Title: Fundamental Concepts of Particle Physics

Lecturer: Professor ROSS, G

Date and Times: 18th July at 09:15
18th July at 10:15
19th July at 09:15
20th July at 09:15
21st July at 09:15
22nd July at 10:15

Summary of the proposed talk

The course will provide an introduction to some of the basic theoretical techniques used to describe the fundamental particles and their interactions. Of central importance to our understanding of these forces are the underlying symmetries of nature and I will review the nature of these symmetries and how they are used to build a predictive theory. I discuss how the combination of quantum mechanics and relativity leads to the quantum field theory (QFT) description of the states of matter and their interactions. The Feynman rules used to determine the QFT predictions for experimentally measurable processes are derived and applied to the calculation of decay widths and cross sections.

Prerequisite knowledge and references:

Basic concepts of Quantum mechanics including the description of spin - covered by any undergraduate textbook on quantum mechanics.
An elementary knowledge of the ideas of the Lagrangian formulation of classical mechanics and the principle of least action is useful but not essential.
For example see H. Goldstein, Classical mechanics, Addison Wesley 1980. There is also a very readable Feynman lecture in Chapter 19, vol II of the Feynman Lectures in Physics, Feynman, Leighton, Sands, and Addison-Wesley 1964.

Biography

Professor Graham Ross.

B.Sc Aberdeen University. PhD Durham University.

Research Associate at Rutherford High Energy Laboratory.

CERN fellow.
Senior Research Associate CALTECH.
Advanced Fellow, Oxford University. Atlas Fellow Rutherford Appleton Laboratory.
Lecturer, reader and professor, Oxford University. Scientific Associate CERN. Fellow of the Royal Society of London.

Book : *Grand Unified Theories, Benjamin Cummings 1984*