

PH 504: NUCLEAR PHYSICS (3-1-0: 4)

Nuclear Properties

The nuclear radius, mass and abundance of nuclides, nuclear binding energy, nuclear angular momentum and parity, nuclear electromagnetic moments, nuclear excited states.

The Force between Nucleons and Nuclear Models

Deuteron, proton-proton and neutron-neutron interaction, properties of the nuclear force, exchange force model, shell model, even $-Z$, even- N nuclei and collective structure, realistic nuclear models.

Radioactive Decay

Radioactive decay law, production and decay of radioactivity, growth of daughter activities, types of decays, natural radioactivity, alpha decay, beta decay, gamma decay.

Nuclear Reactions

Types of reaction and conservation laws, isospin, nuclear fission, nuclear fusion

Detector and Accelerators

Interaction of radiation with matter, gas filled counters, scintillation detectors, semiconductor detectors, electrostatics accelerators, cyclotron accelerators, synchrotrons, linear accelerators, colliding-beam accelerators.

Particle Physics

Yukawa's hypothesis, properties of mesons, symmetries and conservation laws, quark model, colored quarks, gluons and strong interaction.

Text Books and References:

1. K. S. Krane, "Introductory Nuclear Physics", John Wiley.
2. S. S. M. Wong, "Introductory Nuclear Physics", Wiley.
3. D. Perkins, "Introduction to High Energy Physics", Cambridge University Press.
4. I. Kaplan, "Nuclear Physics", Addison Wesley Publishing Company.