



## LECTURE COURSE IN THE QUANTUM UNIVERSE RESEARCH SCHOOL

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Winter Term 2023/2024

# Instrumentation and Analysis Methods

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### Course Description:

The course will cover the experimental aspects of data analyses in particle physics. For this a deep understanding of the physics and functioning principles of particle detectors is needed, together with the knowledge of interactions of particles with matter, and of simulation and statistical analyses methods.

In the exercises students will develop a critical capability to discuss plots and scientific results via a journal club. They will learn how to apply the acquired knowledge from the course to use and develop simulation programs (C++ and ROOT). The main component of the exercises is a tutorial in which real data from the LHC are analyzed.

### Literature:

- K. Kleinknecht: *Detectors for Particle Radiation*, Cambridge
- C. Grupen: *Particle Detectors*, Cambridge
- W. R. Leo: *Techniques for Nuclear and Particle Physics Experiments*, Springer
- C. W. Fabjan and J. E. Pilcher, *Instrumentation in elementary particle physics*, World Scientific
- T. Ferbel, *Experimental Techniques in High Energy Physics*
- F. Sauli, *Instrumentation in High Energy Physics*, World Scientific
- R. Wigmans: *Calorimetry: Energy Measurement in Particle Physics*, Clarendon Press

**Date and Place:** Mon, 9:00–10:30, SR 1083, Notkestr. 9, Bahrenfeld  
Wed, 14:00–15:30, Poolraum, Bahrenfeld

**Problem Classes:** Wed, 15:45–17:15, Poolraum, Bahrenfeld

**Starting on:** 16 October 2023

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