

## Advanced Quantum Theory - physics606

<i>Course</i>	Advanced Quantum Theory
<i>Course No.</i>	physics606

Category	Type	Language	Teaching hours	CP	Semester
Required	Lecture with exercises	English	3+2	7	WT

### Requirements:

**Preparation:** Theoretical courses at the Bachelor degree level

**Form of Testing and Examination:** Requirements for the module examination (written examination): successful work with exercises

**Length of Course:** 1 semester

**Aims of the Course:** Ability to solve problems in relativistic quantum mechanics, scattering theory and many-particle theory

### Contents of the Course:

Born approximation, partial waves, resonances

advanced scattering theory: S-matrix, Lippman-Schwinger equation

relativistic wave equations: Klein-Gordon equation, Dirac equation

representations of the Lorentz group

many body theory

second quantization

basics of quantum field theory

path integral formalism

Greens functions, propagator theory

### Recommended Literature:

L. D. Landau, E.M. Lifschitz; Course of Theoretical Physics Vol.3 Quantum Mechanics (Butterworth-Heinemann 1997)

J. J. Sakurai, Modern Quantum Mechanics (Addison-Wesley 1995)

F. Schwabl, Advanced Quantum Mechanics. (Springer, Heidelberg 3rd Ed. 2005)

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