

## Homework 7

1. (50 points) Derive the expression for the scattering amplitude that relates it to the interaction potential using the Green function method. Show that choosed Green function is indeed a Green function of the Schroedinger wave equation.
2. (20 points) From the above, derive the Born Apprixmation, explain in which case such approximation is justified
- 3 (40 points) Consider spherical potential for Born Approximation and derive the scattering amplitude for the Yukawa potential.
4. (40 points) Same as above but for Coulomb potential and obtain Rutherford formula.
5. (50 points) For given charge distribution  $\rho(r)$  obtain the expression for the form - factor .
6. (50 points) Give the detailed derivation of Optical Theorem