

## Quantum Mechanics III (Fall 2004)

Week	Date	Morning Topic	Reading	Afternoon Topic	Reading
1	1 Sep	Introduction; The Quantized Electromagnetic Field <i>See also Weinberg, Chapter 1</i>	Zee Page xv; Chap I.1 Mandl & Shaw §1.2	Classical Chains and Strings; The Quantum String	Huang §1.1,1.2
2	8 Sep	Path Integral Formulation of Quantum Mechanics	Zee Chapter I.2 Shankar Chapter 8	Quantum Field Theory from Path Integrals	Zee Chapter I.2, I.3 Shankar Chapter 8
3	15 Sep	Disturbing the Vacuum	Zee Chapter I.3	Propagators, Particles and Forces	Zee Chapters I.3,I.4 Sakurai §2.5
4	22 Sep	Quantized Electromagnetism	Zee Chapter I.5 Mandl & Shaw Ch.5	Gravitation and Extra Dimensions	Zee Chapters I.5,I.6
5	29 Sep	Interacting Fields: Doing the Difficult Path Integral	Zee Chapter I.7	Feynman Diagrams	Zee Chapter I.7
6	6 Oct	Canonical Quantization and the Vacuum	Zee Chapter I.8 Mandl & Shaw Ch.2	Symmetry	Zee Chapter I.9 Sakurai, Chapter 4
7	13 Oct	The Dirac Equation	Zee Chapter II.1 Mandl & Shaw App.A	Symmetries of Spin-1/2 Particles	Zee Chapter II.1 Huang Chapter 7
8	20 Oct	Quantization of the Dirac Field	Zee Chapter II.2 Mandl & Shaw Ch.4	The Dirac Propagator; Fermion Feynman rules	Zee Chapters II.2,II.5 Mandl & Shaw §4.4
9	27 Oct	Detailed Calculation of Møller Scattering (I)	Zee Chapter II.6 Mandl & Shaw Ch.8	Detailed Calculation of Møller Scattering (II)	Zee Chapters II.6 Mandl & Shaw Ch.8
10	3 Nov	The Problem of Divergences in Quantum Field Theory	Zee Chapter III.1	Renormalization and Physical Perturbation Theory	Zee Chapters III.2, III.3 Mandl & Shaw Ch.9
11	10 Nov	Gauge Invariance; The Nonrelativistic Limit	Zee Chapters III.4,5	The Magnetic Moment of the Electron	Zee Chapter III.6 Mandl & Shaw §9.6
12	17 Nov	Spontaneous Symmetry Breaking	Zee Chapter IV.1 Mandl & Shaw Ch.13	Pion Decay and PCAC; Goldberger-Treiman Relation	Zee Chapter IV.2 Gross §13.8
13	24 Nov		<b>No Classes (Thanksgiving Recess)</b>		
14	1 Dec	Superfluidity	Zee Chapters V.1 F&W (QMPS) §54	Landau-Ginzburg Theory; Superconductivity	Zee Chapters V.3,V.4 Ashcroft & Mermin, Ch.34
15	8 Dec	Local Gauge Theories; Anderson-Higgs Mech.	Zee Chapters IV.5,IV.6	Summary and Review	Zee pp.455-458