

# Physics 507

## Group Theory

### Text:

- *Lie Groups in Particle Physics*, 2<sup>nd</sup> edition, by H. Georgi

### Books on Reserve (titles linked to UW library catalogue:

- *Finite Groups and Quantum Theory*, by D.B. Chesnut
- *Group Theory in Physics: An Introduction*, by J.F. Cornwell
- *Nonrelativistic Quantum Mechanics*, by Landau & Lifschitz

### Syllabus:

1. Finite groups
2. Lie groups
3. Representations of the Lorentz group
4. SU (2)
5. Tensor Operators
6. Isospin
7. Roots and Weights
8. SU (3)
9. Simple Roots
10. More SU (3)
11. Tensor Methods
12. Hypercharge and Strangeness
13. Young Tableaux
14. SU (N)
15. 3-D Harmonic Oscillator
16. SU (6) and the Quark Model
17. Color
18. Constituent Quarks
19. Unified Theories and SU (5)
20. The Classical Groups
21. The Classification Theorem
22. Group Topology

### Grading:

There will be roughly one problem set due every week. Some fraction of the problems will be graded, and the scores of the graded problems will constitute 70% of the grade for the course. Working together on problem sets is fine.

There will be a take-home exam at the end of the quarter which will count for the remaining 30% of the course grade.