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Theoretical Optics (V: 4 SWS=48h, Ü: 1 SWS =16h)	64
 The laws of radiation in a cavity Spectra of light Kirchhoff law, balance of radiation Derivation of Stefan-Boltzmann and Wien's displacement law (thermodynamical pro Thermal radiation and derivation of Rayleigh-Jeans and Wien formula Unification of Planck's radiation formula, derivation by entropy, quantization 	10 occesses)
 Electromagnetic waves Flux of fields, Gauß integral theorem, sources of fields Charge distribution in large distance, multipole expansion Stokes' integral theorem, induction law, electrical displacement current Maxwell equations Solution in vacuum Properties of waves (phase-, group velocity) Energy transport, Poyntingvector General solutions of Maxwell equations in terms of retarded potentials (dipole radi Calculus with nabla operators Boundary conditions, polarization Reflection and transmission at planar interfaces, Fresnel's formulae Metal optics, waves and reflexion at metal surfaces Dielectrics, dispersion, electrical conducting solids 	ation)
 3. Interference and diffraction 3.1 Optical lattices, double slit 3.2 Kirchhoff's diffraction theory 3.3 Frauenhofer and Fresnel diffraction 	5
 4. Introduction into quantum theory 4.1 Philosophy of measurement 4.2 Observables and operators, uncertainty 4.3 Second quantization, harmonic oscillator in number states 4.4 Time evolution of mean values, Ehrenfest theorem 4.5 Quantization of electromagnetic field 4.6 Coherent states, chaotic light 4.7 Coherence properties (Mach-Zehnder, Hanbury Brown-Twiss Interferometry) 	15
 5. Single-mode quantum optics 5.1 Squeezed states (vacuum, phase, amplitude) 5.2 Phase distribution, Observation of non-classical light 5.3 Interaction of photons with atoms 5.4 Selection rules 	10
 6. Quantum information 6.1 Entangled states 6.2 Bell's inequalities 6.3 Quantum computing and quantum logic 6.4 Quantum cryptography 6.5 Quantum teleportation 	9