Ma 16 - Femtosecond laser spectroscopy of coherent phonons

Physics:

- Electronic band structure of solids, real vs. virtual states
- (Coherent) phonons
- Stimulated Raman scattering
- Refractive index, dielectric function and dispersion
- Ray optics and nonlinear optics (second harmonic generation)
- Physics of ultrafast laser pulses

Technical:

- Lock-in amplifier
- Photodiodes
- Motorized delay stages
- Ultrafast time-domain pump-probe spectroscopy
- Intensity autocorrelation

Data analysis:

- Time and frequency domain data plotting
- Lorentz oscillator (time and frequency domain fits)
- Gaussian functions and their convolutions
- (Fast) Fourier transformation (FFT)
- Exponential decay (fits)