

Ultrafast Laser Physics

ETH Zurich, HS 2024 (14 weeks)

Lecture: Tuesday 9:45 – 11:30, HCI J6

Wednesday 12:45-13:30, HCI J6

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Exercises: Wednesday 13:45 – 15:30, HCI D6

Thursday 7:45 – 9:30, HIT F 31.1

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Outline and approximate time schedule

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| Week 1 (17./18. Sep.): | Introduction/Motivation/Overview,
Linear pulse propagation |
| Week 2 (24./25. Sep.): | Linear pulse propagation
Dispersion compensation |
| Week 3 (1./2. Oct.): | Dispersion compensation
Nonlinear pulse propagation |
| Week 4 (8./9. Oct.): | Nonlinear pulse propagation |
| Week 5 (15./16. Oct.): | Chi(2)-nonlinearities with ultrashort pulses |
| Week 6 (22./23. Oct.): | Relaxation oscillations
Q-switching |
| Week 7 (29./30. Oct.): | Q-switching
Active modelocking |
| Week 8 (5./6. Nov.): | Passive modelocking |
| Week 9 (12./13. Nov.): | Passive modelocking
Pulse duration measurements |
| Week 10 (19./20. Nov.): | Pulse duration measurements
Noise |

- Week 11 (26./27. Nov):** Pump-probe measurements
Frequency combs and carrier-envelope offset phase
- Week 12 (3./4. Dec.):** Frequency combs and carrier-envelope offset phase, high-harmonic generation and attosecond science
- Week 13 (10./11. Dec.):** High-harmonic generation and attosecond science
- Week 14 (17./18. Dec.):** Ultrafast THz science
Hot topics