

Summer course “Introduction to Quantum Physics”, 2010

Goals

In different fields of Engineering (like Electronics, Photonics, New Materials), Quantum Mechanics is frequently used as a powerful *tool* to describe the properties of materials and devices. In contrast to that, the current course will emphasize the historic steps of the development of Quantum Physics and look at “What is different” compared to Classical Physics. Basic example from Quantum Mechanics will be used to demonstrate the methods of Quantum Mechanics and their applications.

The course is a non-credit course offered by the Physics Department to all interested students starting from the 4th semester.

The course will consist of lectures and discussion sessions.

Sessions:

Sunday, Tuesday and Wednesday, 10:30 – 13:00 plus 1 h discussion time afterwards

First session: Sunday, June 13

Last session: Wednesday, June 23.

Topics

Historical development in experiment and theory. The introduction of the quantum, particle properties of light, particle-wave dualism, Heisenberg’s uncertainty relation

Mathematical tools, including: complex exponential function, complex waves, operators

Quantum Mechanics, examples and applications: particle in a box, tunnelling, the hydrogen atom

Material:

Serway, Physics for Scientists and Engineers, Chapter 40 - 43

“Knocking on the Devil’s door”, Jeffrey Gold, Tachyon Publishing (pdf)

“Quantum Mechanics, an introduction”, W. Greiner (Springer) (pdf)

„Introduction to Quantum Mechanics – Mathematics” (pdf)

Registration:

Minimum registration for the course is 10 students. Deadline for registration is June 10.

While later submissions may be accepted, the number reached by June 10 will decide about the running of the course.

Lab Experiments?

Due to the limited time available this summer, we will not be able to offer Lab sessions this summer. Students interested in experiments related to Quantum Physics are, however, welcome to join us in the Lab at a later time.