

Homework set for Chapter 13

1. Jackson (second edition) 13.1 (hint, use Eq. 13.4).
2. Jackson (second edition) 13.2
3. Jackson (second edition) 13.3
4. Jackson (second edition) 13.5
5. Jackson (second edition) 13.6
6. A particle moving with constant velocity \mathbf{v} is incident upon a target particle with an impact parameter b , and an instantaneous central force

$$\mathbf{F} = \frac{ze^2}{R^2} e^{-R/a}$$

acts between the two particles. Here R is the interparticle separation, and a is a constant length.

1. Find an integral expression for the energy transfer to the target particle in the impulse approximation.
 2. **Estimate** the value of the integral.
 3. Given a uniform density \mathcal{N} of target particles per unit volume, devise an integral which gives the energy loss per unit path length on the incident particle. Discuss the meaning of the any cutoffs you must introduce in the integral to keep it finite.
7. Jackson (second edition) 13.8