PHYSICS 2424 - Spring 1999
Unit 7: Quantum Mechanics and Elementary Particles

Reading:
Sections 27.0 - 27.7
Sections 28.1 - 28.4
Sections 32.0 - 32.1, 32.3 - 32.4, 32.6, 32.9, 32.10 - 32.11

Homework:
Chapter 27 - Questions 2,13
   Problems 7,17,18,28,38,41,64,67
Chapter 28 - Problems 1,5,8,10
   Problem A
Chapter 32 - Questions 6,9
   Problems 19,23,25,36

Dates:
• Reading Questions (Chapter 27) .................... Friday, April 9, 8:00 a.m.
• Reading Questions (Chapter 28) .................... Monday, April 12, 8:00 a.m.
• Reading Questions (Chapter 32) .................... Wednesday, April 14, 8:00 a.m.
• Homework Due ....................................... Tuesday, April 20
• Unit 7 Quiz ............................................ Tuesday, April 20

Homework is due by 5:00 p.m. on Tuesday, April 20. It may be turned in to your discussion group leader or put in the box outside of Nielsen 311 on Tuesday before 5:00.

Reading questions are to be submitted directly from the World Wide Web using the form available at http://www.nhn.ou.edu/~strauss/phys2424. If you try to submit answers to the reading questions on the web, but the answers are rejected, please e-mail me at mgstrauss@ou.edu and describe the problem in detail.

READING QUESTIONS FROM CHAPTERS 27:

READING QUESTIONS FROM CHAPTERS 28:
1. How can we interpret the wave nature, or wavefunction, of a particle?  2. What is the Heisenberg uncertainty principle?  3. Does it deal just with how well quantities can be known, or is it a fundamental property of nature?

READING QUESTIONS FROM CHAPTER 32:
1. Why do high energy particles probe the fundamental structure of matter?  2. How are forces described in particle physics?  3. What are the four fundamental forces in nature?  4. What is an antiparticle?  4. How many particles in nature have associated antiparticles?  5. What do the following terms refer to: (a) gauge bosons, (b) leptons, (c) hadrons, (d) baryons, (e) mesons?  6. What are all hadrons, including the proton and neutron, made of?  7. What is “color”?  8. What is a “Grand Unified Theory?”

Problem A: Suppose the minimum uncertainty in the position of a particle is equal to its de Broglie wavelength (as we often assume). If the particle has an average speed of $4.5 \times 10^5$ m/s, what is the minimum uncertainty in its speed?