

Physics 621 Homework Assignment 2

due Tuesday September 22 2009

Unless otherwise indicated, the problems are from the textbook (Merzbacher, 3rd edition).

I have the page numbers correct this time, I hope...

1. Problem 2.4 (page 24)
2. Exercise 3.2 (page 26)
3. Given an arbitrary function $g(x)$ that can be expanded in a power series, prove that

$$[g(x), p] = i\hbar g'(x)$$

4. Given a Hamiltonian $H = p^2/2m + V(\vec{r})$, find the uncertainty principle connecting a measurement of the energy and the position.
5. Exercise 3.4 (page 27)
6. Exercise 3.13 (page 39)
7. Problem 3-2 (page 49). Note: the statement of the problem in the text has a typo; the second term in the square brackets should read $\langle x \rangle_0 \langle p_x \rangle_0$ (the subscript "0" on $\langle p_x \rangle$ is missing in the text).