

Seminar in Optoelectronics I + II #3180

Topics:

- (1) Ultrafast transmitter devices for high bitrate fibre telecommunication: Basics and modern trends
- (2) Fibres in optical communication: types, characterization, connectors and trouble shooting
- (3) Current problems in the proceeding of electronic circuit integration
- (4) Chirped distributed feedback (DFB) semiconductor lasers: structures and operation principles
- (6) Mounting of laser devices: self-aligning versus fine-placing techniques
- (7) Nonlinear optics: basics and applications
- (8) Polymers in optoelectronics: basics and applications
- (9) Semiconductor laser generated ultra short optical pulses: basics
- (11) Technological implementation of buried semiconductor DFB lasers
- (12) Spot size converters: a key-principle for fibre-chip coupling?
- (13) MEMS and MOEMS for medical applications
- (14) Macro-, micro- and nanospectrometers: fundamentals, fabrication, comparison
- (15) Application of ultra short optical laser pulses
- (16) Introduction to optical communication networks: active components
- (17) Introduction to optical communication networks: passive components
- (18) Foundations and fabrication of fibre Bragg gratings (do not overlap with the neighbouring topics!)
- (19) Applications of fibre Bragg gratings: optical filters (do not overlap with the neighbouring topics!)
- (20) Applications of fibre Bragg gratings: external cavity semiconductor lasers (do not overlap with the neighbouring topics!)
- (21) Applications of fibre Bragg gratings: all-glass fibre lasers (do not overlap with the neighbouring topics!)
- (22) Comparison of direct modulation, external modulation and principles of coherent transmission systems
- (23) Rare earth doped fibres: basics and applications in optoelectronic systems (except amplifiers)
- (24) Doped fibre amplifiers (all except Er^{3+})
- (25) Er^{3+} doped fibre amplifiers (describe the design process!)
- (26) Design aspects of vertical cavity $1.55\mu\text{m}$ filters (relation to practicum Opto I)
- (27) Foundations of holography: 3D images, 2D gratings
- (28) Comparison of Schrödinger Equation and Helmholtz equation
- (29) Foundations of materials for gas sensing
- (30) Photonic applications of rare-earth-doped materials
- (31) CD's, DVD's and Blue Ray Discs: foundations, operation principles, applications
- (32) Laser radar: foundations, principles, applications
- (33) Gas Sensorics: Introduction into foundations, applications and perspectives
- (34) From Electronics to Photonics
- (36) Chaos in Semiconductor Lasers: Transitions between Stability, Instability and Chaos
- (37) AWS – Arrayed Waveguide Grating
- (38) Directly generated laser light versus harmonically generated laser light
- (39) Yield aspects in the fabrication of optoelectronic devices

- (40) Influence of end facet phases on the properties of DFB lasers
- (41) Frequency chirp in directly modulated lasers: intuitive aspects and system consequences
- (42) Foundations of dispersion compensating optical communication systems
- (43) Introduction in external modulation technologies of Semiconductor Lasers
- (44) Comparison of external modulators based on SOA, Mach Zehnder Fabry P erot and 2x2 splitter principles
- (45) Lasers and Modulators for OTDM systems
- (53) Methodologies to translate properties to be measured such as temperature, fields, pressure and others into changes of the "optical length" in Mach Zehnder Interferometers
- (54) Flip Chip technology in Optics
- (80) Entangled Photons: foundations, famous experiments, applications in quantum cryptography
- (104) Laser processing: Two photon polymerization laser printing and laser ablation
- (105) Plasmonics
- (106) Micro- and Nano- Origami
- (107) Two Photon Polymerization: foundations - resolution limit and application
- (108) Direct laser writing
- (109) Embossing and Nanoimprint: Classification of different methodologies - resolution limits and applications
- (110) Foundations of Holography with visible light: 3D images, 2D gratings
- (111) X-ray Holography
- (112) Electron Holography
- (113) Optical multibeam holography