	Molecular Orientation by Intense Visible and THz Optical Pulses ...	243
	K. Kitano, N. Ishii, and J. Itatani	
41	Below-Threshold High-Harmonic Spectroscopy with Aligned Hydrogen Molecular Ions	247
	Fu-Yuan Jeng, Dmitry A. Telnov, and Shih-I Chu	
42	Two-Center Interference of Heteronuclear Diatomic Molecules in High-Order Harmonic Generation	253
	Xiaosong Zhu and Peixiang Lu	
43	Toward the Extension of High Order Harmonic Spectroscopy to Complex Molecules: Investigation of Aligned Hydrocarbons	259
	C. Vozzi, R. Torres, M. Negro, L. Brugnera, T. Siegel, C. Altucci, R. Velotta, F. Frassetto, P. Villoresi, L. Poletto, S. De Silvestri, J.P. Marangos, and S. Stagira	

44	Nonlinear Fourier-Transform Spectroscopy of D₂ Using High-Order Harmonic Radiation	263
	Yusuke Furukawa, Yasuo Nabekawa, Tomoya Okino, Kaoru Yamanouchi, and Katsumi Midorikawa	
45	Steering of Molecular Multiple Dissociative Ionization with Strong Few-Cycle Laser Fields	269
	Yunquan Liu, Xianrong Liu, Yongkai Deng, Chengyin Wu, and Qihuang Gong	
46	A Generalized Approach to Molecular Orbital Tomography	277
	C. Vozzi, M. Negro, F. Calegari, G. Sansone, M. Nisoli, S. De Silvestri, and S. Stagira	
47	Tracing Attosecond Electron Motion Inside a Molecule	283
	Liang-You Peng, Ming-Hui Xu, Zheng Zhang, and Qihuang Gong	
48	Natural Orbital Analysis of Ultrafast Multielectron Dynamics of Molecules	289
	Hirohiko Kono, Takayuki Oyamada, Tsuyoshi Kato, and Shiro Koseki	
49	Protonic Configuration of CH₃OH within a Diatomic-Like Molecular Picture	299
	Tsuyoshi Kato and Kaoru Yamanouchi	
50	Siegert-State Method for Strong Field Ionization of Molecules	305
	L. Hamonou, T. Morishita, O.I. Tolstikhin, and S. Watanabe	
51	Ionisation and Fragmentation of Small Biomolecules with Femtosecond Laser Pulses	309
	L. Belshaw, O. Kelly, M.J. Duffy, R.B. King, T.J. Kelly, J.T. Costello, I.D. Williams, C.R. Calvert, and J.B. Greenwood	
52	Initial Process of Proton Transfer in Salicylideneaniline Studied by Time-Resolved Photoelectron Spectroscopy	313
	T. Sekikawa, O. Schalk, G. Wu, A.E. Boguslavskiy, and A. Stolow	
53	Visualizing Correlated Dynamics of Hydrogen Atoms in Acetylene Dication by Time-Resolved Four-Body Coulomb Explosion Imaging	317
	Akitaka Matsuda, Mizuho Fushitani, Eiji J. Takahashi, and Akiyoshi Hishikawa	
54	Ultrafast Delocalization of Protons in Methanol and Allene in Intense Laser Fields	323
	Huailiang Xu, Tomoya Okino, Katsunori Nakai, and Kaoru Yamanouchi	

55	Double Proton Migration and Proton/Deuteron Exchange in Methylacetylene in Intense Laser Fields	335
	T. Okino, A. Watanabe, H. Xu, and K. Yamanouchi	
56	High Energy Proton Ejection from Hydrocarbon Molecules Driven by Highly Efficient Field Ionization	341
	S. Roither, X. Xie, D. Kartashov, L. Zhang, M. Schöffler, H. Xu, A. Iwasaki, T. Okino, K. Yamanouchi, A. Baltuška, and M. Kitzler	
57	Efficient Ionization of Acetylene in Intense Laser Fields.....	347
	E. Lötstedt, T. Kato, and K. Yamanouchi	
58	Laser-Assisted Electron Scattering and Its Application to Laser-Assisted Electron Diffraction of Molecules in Femtosecond Intense Laser Fields	351
	Reika Kanya, Yuya Morimoto, and Kaoru Yamanouchi	

Part V Laser-Induced Surface and Nanoscale Dynamics

59	A System for Conducting Surface Science with Attosecond Pulses ...	359
	C.A. Arrell, E. Skopalova, D.Y. Lei, T. Uphues, Y. Sonnefraud, W.A. Okell, F. Frank, T. Witting, S.A. Maier, J.P. Marangos, and J.W.G. Tisch	
60	Attosecond Transversal Streaking to Probe Electron Dynamics at Surfaces	365
	Luca Castiglioni, D. Leuenberger, M. Greif, and M. Hengsberger	
61	Dynamics of Coherent Optical Phonons in PbTiO₃ Excited by Impulsive Stimulated Raman Scattering	369
	K.G. Nakamura, H. Koguchi, J. Hu, H. Takahashi, M. Nakajima, S. Utsugi, and H. Funakubo	
62	High-Order Harmonic Photoelectron Spectroscopy System towards Measuring Attosecond Electron Dynamics on Solid Surfaces	373
	Katsuya Oguri, Hidetoshi Nakano, Keiko Kato, Tadashi Nishikawa, Atsushi Ishizawa, Hideki Gotoh, Kouta Tateno, and Tetsuomi Sogawa	
63	Effect of Light Polarization on Plasma Distribution and Filament Formation	379
	L. Arissian, D. Mirell, J. Yeak, S. Rostami, and J.-C. Diels	

64	Ignition of Doped Helium Nanodroplets in Intense Few-Cycle Laser Pulses	385
	S.R. Krishnan, L. Fechner, M. Kremer, V. Sharma, B. Fischer, N. Camus, J. Jha, M. Krishnamurthy, T. Pfeifer, R. Moshhammer, J. Ullrich, F. Stienkemeier, and M. Mudrich	
65	Ultrafast Nanoscale Imaging Using High Order Harmonic Generation	391
	Willem Boutu, David Gauthier, Xunyou Ge, Fan Wang, Aura Ines Gonzalez, Benjamin Barbrel, Ana Borta, Mathieu Ducouso, Bertrand Carré, and Hamed Merdji	
66	Strong-Field Effects and Attosecond Control of Electrons in Photoemission from a Nanoscale Metal Tip	401
	M. Krüger, M. Schenk, and P. Hommelhoff	
67	Femtosecond Laser-Induced X-Ray Emission from Gold Nano-Colloidal Solutions	407
	K. Hatanaka, K. Yoshida, A. Iwasaki, and K. Yamanouchi	
	Index	411

Multiphoton Processes and Attosecond Physics
Proceedings of the 12th International Conference on
Multiphoton Processes (ICOMP12) and the 3rd
International Conference on Attosecond Physics
(ATT03)

Yamanouchi, K.; Katsumi, M. (Eds.)

2012, XVIII, 416 p., Hardcover

ISBN: 978-3-642-28947-7