

Contents

Introduction	1
2 Theoretical background	5
2.1 Ultrashort Laserpulses	5
2.2 Maxwell's equations	6
2.3 Nanoplasmonics	8
2.4 Mie Theory	10
2.5 Attosecond streaking	13
2.5.1 Fundamentals of attosecond streaking	13
2.5.2 Attosecond streaking from solids	16
3 Experimental methods and setup	23
3.1 Generation of ultrashort laserpulses	23
3.2 CEP-stabilization	25
3.3 High-Harmonic Generation	28
3.4 AS5-Beamline	31
4 Electron scattering in solids	35
4.1 Elastic Scattering	35
4.2 Inelastic Scattering	41
4.2.1 Kinematics of inelastic scattering	41
4.2.2 Theory	43
4.2.3 Extension algorithms	46
4.2.4 Energy Loss Function	49
4.3 Surface Scattering	53
4.4 Transmission	57
4.5 Simulation for a plane surface	59

5	Attosecond streaking from metal nanotips	63
5.1	General characteristics of nanoplasmonic streaking . .	63
5.2	Theoretical Modelling	66
5.3	Experiments	75
5.4	Analysis	77
5.5	Suggestion for proof-of-principle experiment	88
6	Conclusion and Outlook	91
	Appendix A: Description of electron scattering	93

Attosecond Experiments on Plasmonic Nanostructures

Principles and Experiments

Schötz, J.

2016, XIV, 106 p. 45 illus., Softcover

ISBN: 978-3-658-13712-0