Physics 556/714 Problem Set #6

due *beginning of class* Thursday Oct 23

1. Griffiths problem 6.4 (**but with the Coulomb potential**): "A nonrelativistic particle of mass m scatters from a fixed repulsive Coulomb-type potential, $V(r) = k/r$, where k is a constant. ..."

2. Show that the two particle flux reduces to the term shown in equation 6.34, namely $4\sqrt{(p_1 \bullet p_2)^2 - (m_1 m_2)^2}$. You should assume that the two particles are headed directly towards each other.

3. Griffiths problem 6.7: "Derive equation (6.36) for scattering of particles..."

4. Griffiths problem 6.8: "Consider the case of elastic scattering, ..."

5. Griffiths problem 6.9: "Consider the collision $1+2 \rightarrow 3+4$ in the lab frame..."

6. Griffiths problem 6.13: "Calculate $d\sigma/d\Omega$ for $A + A \rightarrow B + B$ in the CM frame,"

714 students please also do the following:

7. Griffiths problem 6.14: "Calculate $d\sigma/d\Omega$ and σ for $A + A \rightarrow B + B$ in the lab frame."
   The general solution for this problem is ugly. Do only the non-relativistic and ultrarelativistic limits.