

# Atomic and Optical Physics [Physics 721]

Time: Monday / Wednesday 2:30 – 3:50 PM

Room : phys 1219

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**NOTE: No class on Sep. 29**

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Instructors:

Dr. Alexey Gorshkov [Joint Quantum Institute], [gorshkov@umd.edu](mailto:gorshkov@umd.edu), CSS Room 2102

Dr. Ian Spielman [Joint Quantum Institute], [spielman@umd.edu](mailto:spielman@umd.edu), PSC Room 2153

Website:

<http://ultracold.jqi.umd.edu/atomic-physics-721/>

Base text:

Lukin atomic physics notes

For reference:

Atom-Photon Interactions [Cohen-Tannoudji, Dupont-Roc, and Grynberg]

Atomic Physics [Budker, Kimball, and DeMille]

Atomic Physics [Foot]

Photons and Atoms [Cohen-Tannoudji, Dupont-Roc, and Grynberg]

Physics of Atoms and Molecules [Bransden and Joachain]

Laser Cooling and Trapping [van der Straten, and Metcalf]

Quantum mechanics [Sakurai]

E & M [J. D. Jackson]

Office hours:

by arrangement

Grade: HW

[95%] and final exam [5%].

Syllabus:

1. Basic atomic and optical physics
2. Basic processes in atomic and optical physics
3. Open quantum systems
4. Propagation of light in an atomic medium
5. Properties of multi-level systems
6. Stochastic wavefunctions
7. Adiabatic processes
8. Atomic motion in laser light
9. Quantum properties of light interacting with matter
10. Trapped ions
11. Atomic matterwaves