

Ultrafast Laser Physics

ETH Zurich, HS 2023 (14 weeks)

Lecture: Wednesday 12:45 – 13:30, HCP E47.3

Thursday 9:45-11:30, HCP E47.2

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Exercises: Wednesday 13:45 – 15:30, HCP E47.4

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Outline and approximate time schedule

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|--------------------------------|---|
| Week 1 (20./21. Sep.): | Introduction/Motivation/Overview,
Linear pulse propagation |
| Week 2 (27./28. Sep.): | Linear pulse propagation
Dispersion compensation |
| Week 3 (4./5. Oct.): | Dispersion compensation
Nonlinear pulse propagation |
| Week 4 (11./12. Oct.): | Nonlinear pulse propagation |
| Week 5 (18./19. Oct.): | Chi(2)-nonlinearities with ultrashort pulses |
| Week 6 (25./26. Oct.): | Relaxation oscillations
Q-switching |
| Week 7 (1./2. Nov.): | Q-switching
Active modelocking |
| Week 8 (8./9. Nov.): | Passive modelocking |
| Week 9 (15./16. Nov.): | Passive modelocking
Pulse duration measurements |
| Week 10 (22./23. Nov.): | Pulse duration measurements
Noise |

- Week 11 (29./30. Nov):** Pump-probe measurements
Frequency combs and carrier-envelope offset phase
- Week 12 (6./7. Dec.):** Frequency combs and carrier-envelope offset phase, high-harmonic generation and attosecond science
- Week 13 (13./14. Dec.):** High-harmonic generation and attosecond science
- Week 14 (20./21. Dec.):** Ultrafast THz science
Hot topics