

What You Should Know from “Looking Glass Universe”!

1.) What is the job of physics?

Tries to predict the future

2.) What is the job of quantum mechanics?

Tries to predict the future state of a system is

3.) What equation accomplishes the task highlighted in Question 2?

Schrodinger's equation predicts the probability a system will be found in a particular state in the future.

4.) To what does Schrodinger's Equation come down to?

Conservation of energy

5.) What one vital fact is “all you need” to understand quantum computers and quantum teleportation ?

Time evolution is linear

6.) What happens to the branches of a superposition when you make a measurement?

Everything evolves perfectly linearly in time *unaware of the other branches* in the superposition, but making a measurement motivates the branches to interact with each other. Measurement, in other words, doesn't obey the Schrodinger Equation. This is the measurement problem.

7.) What conservation principles is built into Schrodinger's Equation.

Conservation of energy

8.) How does the probability of an energy eigenstate change with time evolution?

It doesn't

9.) Consider the Schrodinger Equation with eigenstates in energy.

$$|\psi\rangle = \alpha_1|E_1\rangle + \alpha_2|E_2\rangle + \alpha_3|E_3\rangle + \dots$$

The equation as time proceeds looks like:

$$T(t)|\psi\rangle = e^{iE_1t/\hbar}\alpha_1|E_1\rangle + e^{iE_2t/\hbar}\alpha_2|E_2\rangle + e^{iE_3t/\hbar}\alpha_3|E_3\rangle + \dots$$

a.) What does the $e^{iE_1t/\hbar}$ term do?

It rotates the probability wave's

b.) How does the probability of each eigenstate change with time?

It doesn't