

Quantum Optics - physics631

Degree - M.Sc. in Physics (PO von 2014)

<i>Module</i>	Specialization: Advanced Experimental Physics
<i>Module No.</i>	physics62a

<i>Course</i>	Quantum Optics
<i>Course No.</i>	physics631

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+1	6	ST

Requirements for Participation:

Preparation:

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

Length of Course: 1 semester

Aims of the Course: Make the students understand quantum optics and enable them to practically apply their knowledge in research and development.

Contents of the Course:

Bloch Vector, Bloch equations,

Quantization of the electromagnetic field; representations;

coherence, correlation functions; single-mode quantum optics; squeezing;

interaction of quantized radiation and atoms;

two & three level atoms; artificial atoms;

quantum information

Laser cooling; quantum gases

Recommended Literature:

R. Loudon; The quantum theory of light (Oxford University Press 2000)

G. J. Milburn, D. F. Walls; Quantum Optics (Springer 1994)

D. Meschede; Optik, Licht und Laser (Teubner, Wiesbaden 2nd edition. 2005)

M. O. Scully, M. S. Zubairy; Quantum Optics (Cambridge 1997)

P. Meystre, M. Sargent; Elements of Quantum Optics (Springer 1999)

U. Leonhardt; Measuring the quantum state of light (Cambridge University Press, Cambridge 1997)

W. Vogel, D.-G. Welsch; Quantum Optics (Wiley VCH, 3rd edition 2006)

