

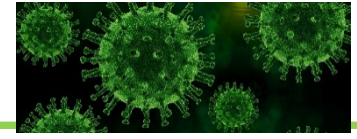
# Preparatory Course to the Advanced Master Lab

## Experiments of intermediate lab course:

- Raleigh scattering
- Zeeman Effect
- HeNe Laser
- STM

Graded module: *Modern Methods in Experimental Physics A*

➤ Oral exam (30 min)                      5 ECTS



- Reduced number of experiments: 3 experiments in presence + 1 home report
- Preliminary and final discussions online
- **Hygiene restrictions:** (introduction also by tutors)
  - Access to physics building limited to experiment (Arrive on time!!)  
Documentation of presence times
  - **Mouth-nose protection** obligatory in corridors and labs!
  - **Hand disinfection** at entrance, WC (**0.2.11**), ...
  - **Distancing:** distribution of work to experiment and documentation

## Introductory part (2 – 5 pages )

hand in 2 days before exp. => Tuesday

- Fundamental physics
- Measurement principle
- Schematic draft of the experimental setup
- Guidelines for execution of experiments

(see instructions on <https://wiki.physik.fu-berlin.de/fp/doku.php>)

- Can be reused for introductory chapters of *lab report*
- Basis for **preliminary discussion** with tutor

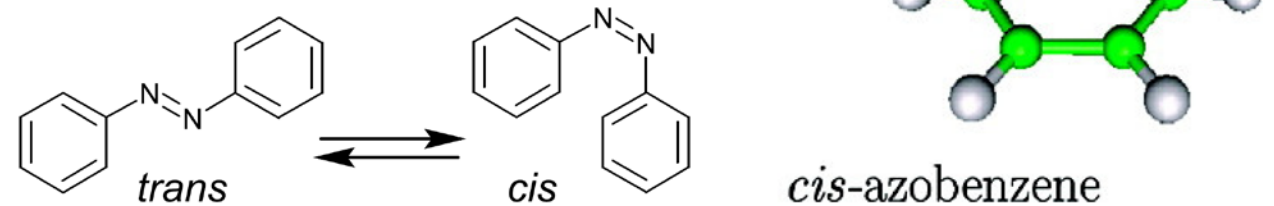
1 day before exp. => Wednesday

- ✓ *Precondition:* Approval of introductory part + preliminary discussion
  
- Tutor's introduction to experimental equipment
  - Tasks according to instructions  
Documentation of experiments: -> Lab notebook
  
  - Beginning of data evaluation
  
  - Arrange access to data!

- Header: title of experiment  
group members, dates, tutor
  - Fundamental physics, measurement principle
  - Experimental details  
sketch of the experiment, guidelines for execution, tasks
  - Results: data with units and uncertainty  
data evaluation procedure, formulars
  - Discussion of results  
sources of errors and uncertainty  
wider context, possible applications
  - Summary
  - Appendix: documentation
- in total: 10 — 15 pages

# Good scientific practice

- Formulate in your own words!
- No copying of text paragraphs!
- Indicate citations for figures, equations...!
- Indicate sources of content!



**Figure 2.1:** *trans* and *cis* forms of azobenzene. Image of 3D structure from [29].

- [29] H. Fliegl, A. Köhn, C. Hättig and R. Ahlrichs. ‘Ab initio calculation of the vibrational and electronic spectra of *trans*- and *cis*-Azobenzene’. In: *J. Am. Chem. Soc.* **125** (2003), 9821–9827. DOI: [10.1021/ja034433o](https://doi.org/10.1021/ja034433o) (cit. on p. 11)

**No plagiarism is accepted in the Lab courses!**

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- Overview of the 4 experiments?
  - Exchange / discussion during semester?

***Have fun with the lab course!***