HE215 Aug 3:0

Nuclear and Particle Physics

Instructor

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Teaching Assistant

Email:

Department: Centre for High Energy Physics

Course Time: Tue, Thus 11:00-12:30

Lecture venue: LH3, New Physical Sciences Building

Detailed Course Page:

Announcements

Brief description of the course

This course is a compulsory course for all undergraduates and Integrated

Ph.D Students,

Prerequisites

classical and quantum mechanics

Special theory of relativity

Quantum transitions

atomic and molecular models

Syllabus

Radioactive decay, subnuclear particles. Binding energies. Nuclear forces, pion exchange, Yukawa potential. Isospin, neutron and proton. Deuteron. Shell model, magic numbers. Nuclear transitions, selection rules. Liquid drop model, collective excitations. Nuclear fission and fusion. Beta decay. Neutrinos. Fermi theory, parity violation, V-A theory. Mesons and baryons. Lifetimes and decay processes. Discrete symmetries, C, P, T and G. Weak interaction transition rules. Strangeness, K mesons and hyperons. Hadron multiplets,

composition of mesons and baryons. Quark model and quantum chromodynamics.

Course outcomes

The students are introduced to the basic tenants of nuclear physics and particle physics. The students should be well versed by the end of the course by the basic building blocks of nature and the four fundamental interactions.

Grading policy

Homeworks 20%, Mid-term 20% Project 20% , Final 40%.

Assignments

Resources