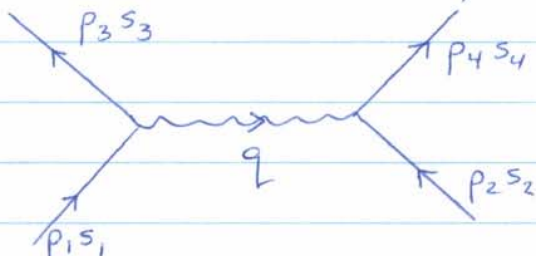


Chapter 6 Assignment

1) Cross sections: Derive (6.14) from (6.13).

2) Write the matrix element for:



3) Show $\sum_{s=1,2} u^s \bar{u}^s = \not{p} + mc$

$$\sum_{s=1,2} v^s \bar{v}^s = \not{p} - mc$$

4) Show $\text{Tr}(\gamma^\mu \gamma^\nu) = 4g^{\mu\nu}$

5) For Bhabha scattering with CM energy $E \gg mc^2$, derive $\left(\frac{d\sigma}{d\Omega}\right)_{\text{CM}}$ given by (6.36).

6) Derive the following expression for the Lamb shift

$$E_L = \frac{4}{3\pi} \frac{Z^4 \alpha^5}{n^3} mc^2 \ln\left(\frac{1}{Z\alpha}\right) \delta_{l0}$$

a) Is it easier to measure E_L in Li^{++} or H?

b) " " in excited or ground states?

Hint: See Bethe & Salpeter's book.