PHYSICS 8011 SYLLABUS – SPRING 2016

Instructor: Prof. Tony Gherghetta  
Office: WBOB 130-9  
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Office Hours: Th 12:30-13:30 or by appointment

Lectures: TTh 11:15-12:30 in PAN 110  

TA: Morgan Dixon (mdixon@physics.umn.edu)

Class web page: http://www.physics.umn.edu/classes

TOPICS

Motivation; Classical field theory; Hamiltonian, Lagrangian; Noether theorem; Klein-Gordon field; Second quantization of scalar fields; Spinors; Dirac equation; Dirac matrices; Second quantization of spinor fields; Scalar quantum electrodynamics; Feynman diagrams; S-matrix; cross sections and decay rates; Spin 1 and gauge invariance; Second quantization of gauge fields; Quantum Electrodynamics; Compton scattering; Feynman diagrams with loops; Anomalous magnetic moment of electron; Renormalization group and running couplings.

SUGGESTED TEXTBOOKS

“An Introduction to Quantum Field Theory” M. Peskin and R. Schroeder, Plenum Press.  

GRADE DETERMINATION

Will be based on homework problem sets. You are expected to solve the homework problems on your own. However discussing them with other students is acceptable, provided you actively participate in the problem solving. Late homework will not be accepted.