Ma 8 - Superconductivity

Physics:

- Origins of resistivity
- Theory of the free electron gas
- Fermi-Dirac and Bose-Einstein statistics
- Superconducting transition temperature
- Magnetic field effects (Meißner-Ochsenfeld effect)
- Isotropic effect
- Superconducting energy (band) gap
- Cooper pairs - binding energy

Technical:

- Vacuum pump
- Low temperature setup (two cryostats: one for the liquid nitrogen and, within this one, a second one for liquid helium)
- Induction system measurements (lock-in amplifier, transformer, coil with power supply, multimeters)

Data analysis:

- Data fitting skills (linear regression, step function fitting)
- Error and precision measurements