

Where was the photon?

For this tutorial, you'll need a computer with the PhET **"Quantum Wave Interference"** simulation, available at <http://phet.colorado.edu/en/simulation/quantum-wave-interference>

1. Run the simulation, and set up a double-slit experiment with a single photon. What happens?

2. What happens when you run the experiment many times?



A single photon is shot towards the slits and detected at the point shown on the screen.

3. What can you say about where the photon was just before it was detected?

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4. Here are some answers that other people have given to that question. Which (if any) do you agree with? Which do you disagree with? Explain why.
- It was located just in front of where it was detected.
 - It was spread out evenly in the space in front of the screen.
 - It was spread out in a non-even pattern in the space in front of the screen.
 - It was spread out evenly through all space.
 - Other: _____

★ *Consult an instructor before you proceed.*

5. Does this photon have a definite speed before it is detected?

6. Can you say anything about the energy of the photon, either before or after it is detected?

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