

Discrete Quantum Optics

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Information regarding the Module (Lectures and Exercises):

Goal of the Module:

Students who successfully complete the course, will be in a position to analyze quantum optical processes in integrated photonic devices. Basic quantum-optical concepts provide the groundwork for working on advanced topics in modern opto-electronic and quantum-photonic functional elements. Prerequisites are knowledge of electrodynamics, optics, and quantum theory.

Lectures and Exercises:

The lectures (2 SWS) will take place on Mondays 9-11 (first time on November 9), the exercises (2 SWS) will be on Wednesdays 15-17 (first time on November 11) in synchronous online form via Zoom. For lectures and exercises a [Moodle course](#) has been set up where all material (exercise sheets, lecture slides etc.) related to the lecture will be uploaded. In addition, all invitations for Zoom meetings and additional announcements will be sent to those registered in the Moodle course. The corresponding password for registration can be obtained by sending an Email to [Konrad Tschernig](#).

The lectures will be accompanied by weekly exercises – the goal of the exercises is to deepen the knowledge by applying the concepts of the lectures to concrete problems.

Literature:

The lecture does not follow a specific textbook. Rather the topic is well-covered in several textbooks/reviews. It is thus useful to compare several of these textbooks/reviews – it is most important that the student can cope with the style and level of presentation. Some recommended textbooks/reviews are:

- Markus Gräfe et al., *Integrated photonic quantum walks*, Journal of Optics **18**, 103002 (2016) **online verfügbar**
- Thomas Meany et al., *Laser written circuits for quantum photonics*, Laser & Photonics Reviews **9**, 363 (2015) **online verfügbar**
- Wim Bogaerts et al., *Programmable photonic circuits*, Nature **586**, 207 (2020) **online verfügbar**
- Richard P. Feynman *The Feynman Lectures on Physics, Vol. III*
<https://www.feynmanlectures.caltech.edu> **online verfügbar**
- Christopher Gerry and Sir Peter L. Knight, *Introductory Quantum Optics*, Cambridge University Press; Illustrated Edition (22. November 2004)