

Homework 9 (10)

1. Show *that* :

$$A_1 = (\hbar \mathbf{L} \times \mathbf{p}) + \frac{k m \vec{r}}{r} \text{ is not hermitean operator}$$

while

$$A = \frac{1}{2} (\hbar \mathbf{L} \times \mathbf{p}) - \frac{1}{2} (\mathbf{p} \times \hbar \mathbf{L}) + \frac{k m \vec{r}}{r} \text{ is hermitean}$$

2. Calculate A^2 where

$$A = \frac{1}{2} (\hbar \mathbf{L} \times \mathbf{p}) - \frac{1}{2} (\mathbf{p} \times \hbar \mathbf{L}) + \frac{Z e^2 m \vec{r}}{r}$$

3. Show that $[H, A] = 0$ for the Hamiltonian of coulomb interaction.