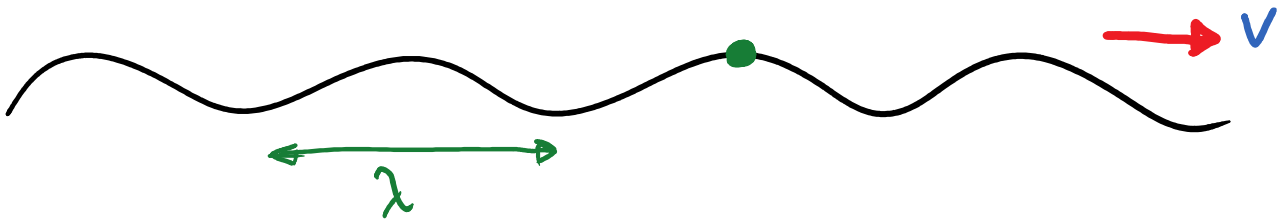
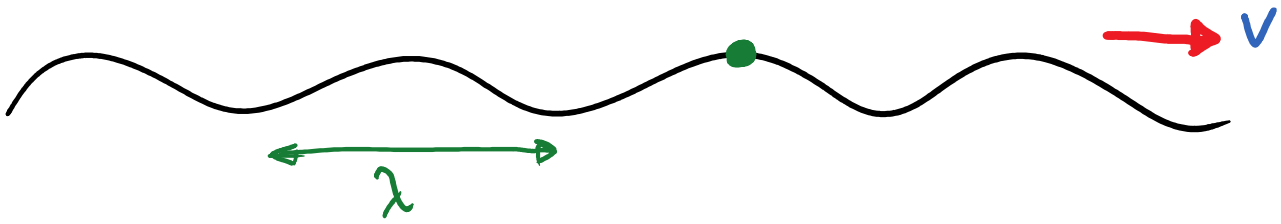


A sinusoidal wave is travelling to the right. At what time will the green spot on the string next oscillate up to a maximum height?

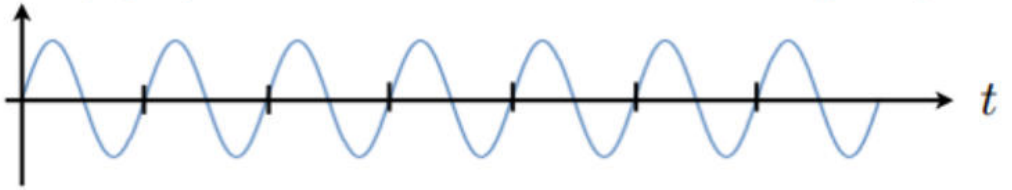
A) λ v
B) λ / v
C) v λ
D) v / λ
E) cos(v λ)



At what time will the green spot on the string next oscillate up to a maximum height?

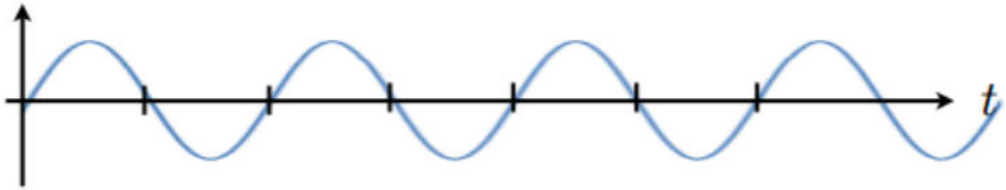
A) λ v
B) λ / v
C) v λ
D) **v / λ**
E) cos(v λ)

This is a history graph of a sinusoidal wave travelling at speed *v*:

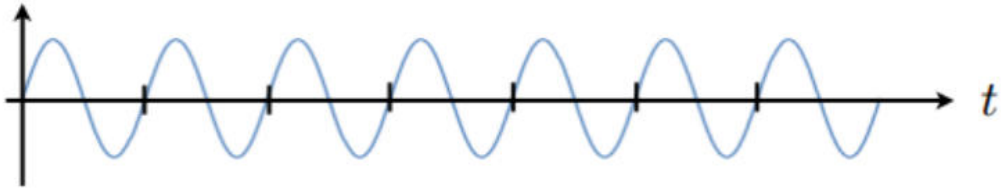


What does the history graph look like if the wave speed is **doubled**.

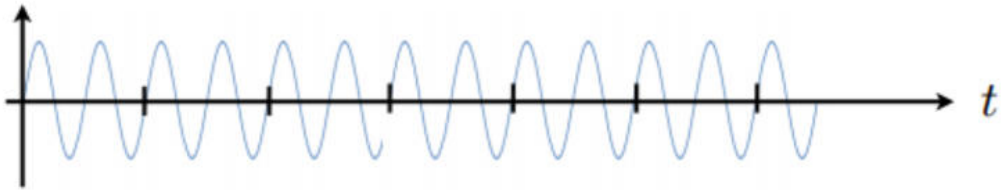
A)



B)



C)



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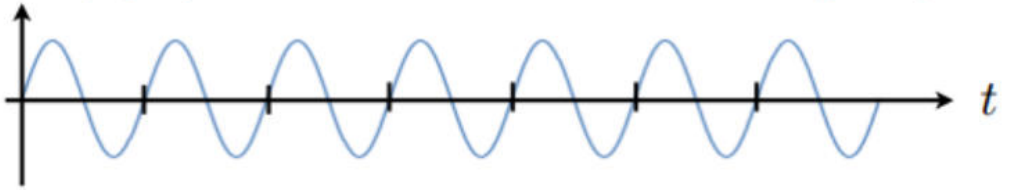

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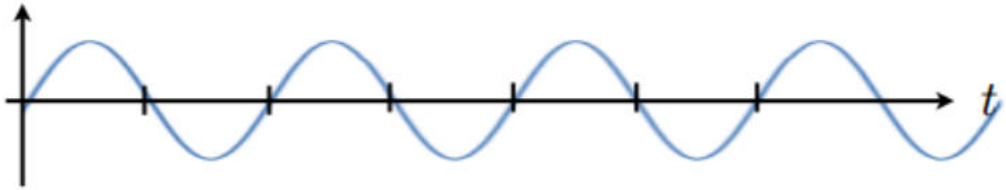
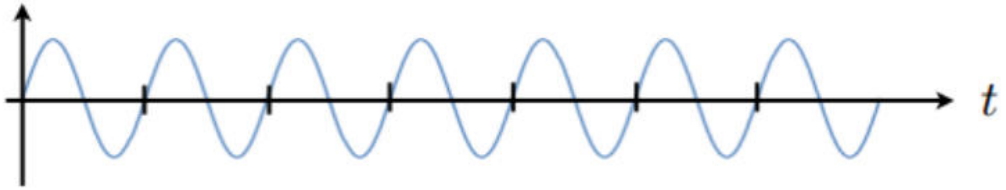
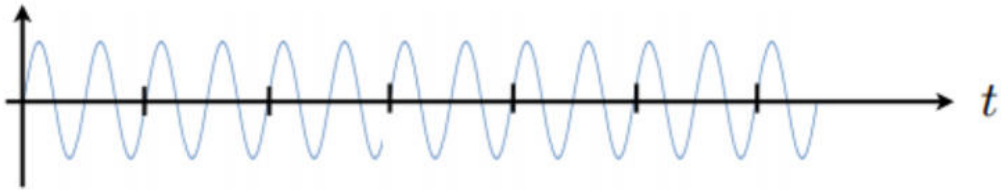
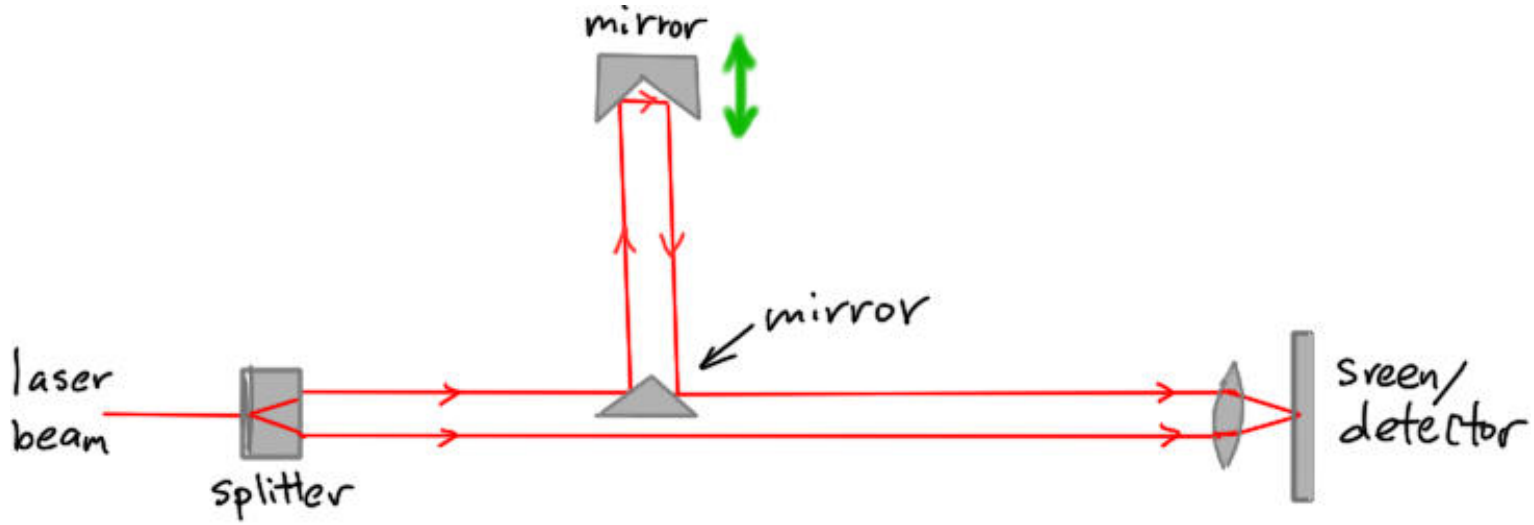


B)



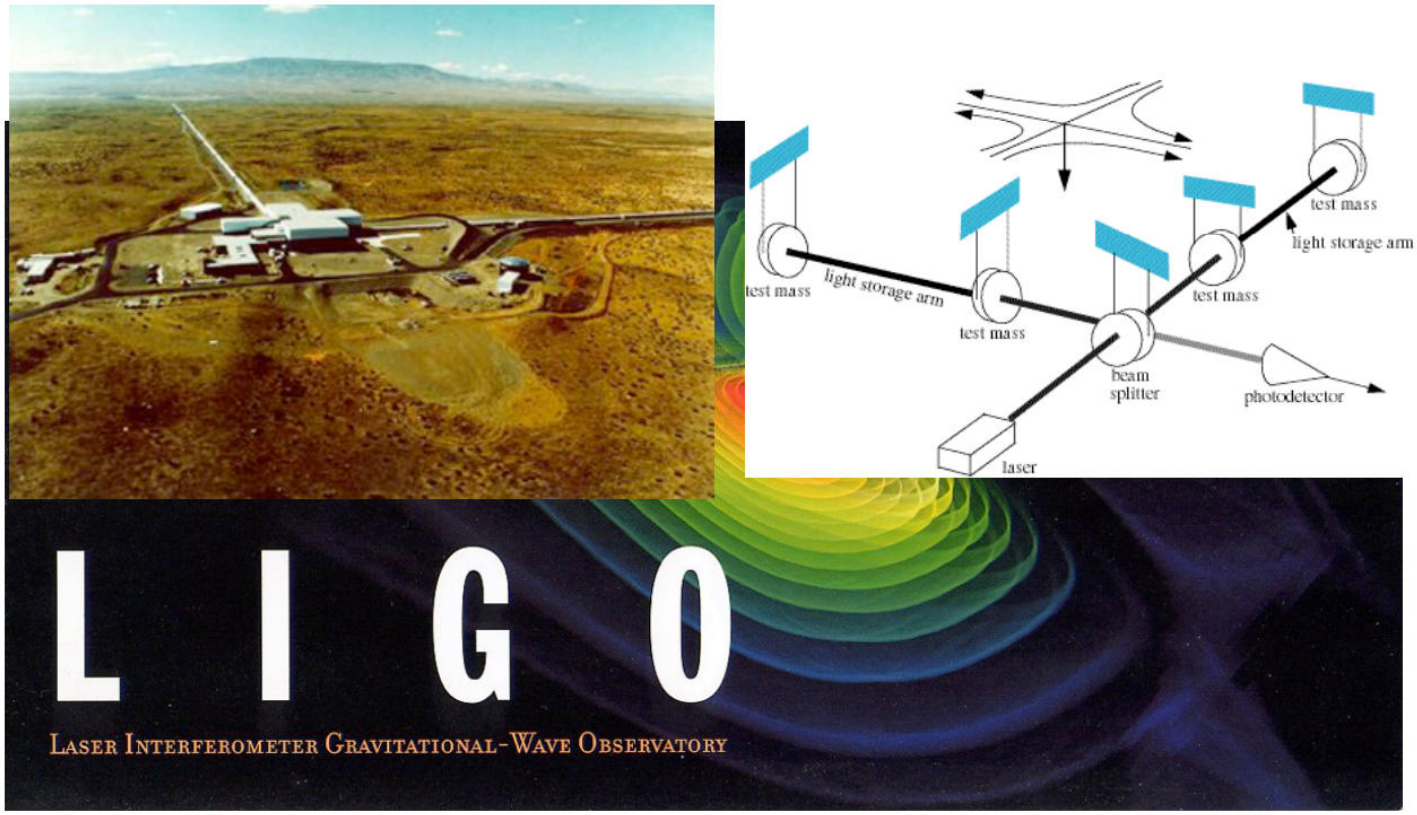
C)





In the apparatus shown, a laser beam is split and then joins again after travelling along two different paths. It is found that as the top mirror moves upwards, the point in the middle of the screen keeps getting brighter and darker. Explain why this would be the case.

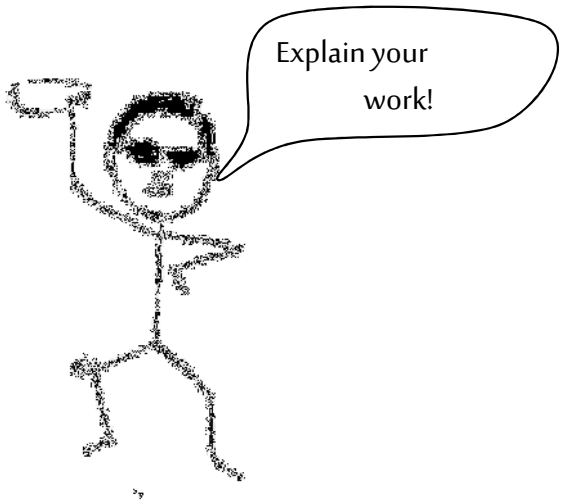
Extra: how far do we have to move the mirror to go from maximum to minimum brightness at a point on the screen? Assume the wavelength of light used is 1000nm.

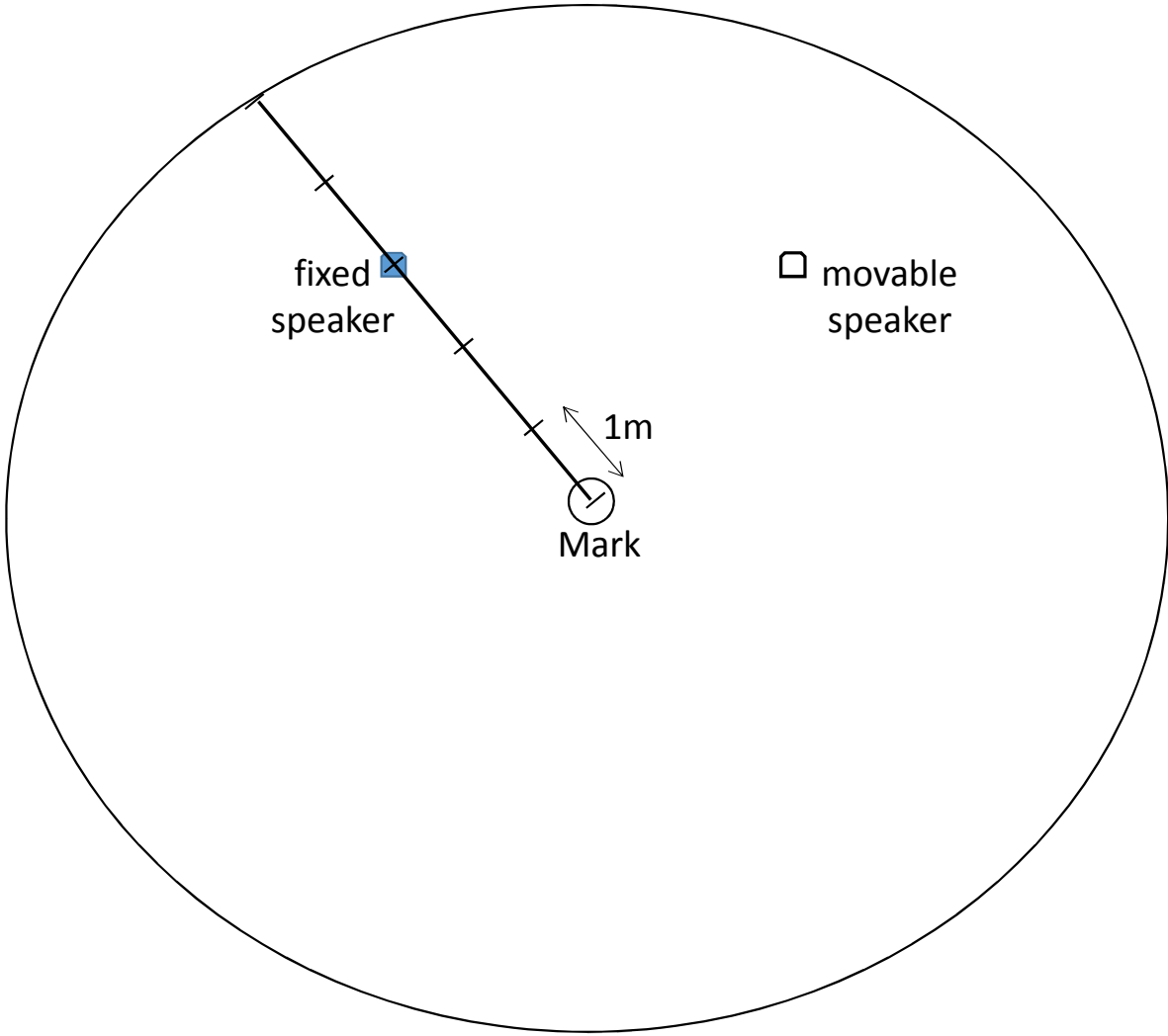


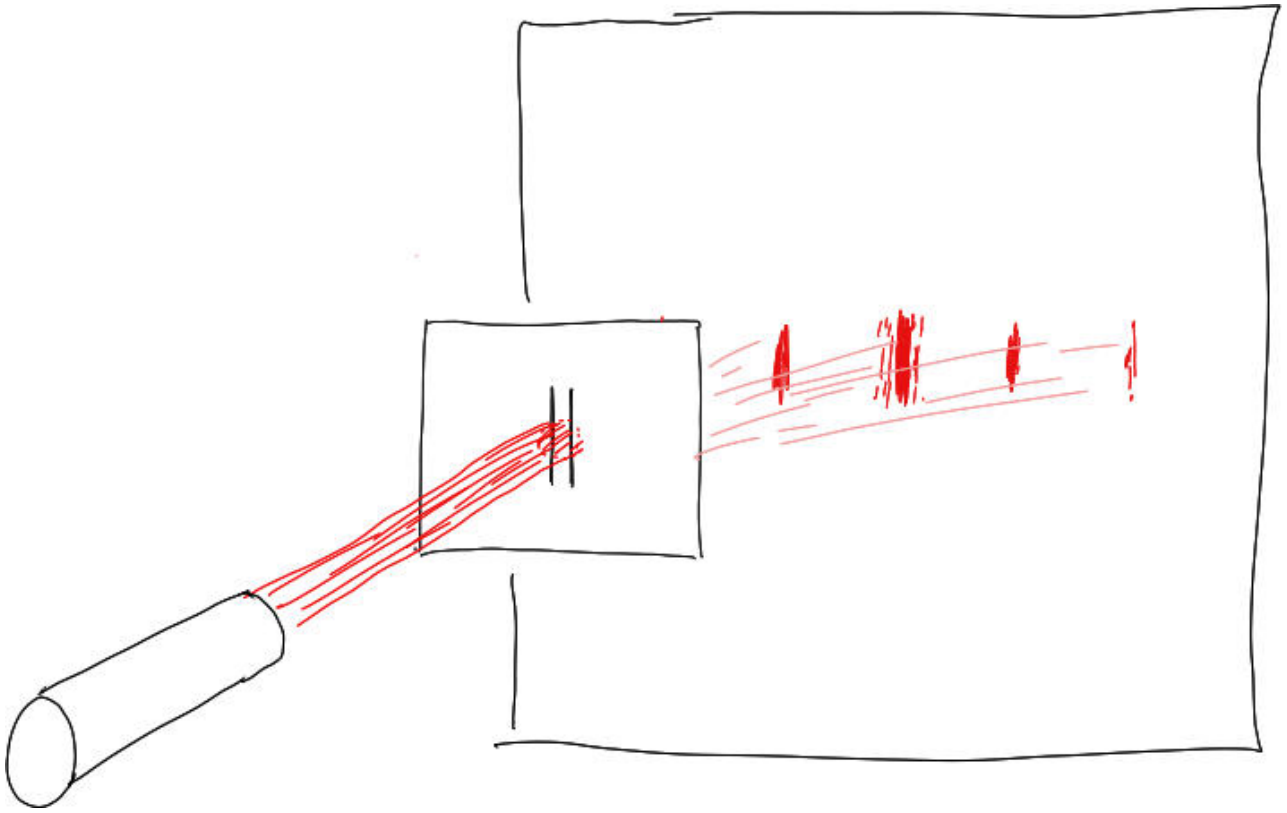
Direct detection of gravity waves look for tiny changes in the distances between objects due to ripples of spacetime – measured by change in interference pattern

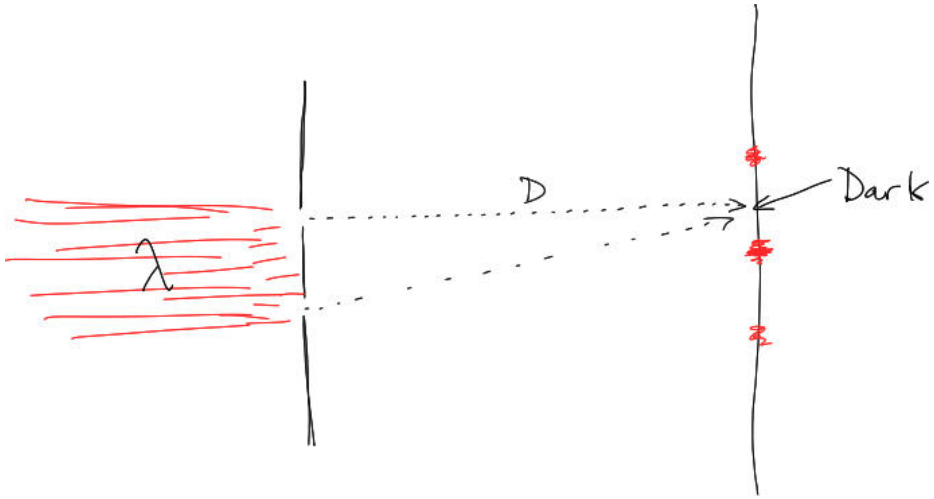
Mark is trapped in a circular room with two speakers playing Gangnam Style on repeat. Only one of the speakers is attached to the ground, and the other one can be moved anywhere he likes. On the picture , indicate all the places where Mark can move the second speaker so that the most annoying part of the music (which has a frequency of 170Hz) will be as quiet as possible at the location of his chair.

Note: assume the speakers are in phase and that the speed of sound is 340m/s.



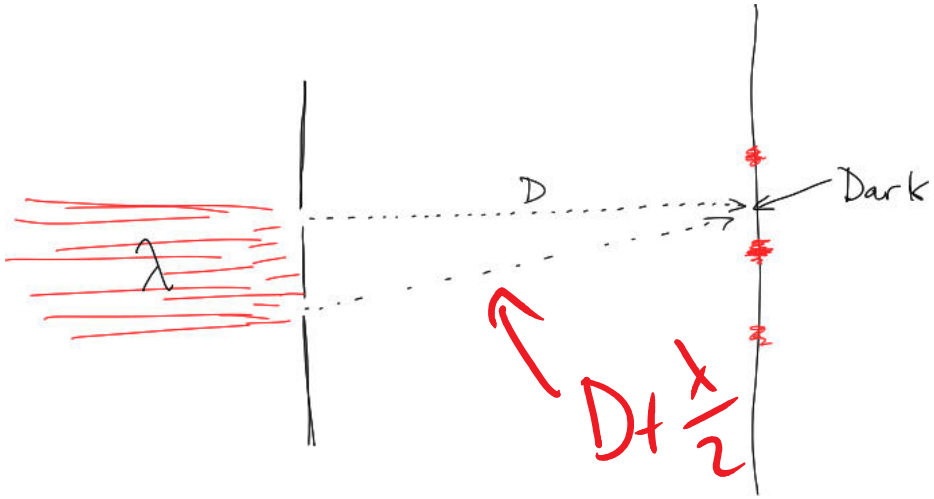






In the two slit interference setup, it is observed that there is a bright area in the middle of the screen and dark areas directly behind the slits. We can say that the distance between the slits is

A) D/2
B) λ
C) λ/2
D) $(D\lambda + \lambda^2/4)^{1/2}$
E) $(D\lambda - \lambda^2/4)^{1/2}$



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A) D/2
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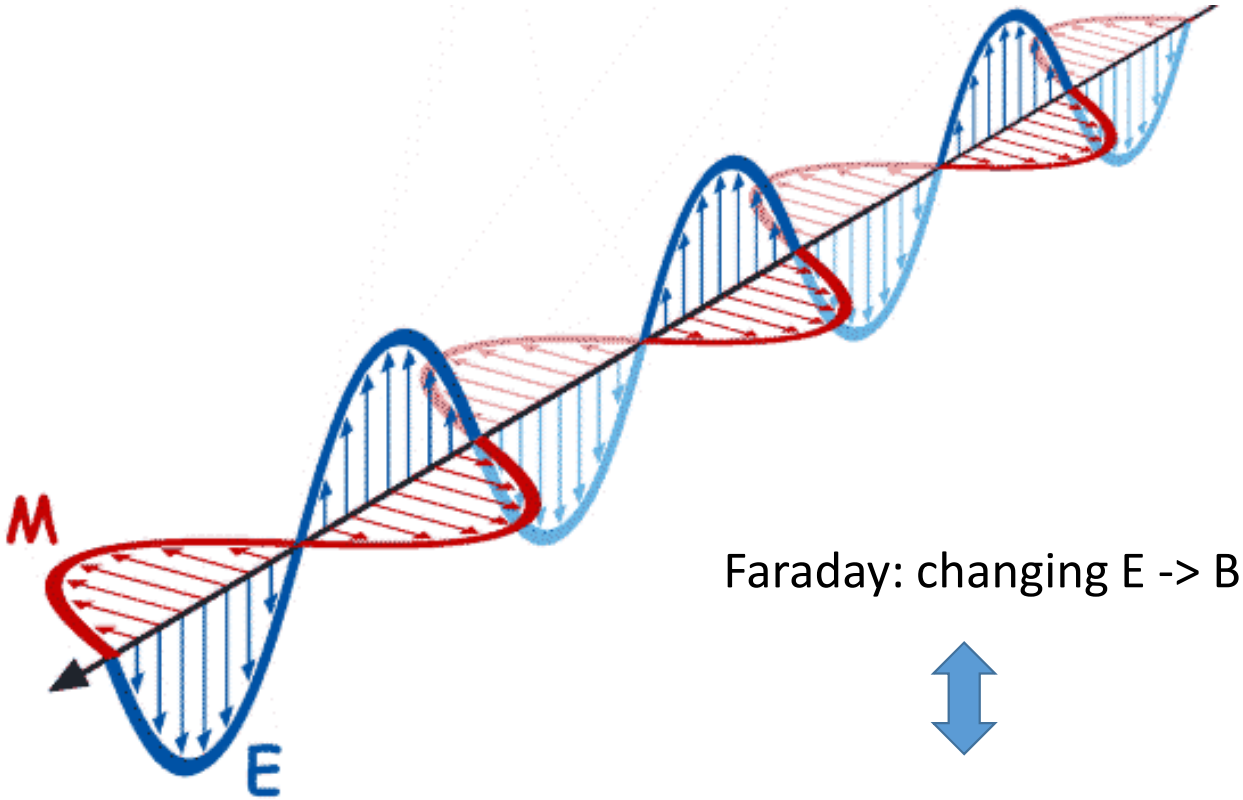
Recall: electromagnetic radiation is a like a chain reaction due to Faraday's and Maxwell's Laws



Faraday: changing E -> B

Maxwell: changing B -> E

What are some characteristics that distinguish light from one source vs light from some other source? Answer in terms of properties that we can actually perceive (rather than in mathematical terms).

How are the characteristics that you listed in previous question related to the mathematical properties of the wave (i.e. features of the diagram)?

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

A) The big bang
B) Laying in the sun for an hour
C) Standing 1m from an incandescent lightbulb for one minute
D) Standing in the dark next to a cat for one millisecond
E) The binding energy of an electron in a hydrogen atom

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