PHYS514

Fall2013

11:00 AM – 12:20 PM, Tuesdays & Thursdays, Ceramics 218

		Topic	Reading	Discussion paper
1	8/27	Units, Hydrogen	F 2.1	
2	8/29	Fine structure, Lamb shift	F 2.3	PRL **75**, 2470 (1995)
3	9/3	Real atoms	F 4	
4	9/5	Hyperfine structure	F 6.1-6.2	PRL **91**, 072501 (2003)
5	9/10	Zeeman effect	F 6.3-6.4	PRL **54**, 2596 (1985)
6	9/12	Static 2-level systems; classical driven 2-level systems and the rotating frame	C-T IV 392-423; C-T IV 424-429, 443-445	
	9/17	Class cancelled		
7	9/19	Quantum 2-level systems	C-T IV 446-454	Phys. Rev. **76**, 996 (1949)
8	9/21*	Two level systems and density matrices	C-T IV 437-442, M&S 4	
	9/24	Class cancelled		
9	9/26	Two level systems and density matrices, continued		
10	10/1	Classical atom and classical light	F 1.6-1.8, C 4.1-4.6	
11	10/3	Classical atom and classical light, continued		
12	10/8	quantum atom, classical light; selection rules	F2.2, F 7.1–7.5	
13	10/10	AC Stark; laser cooling and trapping	F 7.6–7.9; F9.1-9.4	Phys. Rev. Lett. **61**, 169 (1988)
14	10/15	Optical dipole traps and	F9.5	Phys. Rev. Lett. **69**, 49 (1992) (you may also want to

		optical lattices		read PRL 65, 33 (1990) to fully appreciate what's going on)
15	10/17	Optical lattices continued		
16	10/22	Magnetic trapping & evaporative cooling	F10.1—10.3	
17	10/24	Ultra-cold collisions	F10.5	
18	10/29	Ultra-cold collisions, cont.		
19	10/31	Class cancelled		
20	11/5	Quantum gases	F10.4, 10.6, 10.7	
21	11/7	Ion traps	F12.1—12.7	
22	11/12	Stimulated Raman transitions; resolved sideband cooling	F12.9, Appendix E	
23	11/14	Quantum optics, continued	M&S 13, M&S 14	
24	11/19	Quantum optics, continued	M&S 13, M&S 14	
25	11/21	Atom—light interaction: quantum light and atom		
26	12/3	Jaynes-Cummings model; Mollow's transformation		
27	12/5	Dressed states and resonance fluorescence		
28	12/10	Electromagnetically induced transparency		
29	12/18	TBA		

F=*Atomic Physics*, Christopher Foot (textbook)
C-T=*Quantum Mechanics*, Cohen-Tannoudji, Dilj, Laloë (e-reserve)
M&S= *Elements of Quantum Optics*, Meystre, Sargent (e-reserve)
C=*Atomic and Laser Spectroscopy*, Corney (e-reserve)