

Physics 101B. Introductory Modern Physics. Professor Dine

Winter, 2005. Homework Set 7. Due Fri., March. 11.

We are approaching the end. You have a lot of time for this problem set, but you also have a lot of reading to do. Read chapter 11 (all of it) carefully. In chapter 12, you can skip 12-1 if you like, but read 12-2 and 12-3. You'll need to read all of chapter 13. Problem numbers refer to your textbook.

1. 11-8
2. 11-9
3. 11-15
4. 11-35
5. 11-47
6. 12-36
7. 13-2
8. 13-8
9. 13-14
10. 13-47
11. The mass of the Z particle is about $91 \text{ GeV}/c^2$ ($1 \text{ GeV} = 10^9 \text{ eV}$). Assuming that the weak force arises through exchanges of this particle, what is the range of the weak force (compare the exchange of pi mesons, pp. 545-547).
12. Despite extensive searches, there is no evidence for large quantities of antimatter in the universe. This means that there are protons, neutrons, but not many anti protons or anti-neutrons. What does this say about the baryon number of the universe? If one is to understand this fact, what conservation laws might one have to give up?