

HW#8, Due June 9 (Wed) by 9:00.

**No late HW will be accepted. So turn in whatever you have done.**

1. (40% ) Use the Born approximation to calculate the differential cross section for the central potential  $V(r) = -V_0 e^{-r/a}$
2. (60% ) Estimate the differential cross section  $d\sigma/d\Omega$  in the Born approximation for particles of mass  $m$  scattering off the following potentials:
  - $V(\vec{r}) = a^3 V_0 \delta^3(\vec{r})$
  - $V(\vec{r}) = a^3 V_0 [\delta^3(\vec{r} - a\hat{z}) + \delta^3(\vec{r} + a\hat{z})]$
  - $V(\vec{r}) = a^3 V_0 [\delta^3(\vec{r} - a\hat{x}) - \delta^3(\vec{r} + a\hat{x})]$

Can you explain the meaning of what you get?