

Information Concerning Mid-Term Exam 2

The second mid-term exam will be held from 12:45 to 1:45 p.m. on Thursday, November 15 in NPB 1002. (Note: The exam will begin five minutes before the usual starting time for the class and will end five minutes later.)

The exam will cover all material discussed in the course up to and including the end of class on Tuesday, November 6. A list of topics, cross referenced to the course texts, appears on the course Web pages at www.phys.ufl.edu/~kevin/teaching/6645/01fall/topics.html. The focus will be on topics introduced since the first mid-term.

You will be allowed to consult Shankar and your lecture notes during the exam. No other written/printed materials will be allowed.

Questions concerning rotational symmetry will be restricted to topics appearing in Shankar Chapter 12, Sections 2–4 (and applications thereof). In preparing for the exam, you would be well-advised to work through Shankar Exercises 12.3.3–7, plus the following:

1. Merzbacher Problem 11.1: For the state represented by the wave function

$$\psi(x, y, z) = Ne^{-\alpha r^2}(x + y)z,$$

- (a) determine the normalization constant N as a function of the parameter α ;
 - (b) calculate the expectation values of \mathbf{L} and L^2 ;
 - (c) calculate the variances of these quantities.
2. Merzbacher Problem 11.2: For a finite rotation through an angle ω about the z axis, apply the rotation operator $U[R(\omega\hat{\mathbf{z}})]$ to the function $f(\mathbf{r}) = ax + by$, and show that it transforms correctly.