



Universität Ulm

Master of Science Physics (PO 2017)

Seminar Ultracold Quantum Gases

Code 8812875024

ECTS credits 3

Attendance time 2

Language of instruction English

Duration 1 Semester

Cycle each Winter Semester

Coordinator Dean of Physics Studies

Instructor(s) Prof. Dr. Johannes Hecker Denschlag

Allocation of study programmes Physics M.Sc., elective
Physics and Management M.Sc., elective

Recommended prerequisites Profound knowledge in atomic physics and quantum mechanics.

Learning objectives The seminar addresses both fundamental and advanced topics in the fascinating field of ultracold quantum gases.

The talks are based on a small number of selected publications and are intended to provide a good understanding of the underlying physics.

Enough time is arranged for relaxed and stimulating discussions in order to deepen the acquired knowledge.

Syllabus

1. Matter-wave interferometry and gravitational measurements
2. Nonlinear atom optics, 4-wave mixing, and solitons
3. Scattering length and Feshbach resonance
4. Optical lattices and Hubbard model
5. Ultracold molecules
6. Repulsively bound atom pairs

7. Ultracold Fermi gases
8. Quantum cradle
9. Quantum walk
10. Rydberg atoms

Literature

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Teaching and learning methods

Seminar (2 hours per week)

Workload

90 hours

Assessment

The credit points will be awarded once the colloquium (presentation and discussion) has been passed. No prerequisites are necessary for exam registration.

Grading procedure

The grade of the module will be the grade of the exam.

Basis for

Research in quantum technology.
