

For these questions, use the simulation “Successive energy measurements” in the QuVis HTML5 collection.

www.st-andrews.ac.uk/physics/quvis/simulations_html5/sims/EMeasurement/EMeasurement.html

1) Have a play with the simulation for a few minutes, getting to understand the controls and displays. Note down three things about the effect of taking an energy measurement that you have found out.

2) Using example states shown in the simulation, describe differences in taking an energy measurement if the initial state is an energy eigenstate and an energy superposition state in terms of

a) theoretical outcome probabilities prior to and after the measurement

b) the quantum state prior to and after the measurement

3) a) For which initial states does the probability density depend on time?

b) For which initial states does the probability of an energy measurement depend on time?

4) Assume the quantum particle is confined in an infinite square well. Assume you take a single measurement and find the energy E_5 . What can you deduce about the quantum state prior to measurement? Give an example / examples of quantum states compatible with this measurement.

5) Which of the Challenges did you find most difficult and why? Explain how you solved this challenge. If none of the Challenges were difficult, choose the one you found most interesting and explain how you solved it.