Title: Prof.

Lecturer: Rohini Godbole

Date and Times:

- Monday, 11th July from 09:15 am to 10:00 am
- Tuesday, 12th July from 09:15 am to 10.00 am
- Wednesday, 13th July from 09:15 am to 10:00 am
- Wednesday, 13th July from 10:15 am to 11:00 am
- Thursday, 14th July from 09:15 am to 10:00 am
- Friday, 15th July from 09:15 am to 10:00 am

Summary of the proposed talk: Standard Model

In this set of six lectures I will try to give a simple overview of important elements of the Standard Model of Particle Physics. The SM summarises our current understanding of the fundamental constituents of matter and interactions among them. I would outline how the knowledge about the fundamental constituents was arrived at, through studies of patterns in static properties of particles and by performing scattering experiments with high energy particle beams. I would then discuss how these patterns helped particle theorists decipher the symmetries (special properties) displayed by the laws which describe interactions of the constituents with each other. After a simple introduction to gauge symmetries and a even briefer statement about gauge field theories, I will focus on issues related to a gauge theory description of electro weak interactions, indicating various experimental discoveries, made mainly at colliders, which were crucial in establishing the SM as we know it today. I would try to point out how, at every stage, as our understanding of the underlying laws developed, in fact theorists ended up predicting newer particles (sometimes even their masses) and/or newer interactions, which were later discovered in the high energy experiments. This discussion will also lead us to an understanding of the special roles that the top quark (which has been found and studied to some extent at the Tevatron collider) and the Higgs boson (for which direct experimental evidence is still lacking) have in the SM. Then I will discuss how these important elements of the SM physics viz. Higgs production and decay as well as aspects of the physics of the top quark.would be studied at the LHC. If time is left I will end by discussing different types of predictions for physics beyond the SM that the theorists make.

Prerequisite knowledge and references:

Non-relativistic and relativistic Quantum Mechanics, Electromagnetism

Biography

Brief CV:

Rohini Godbole obtained her master's degree from the Indian Institute of Technology at Mumbai and then her Ph.D. from the State University of New York at Stony Brook. She is currently a Professor at the Indian Institute of Science in Bangalore India. She was a post doctoral fellow at the Tata Institute of Fundamental Research in Mumbai and University of Dortmund, Germany. She has been short term visitor (> = 6 months) at CERN, DESY and Univ. of Utrecht.

Publications:

Please see the following website:

http://www-spires.fnal.gov/spires/find/hep/www?rawcmd=find+a+godbole&FORMAT=WWW&SEQUENCE=