QUANTUM FIELD THEORY I

Physics 443 - Fall Quarter, 2005 - University of Chicago

SUGGESTIONS FOR PROJECTS

It is time to begin thinking about your final project. The course grade will consist of 75% for weekly problem sets and 25% for a project paper due on Tuesday, Dec. 6. By Tuesday, Nov. 8, please submit a short paragraph describing your proposed project. Choose any subject with some relation to the topics covered in this course, or a topic such as one mentioned below which we have not had time to cover. Try to keep the length of the paper below 10 pages. Papers will be reproduced for the benefit of the rest of the class, and should be a clear pedagogic exposition for the non-expert. Collaborations of up to two people are acceptable.

Here are some suggestions for possible projects. Once you choose a topic, I will give appropriate references.

Axion searches
Classical description of spin
Casimir effect
Compton scattering
Conformal (scale) invariance
The CPT theorem (rigorous proof)
Dirac matrices in d space-time dimensions
Linear and nonlinear σ model
Magnetic monopoles
Majorana neutrinos and neutrino mass
Polarization states of massless bosons with $J = 1,\ 2$
A quantum field theory in one time and no space dimensions
Renormalizable theories in d space-time dimensions
Spin and statistics (rigorous proof)
Sunyaev–Zeldovich effect (inverse Compton scattering)
Supersymmetric quantum mechanics
Twistors
Unusual statistics: parasatistics; anyons