

Physics 216. Quantum Mechanics. Professor Dine

Spring, 2004. Homework Set 2. Due Tues., April 19.

Make sure you read: Shankar, chapter 17 and Sakurai, chapter 5 (through section 4). Also, since most of you seem to be unfamiliar with parity symmetry, please read Shankar, section 11.4 and Sakurai, sections 4.1-4.2.

This is a somewhat long problem set, which is why you have a few extra days.

1. Show that the tensor

$$Q_{ij} = (x_i x_j - \frac{1}{3} \delta_{ij} \vec{x}^2) \tag{1}$$

is a spherical tensor of rank 2 (i.e. it transforms under rotations like Y_2^m).

2. Sakurai chapter 4, problem 5.
3. Sakurai 5.4
4. Sakurai 5.7
5. Sakurai 5.8
6. Sakurai 5.12