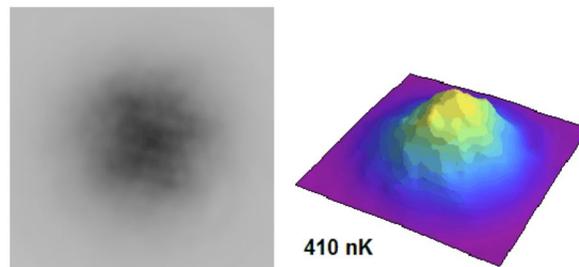


Atomic Physics & Ultracold Quantum Gases



PHY 566/QEII* Fall 2020

* NOTE: SELF-CONTAINED COURSE - **NOT** PART 2 OF PHY565/QEI

Meeting time and place

Lecture: 6:30PM-
7:50PM TuTh
EST

Melville Lbry.
W4550 (to be
finalized)

Instructor

[Prof. Dominik Schneble](#)
Dominik.Schneble@stonybrook.edu
(631) 632-8043 or -4497

A-106

Office hours: tba

topics

Review of atomic structure in external fields; atom-light interactions; ultracold collisions; cooling and trapping; Bose-Einstein condensates and their mean-field physics; low-dimensional Bose gases; degenerate Fermi gases; pairing, superfluidity and BEC-BCS crossover; vortices; optical lattices; artificial gauge fields.
Connections to condensed-matter, nuclear, and particle physics, quantum information science, and metrology.

textbooks

None required - detailed lecture notes with chapter references to reviews and textbooks will be posted on Blackboard as the course proceeds.
Recommended: C.J. Pethick & H. Smith: Bose-Einstein-Condensation in Dilute Gases.

grading

~biweekly homework (50%), midterm (15%) & final (15%); term paper (20%).
The midterm and final exams will be take-home exams. All work to be submitted through Blackboard.

learning outcomes

Students who completed this course will have a thorough understanding of basic phenomena in ultracold AMO physics, will be able to describe these phenomena based on quantum mechanics, and will be able to make quantitative estimates for them.

important note

This course is scheduled for face-to-face delivery; office hours may be held in person or online. **Everyone participating in this class must wear a mask/face covering at all times. Any student not in compliance with this will be asked to leave the class.** International graduate students unable to return to the US who wish to take the course will be accommodated online upon request. -- Every effort will be made to avoid changes in the syllabus, but the possibility exists that unforeseen events will make syllabus changes necessary. Any such changes will be clearly noted in course announcements or through Stony Brook email.

<http://ultracold.physics.sunysb.edu/Courses/PHY566-20.Fall>



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8/2020