

Experimental Particle Physics FIZ 639E , 2019-2020 SPRING SEMESTER

TEXTBOOK:

- Experimental Foundation of Particle Physics, R. Chan & G. Goldhaber, Cambridge

REFERENCES:

- Particle Detectors, Claus Gruppen & Boris Schwartz, Cambridge
- Detectors for Particle Radiation, K. Kleinknecht, Cambridge
- At the Leading Edge: The ATLAS and CMS LHC Experiments, Dan Green, World Scientific

Lecturer: Kerem Cankoçak

WEEKS - CHAPTERS

1. Introduction
2. Basic concepts: Particle interactions, The electromagnetic interaction, The strong interaction, The weak interactions (charged and neutral current)
3. Particle acceleration, particle production, an overview of accelerator techniques
4. Particle detection techniques, particle interactions with matter, particle detectors
5. Discovery of muon, pion and strangeness
6. Discovery of antibaryons and resonances
7. Detection of weak currents and CP violation
8. discovery of the J/Ψ and Charm
9. Quarks, Gluons, and Jets; Experimental studies of QCD
10. Deep Inelastic Scattering and QCD; Quark-Parton model
11. From Neutral Currents to Weak Vector Bosons and Electro-weak unification
12. Testing the Standard Model and Flavor violation
13. Mixing and CP Violation in Heavy Quark Mesons
14. Searches for physics beyond Standard Model

Homework:

There will be study problems assigned every week (30%)

Exam Schedule & contents:

Midterm, includes chapters 1-8 (30%)

Final includes all chapters (40%)