Syllabus for PY752: High-Energy Physics II

Instructor: Martin SchmaltzLectures: Mo,We 2:30-4:00 pm, PRB 150Office: PRB 561phone: (617) 780-4509email: schmaltz@bu.eduOffic hrs: stop by my office anytimeWeb: http://physics.bu.edu/~schmaltz/PY752

This is the second semester of an advanced graduate course on phenomenological aspects of modern particle physics. We will study the standard model of strong and electro-weak interactions in more detail than in the first semester and discuss popular extensions of the standard model. Specific topics include flavor physics, CP violation, neutrino physics, naturalness of the Higgs sector, grand unified theories, the minimal supersymmetric standard model. Wherever appropriate we will explore how the physics discussed in lecture would/will be observed at the LHC.

Prerequisites: PY751 or consent of the instructor.

Office hours: Feel free to stop by my office anytime, usually I can make time for a question.

Homework: There will be graded homework sets approximately every other week. You are encouraged collaborate on the homework, but what you hand in should be your own work. If you have difficulties come see me for help. Late homework submissions may be accepted in exceptional cases.

Exams and course grade: There will be no exams. Your course grade is determined from your homework (70%) and possibly a course project (30%). Projects should be chosen no later than March 7 in consultation with the instructor. Students will work on their projects throughout the second half of the semester.

Academic conduct: You are expected to be familiar with and adhere to the BU Academic Conduct Code (posted at http://www.bu.edu/academics/). In particular, cheating on exams or other course work will not be tolerated, and suspected cases will be treated in accordance with BU Academic Conduct procedures.

Textbook: The course will not follow a single text book, and you are not required to buy a book. Where possible, relevant reading material will be provided during the semester.

- Peskin, Concepts of Elementary Particle Physics, PY751 book, includes PY752 topics.
- Halzen and Martin, *Quarks and Leptons: An Introductory Course in Modern Particle Physics*, nice text.
- Barger and Phillips, *Collider Physics*, the classic in collider physics.
- Quigg, Gauge Theories of the Strong, Weak, and Electromagnetic Interactions.
- Kane, Modern Elementary Particle Physics.
- Langacker The Standard Model and Beyond, more modern topics.
- Peskin and Schroeder, *Quantum Field Theory*, contains a lot of the material we will cover but at a more rigorous mathematical level (more Quantum Field Theory).
- Ryder, *Quantum Field Theory*, another QFT book, more basic than Peskin and Schroeder.
- Perkins, Introduction to High Energy Physics, a classic PY551 textbook.
- Ramond, Journeys beyond the Standard Model.

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