

This is the first draft of the syllabus for Neutrino Physics

The course attempts to introduce the basic concepts of the neutrino physics. The aim is to develop the necessary theoretical background to understand the recent experiential developments in this field. The neutrino oscillation experiments of past, present and future will be presented not in the historical order but according to their relevance to the ideas developed in the course.

1. Introduction

Quark mixing, CP violation, particle-antiparticle oscillations

2. Neutrino oscillations

2.1 Two flavor approximation

Oscillations as a two level system, description of early neutrino experiments, Reactor neutrinos

2.2 Matter effects

MSW effect, Solar neutrinos, Atmospheric neutrinos

2.3 Three flavor Analysis

PMNS matrix, experimental observation of θ_{13} , matter effects with three generations, CP violation, Current and future neutrino experiments

3 Non-standard physics

Sterile neutrinos, CPT violation, Non-standard interactions etc.