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

Module: Specialization: Advanced Experimental Physics

Module No.: physics62a

Course: Quantum Optics

Course No.: physics631

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<th>Category</th>
<th>Type</th>
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<td>Elective</td>
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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)
- M. O. Scully, M. S. Zubairy; Quantum Optics (Cambridge 1997)
- P. Meystre, M. Sargent; Elements of Quantum Optics (Springer 1999)

September 2008