

The SERC Main School 2014

BITS - Pilani, K K Birla Goa Campus

Topic: Flavour Physics

Course Syllabus:

- 1 . The unordered and strange flavours:
Muon energy loss, muon decay, Fermi theory
Decays of K mesons and branching fractions, decay constants, form factors
Quark mixing, GIM mechanism, tau-theta puzzle
K-Kbar mixing, CP violation, direct vs indirect CPV
2. CP violation:
Standard Model Lagrangian and CKM matrix, unitarity
Neutral meson mixing and decay
CPV through decay, mixing and interference
- 3 . The flavours of beauty and charm:
Decays of B mesons for determining CKM matrix elements
Semileptonic, leptonic, FCNC decays
Mixing and decays of D mesons
4. Precision tests of SM and looking for new physics
Effective operators and operator product expansion
Some new physics models
Constraining new physics from flavour data

Suggested Text/Reference Books:

1. Review of Particle Properties (PDG):
[Please bring the small PDG handbook, it is OK if it is not the latest.]
- 2 . “CP violation”, Bigi and Sanda: available in Indian edition
- 3 . “CP violation”, Branco, Lavoura and Silva
- 4 . The Babar Physics book:
<http://slac.stanford.edu/pubs/slacreports/reports19/slac-r-504.pdf>
5. The physics of the B factories: <http://arxiv.org/abs/1406.6311>

Background Study Material:

Have a look at <http://theory.tifr.res.in/~amol/talks/B-notes.pdf> , which will be followed in the earlier part of the course.