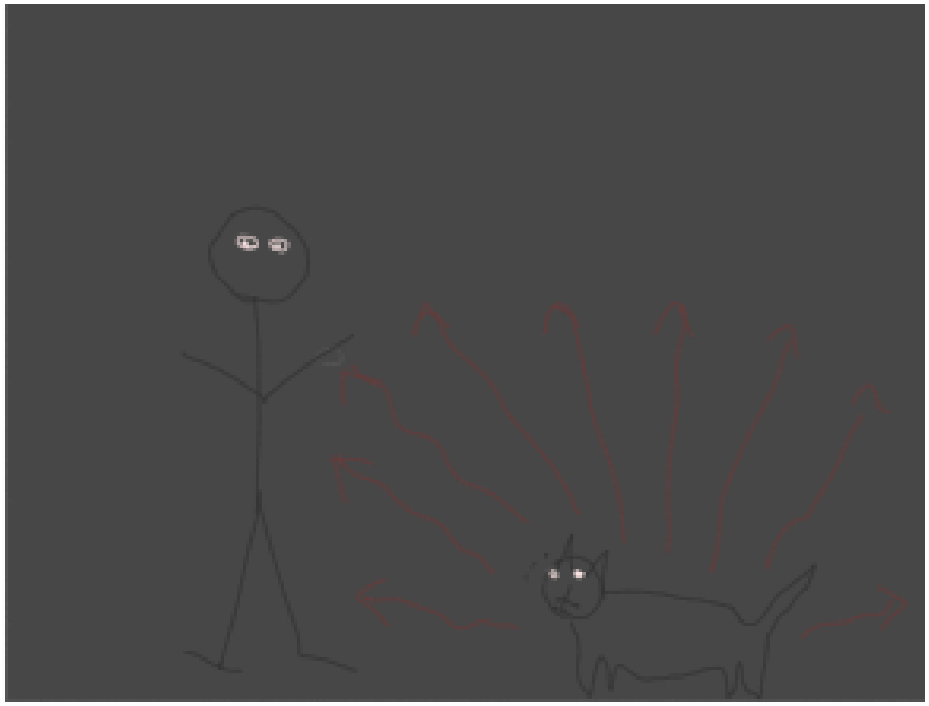
LAST TIME: During a single chest x-ray, a patient typically absorbs radiation energy equivalent to

D) Standing in the dark next to a cat for one millisecond



Discussion question: why are x-rays and gamma rays more harmful than ordinary light, infrared, etc…?

The figure above represents the photons in some beam of light with a particular wavelength and power/intensity. If size represents photon energy in the picture, which of the pictures below best represents a beam with double the wavelength but the same power/intensity?

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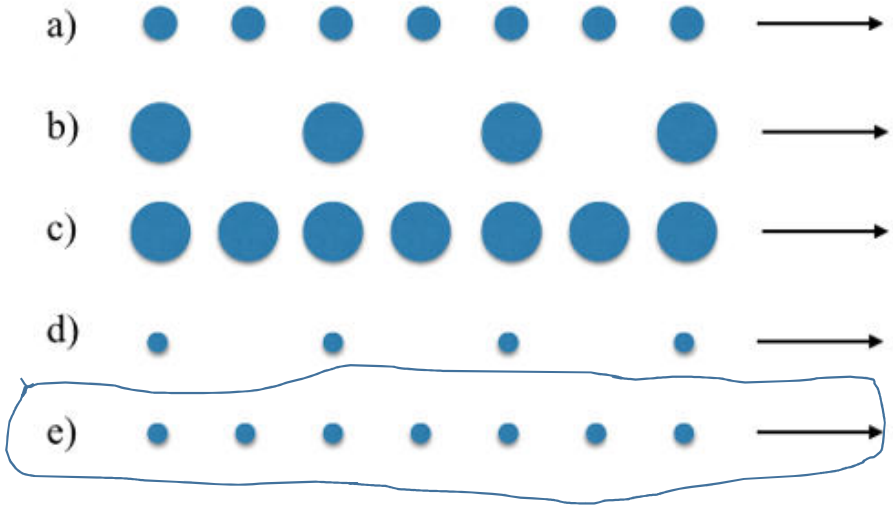
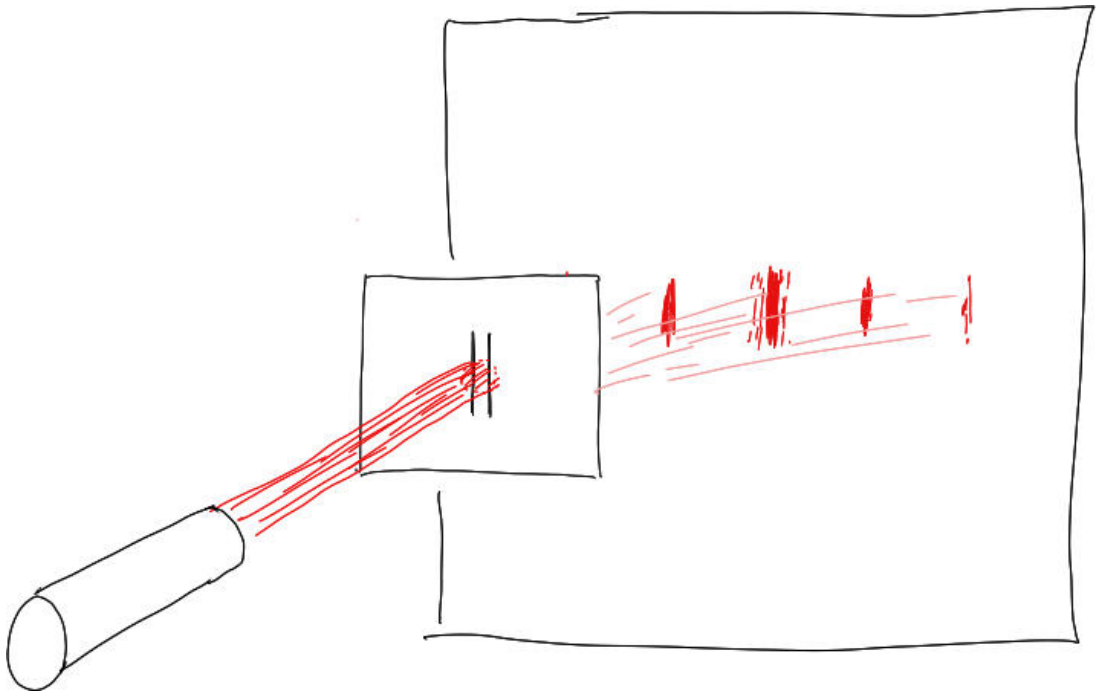


In the double-slit experiment, why is there a bright spot in the middle of the screen, even though this lies right between the two slits where the light should be blocked?



Suppose we reduce the intensity of the laser beam so that only one photon at a time passes through the double slit apparatus.

We have a screen that is sensitive enough to detect the individual photons.

What will we see if we send one photon through? What will the cumulative image look like after 100 photons have hit?

In the double slit experiment, performed with one photon at a time, the pattern of hits on the screen after many photons have gone through looks different in the case where both slits are open for each photon compared with the case where we open only one random slit each time.

What could explain this??

In the double slit experiment a series of particles is prepared and sent through, so that each particle is identical to the last.

The particles are found to hit different locations on the screen.

In this case, it logically possible that the original particles were actually identical to one another? If so, how can we explain why the particles hit different places on the screen?

According to the quantum superposition model, what will happen if we remove the middle screen with the two slits?

A) Nothing, the pattern of hits will remain the same
B) The photons will now all hit the screen at the same place
C) The photons will still hit at various locations, but the pattern of hits will be different.
D) The photons will no longer hit at specific locations, but will be absorbed in a more diffuse way, distributing their energy over a larger region.

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