

Quantum Mechanics III (Fall 2005)

Week	Date	Wednesday Topic	Reading	Thursday Topic	Reading
1	31 Aug	Introduction; Classical mechanics	Zee Page xv; Chap I.1 Marion & Thornton Ch.7,8	Classical field theory; Electromagnetism	Zee Pages 16-19 Jackson §12.7,12.8
2	7 Sep	Quantum mechanics and path integrals	Zee Chapter I.2 Shankar Chapter 8	Quantum field theory	Zee Chapter I.2, I.3
3	14 Sep	Disturbing the vacuum	Zee Chapter I.3	Propagators, particles and forces	Zee Chapters I.3,I.4
4	21 Sep	Quantum electromagnetism	Zee Chapter I.5	General relativity and quantum gravity	Zee Pages 79-82 Zee Chapters I.5,I.6
5	28 Sep	Interacting fields: Doing the difficult path integral	Zee Chapter I.7	Feynman Diagrams	Zee Chapter I.7
6	5 Oct	Symmetry	Zee Chapter I.9	Canonical quantization and the vacuum	Zee Chapter I.8
7	12 Oct	The Dirac equation	Zee Chapter II.1	Lorentz invariance and the Dirac Lagrangian	Zee Chapter II.1
8	19 Oct	Quantization of the Dirac field (I)	Zee Chapter II.2	Quantization of the Dirac field (II)	Zee Chapter II.2
9	26 Oct	The Dirac Propagator; Spin and causality	Zee Chapter II.2-4	Dirac path integrals; Fermion Feynman rules	Zee Chapters II.5
10	2 Nov	Detailed calculation of Møller scattering (I)	Zee Chapter II.6	Detailed calculation of Møller scattering (II)	Zee Chapter II.6
11	9 Nov	Spontaneous symmetry breaking	Zee Chapter IV.1	Pion decay, PCAC, and the Goldberger-Treiman Relation	Zee Chapter IV.2
12	16 Nov	Divergences (UV and IR)	Zee Chapters III.1	Counterterms and renormalizability	Zee Chapters III.2,III.3
13	23 Nov	No Classes (Thanksgiving Recess)			
14	30 Nov	Nonabelian gauge theories	Zee Chapter IV.5	The Anderson- Higgs mechanism	Zee Chapter IV.6
15	7 Dec	Superfluidity	Zee Chapter V.1	Landau-Ginzburg theory; Superconductivity	Zee Chapters V.3,V.4