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	Electrons and Holes; 2.2.2 Phonons; 2.2.2.1 Adiabatic Approximation; 2.2.2.2 Harmonic Approximation; 2.2.2.3 Lattice Dynamics; 2.2.2.4 Phonons at Surfaces; 2.2.3 Electron-Phonon Coupling in Metals; 2.2.4 Excitons: Electron-Hole Pairs in Semiconductor Quantum Wells 2.2.4.1 Microscopic Theory2.2.4.2 Excitonic Resonances and Populations; 2.2.4.3 Terahertz Spectroscopy of Exciton Populations; 2.2.4.4 Excitonic Signatures in the Photoluminescence; 2.2.5 Polarons: Electron-Phonon Coupling in Polar and Ionic Solids; 2.3 Collective Excitations; 2.3.1 Plasmons: Electron Density Oscillations; 2.3.1.1 Surface Plasmons; 2.3.1.2 Acoustic Surface Plasmons; 2.3.2.1 Apinov Elementary Excitations in Ferromagnetic Materials; 2.3.2.1 Spin Waves in the Heisenberg Model; 2.3.2.2 Itinerant Electrons; 2.3.2.3 Conclusions 2.4 Experimental Access to Quasi-Particle and Collective Excitations2. 4.1 Coherent Phonons; 2.4.1.1 Coherent Optical Phonons; 2.4.1.2 Coherent Acoustic Phonons; 2.4.2 High-Resolution Angle-Resolved Photoemission; 2.4.2.1 Photoemission Spectral Function of Quasi- Particles; 2.4.2.2 Experimental Considerations for Photoelectron Spectroscopy; 2.4.2.3 Quasi-Particles from Electron-Phonon Interaction; 2.4.2.4 Quasi-Particles from Electron-Phonon Interaction; 2.4.2.4 Quasi-Particles from Electron-Phonon Interaction; 2.4.2.5 Conclusions and Implications; 2.4.3.1 Time-Resolved Photoelectron Spectroscopy; 2.4.3.1 Experiment; 2.4.3.2 Electron Lifetimes 2.4.3.3 Electron-Phonon Coupling2.4.3.4 Surface Exciton Formation; 2.4.3.5 Magnon Emission; 2.4.3.6 Magnon-Phonon Interaction; 2.5 Summary; References; 3 Surface States; and Adsorbate-Induced Electronic Structure; 3.1 Intrinsic Surface States; 3.1.1 Basic Concepts of Surface States; 3.1.2 Scattering Model of Surface States; 3.2.1 Tamm and Shockley Surface States; 3.2.2 Dangling Bond States; 3.3.2 Quantum Well States; 3.4 Experimental Methods; 3.4.1 Photoemission; 3.4.2 Two-Photon Photoemission 3.4.3 Scanning Tunneling Methods
Sommario/riassunto	This two-volume work covers ultrafast structural and electronic dynamics of elementary processes at solid surfaces and interfaces, presenting the current status of photoinduced processes. Providing valuable introductory information for newcomers to this booming field of research, it investigates concepts and experiments, femtosecond and attosecond time-resolved methods, as well as frequency domain techniques. The whole is rounded off by a look at future developments.