

Phys 501; Quantum Mechanics II

Homework Set IV (Due 1230pm, Wed, Feb. 6, 2019)

Objectives:

Understand scattering phenomena using the Green's function/Transition matrix approach (Text book Chapter 19.4)

- 1) *General frame work and connection to perturbation theories*
- 2) *Born approximation as the first order perturbation to the incident waves; comparison with the partial wave expansion.*
- 3) *Beyond the Born approximation: what we can do.*

Math requirements:

- * Deriving the Green's function for free particle Hamiltonian in 3D space.*

Prob. 1 Exercise 19.3.2, page 533 textbook. Compare your result here with what you had in previous HW sets on s-wave and p-wave (**in the same limit**). Extract the information of p-wave scattering in this approximation.

Prob. 2 Exercise 19.3.3

Prob. 3 Exercise 19.3.4