

Physics 2150 – Experimental Modern Physics – Fall 2006  
Problem Set

Due October 11, 2006, in the report turn-in box.

**You may use calculators, but *not* computer programs.**

1. Taylor 5.2
2. Fit the results in the previous problem to determine the isotope's mean life. What is the error on the lifetime? What is  $\chi^2/\text{dof}$ ?
3. Two experimental groups have measured a fundamental quantity called  $\epsilon'$ . One group found a result  $\epsilon' = 2.30 \pm 0.65$ ; the other group found  $\epsilon' = 0.74 \pm 0.59$ .
  - a.) At what confidence level are these results consistent?
  - b.) Assuming they are consistent, what is the weighted average (and its uncertainty) of the two measurements?
  - c.) The group that found the larger value claimed to have discovered that  $\epsilon' \neq 0$ . Was that justified?
4. Taylor 9.4
5. Taylor 11.20