

Physics 821: Problem Set 5

Due Thursday, October 29, 2009 at 11:59 P. M.

1. **Hard sphere scattering.** Consider scattering of a particle of mass m from an infinitely massive “hard sphere.” The potential of the hard sphere is

$$\begin{aligned} V(r) &= \infty & r < a \\ V(r) &= 0 & r > a, \end{aligned} \tag{1}$$

where a is the hard sphere radius. First, find the differential scattering cross-section (called $\sigma(\Theta)$ in GPS) as a function of scattering angle Θ . Then find the total cross-section, and give a simple physical interpretation of this total cross-section.

2. GPS, Chapter 3, Problem 31 (20 pts.)
3. GPS, Chapter 3, problem 33.
4. GPS, Chapter 3, problem 20