

PHYC 542: Particle Physics I

Fall 2017

Homework Assignment #2

(Due September 29, 2017)

1- Exercise 5.5 of Halzen and Martin.

2- Derive the “Gordon identity”:

$$\bar{u}(p')\gamma^\mu u(p) = \bar{u}(p') \left[\frac{p'^\mu + p^\mu}{2m} + \frac{i\sigma^{\mu\nu}q_\nu}{2m} \right] u(p),$$

where $q = (p - p')$.

3- Problem 3.8 of Peskin and Schroeder (page 76). It will be useful to go through the table on page 71 that summarizes the transformation properties of the fermion bilinears under C and P . Focus on $\bar{\psi}\gamma^\mu\psi$, which couples to the electromagnetic field A_μ .