

ICTP DIPLOMA PROGRAMME IN HIGH ENERGY PHYSICS 2014-15

SYLLABUS

Lie Groups & Lie Algebras - {19 Lectures = 28.5 hours} G. Thompson

1. Introduction
2. Basics of Groups
3. 1-Dimensional Lie Groups
4. Infinitesimal Transformations, Symmetries and Conserved Charges
5. The Groups $SU(2)$ and $SO(3; \mathbb{R})$
6. Representations of the Lie Algebra of $SU(2)$
7. Tensor Representations and Young Tableaux
8. $SU(3)$ and its Lie Algebra
9. Lie Algebras, Sub-Algebras and Ideals
10. Matrix Groups and their Lie Algebras
11. The Cartan-Killing Form and Root Spaces
12. Simple and Semi-Simple Lie Algebras
13. The Classical Lie Groups
14. The Cartan Matrix and Dynkin Diagrams