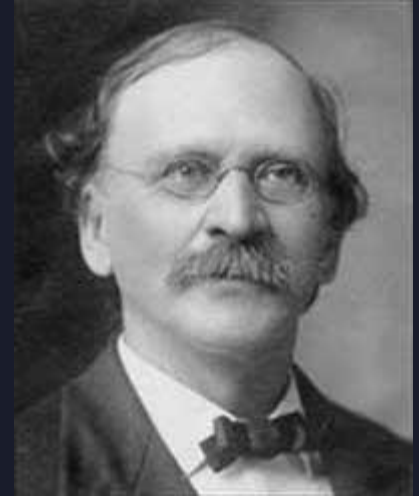


# The Michelson-Morley experiment



The Most Famous **Failed** Experiment



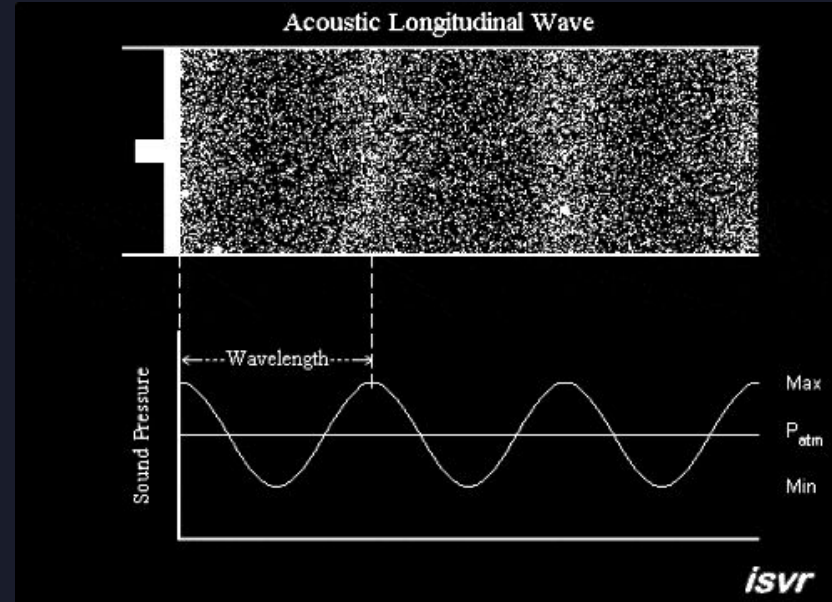
# What is the definition of “fail”?

Cambridge dictionary says the word “fail” means to not succeed in what you are trying to achieve or are expected to do.

...trying to **prove** that ether  
exists... but it **failed**.

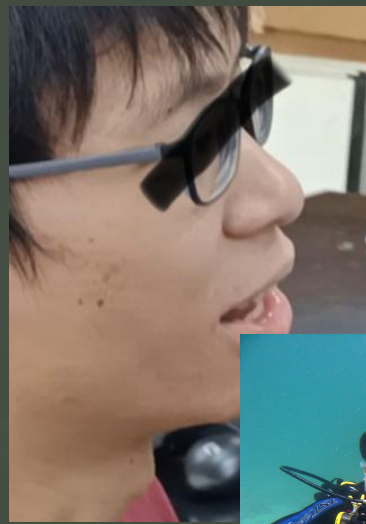
What is this “ether”?

A wave is a  
disturbance in some  
medium(介質)



Water waves are  
disturbances in water.

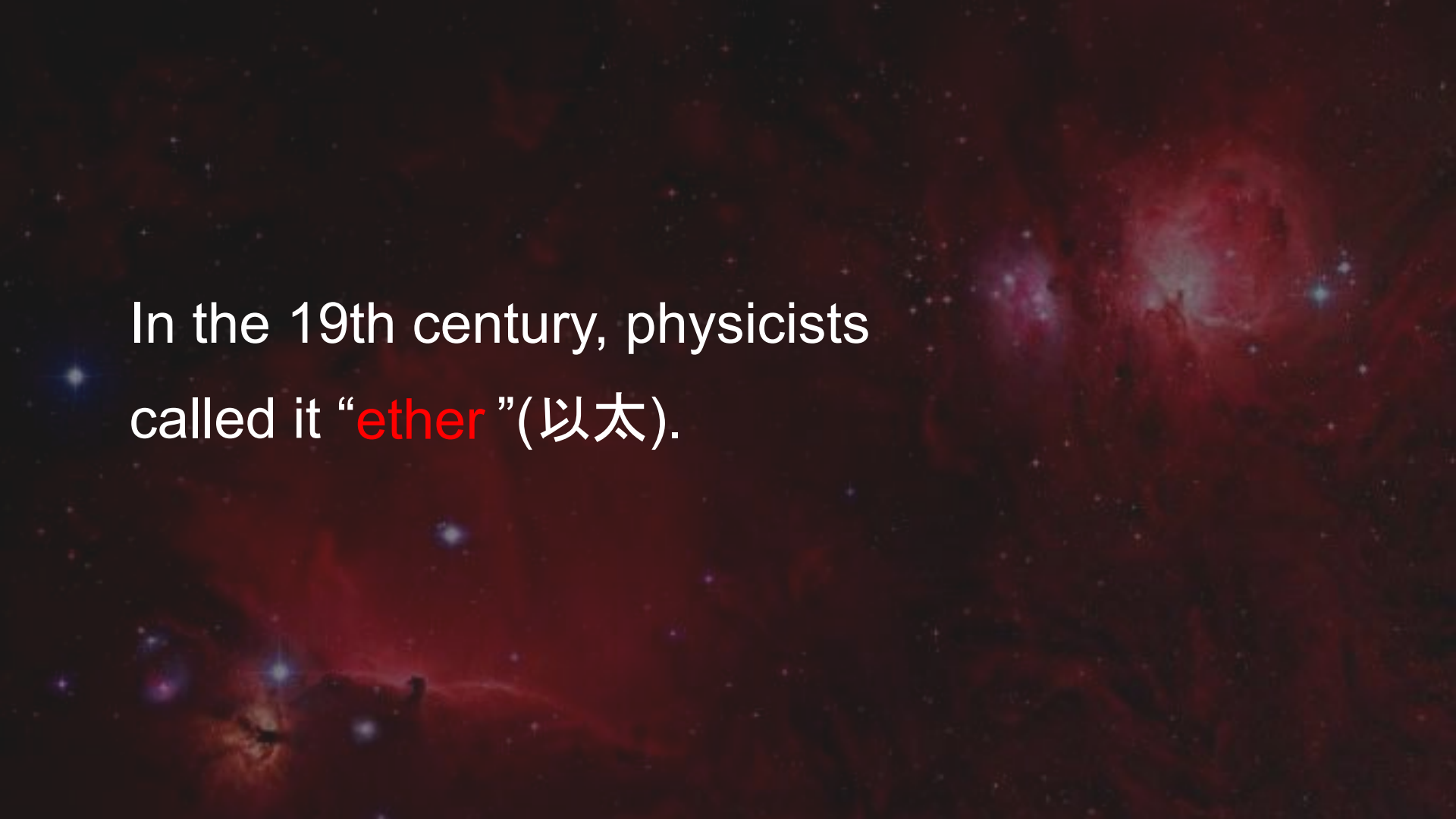
Sound waves are disturbances in particles of air, water or some solid.



But what about light? What is its medium?



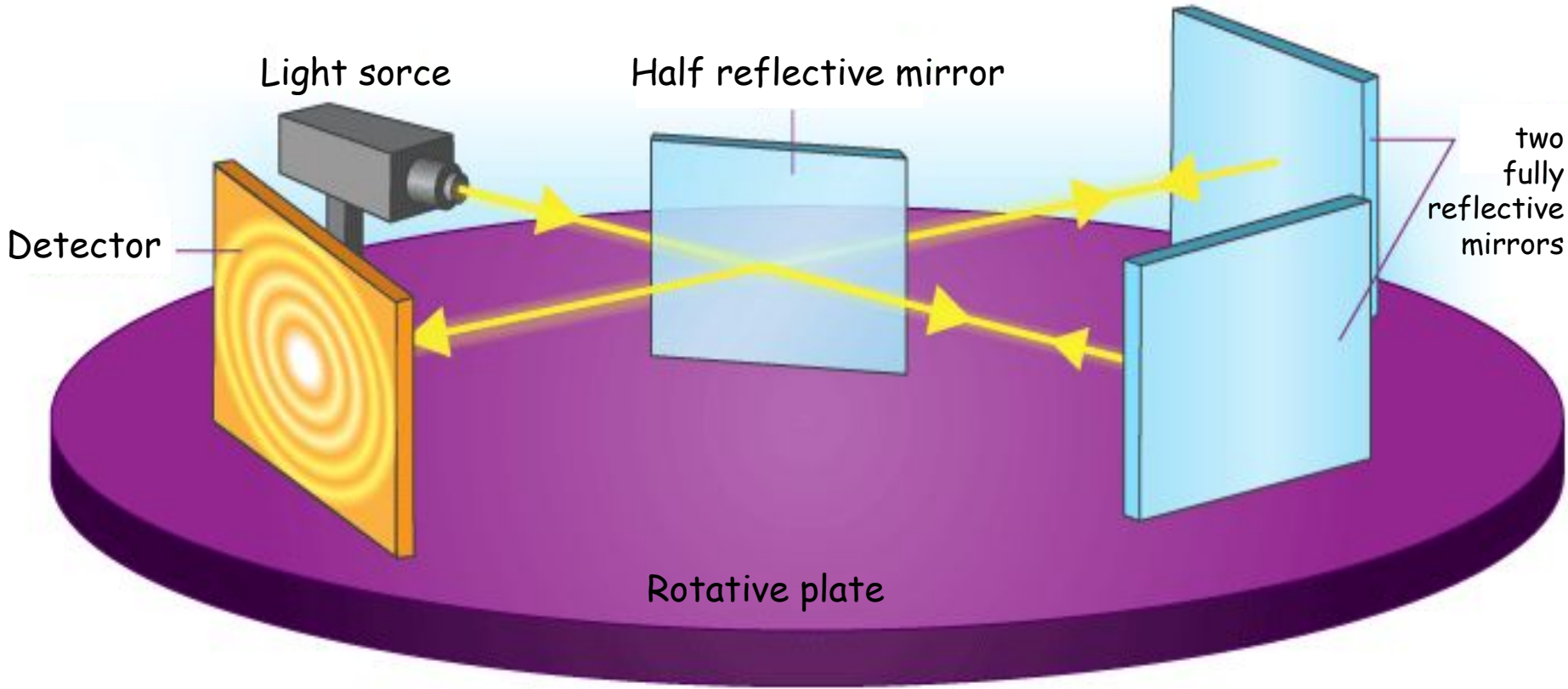
The light can travel through the nothingness in outer space.

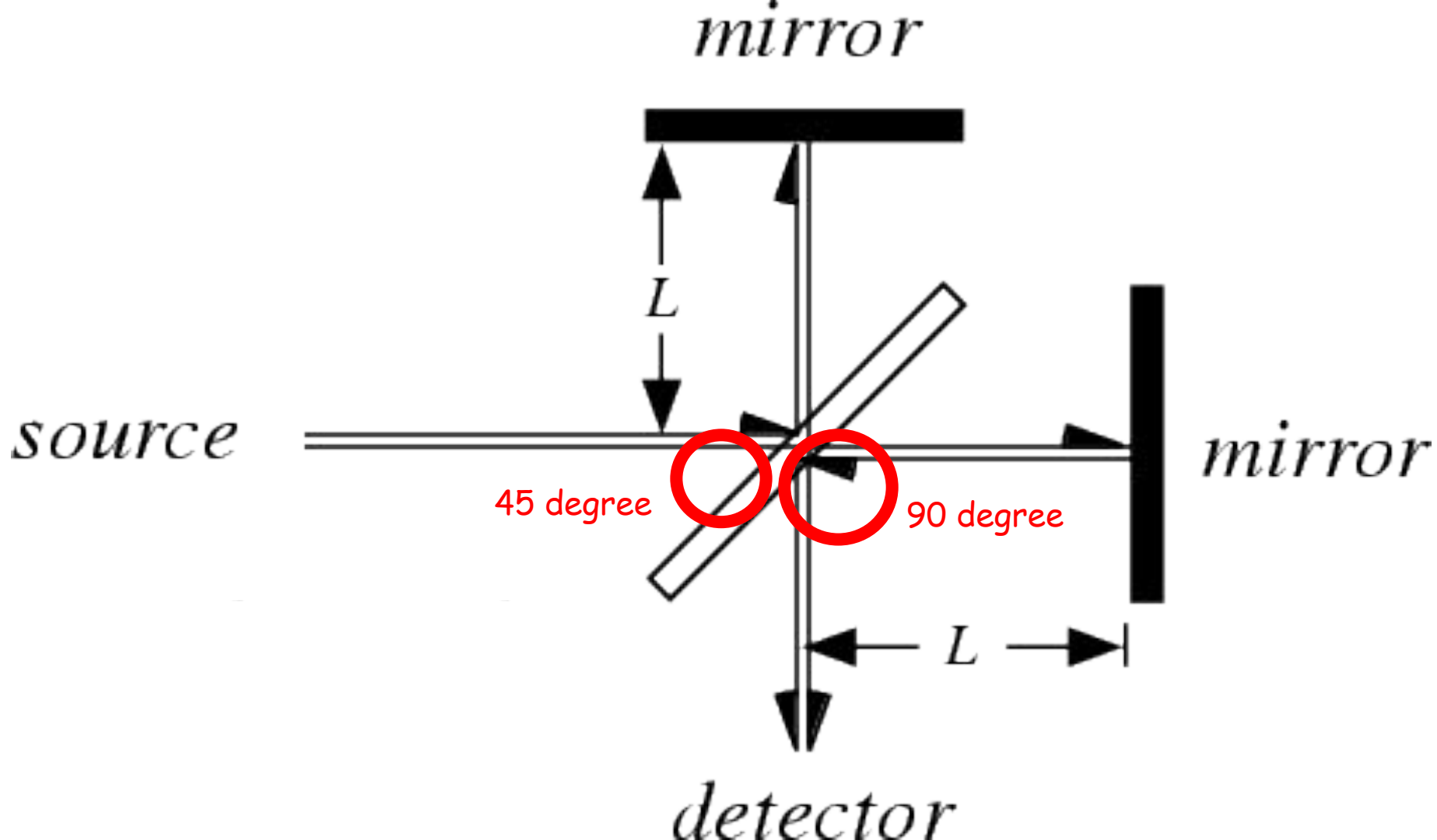


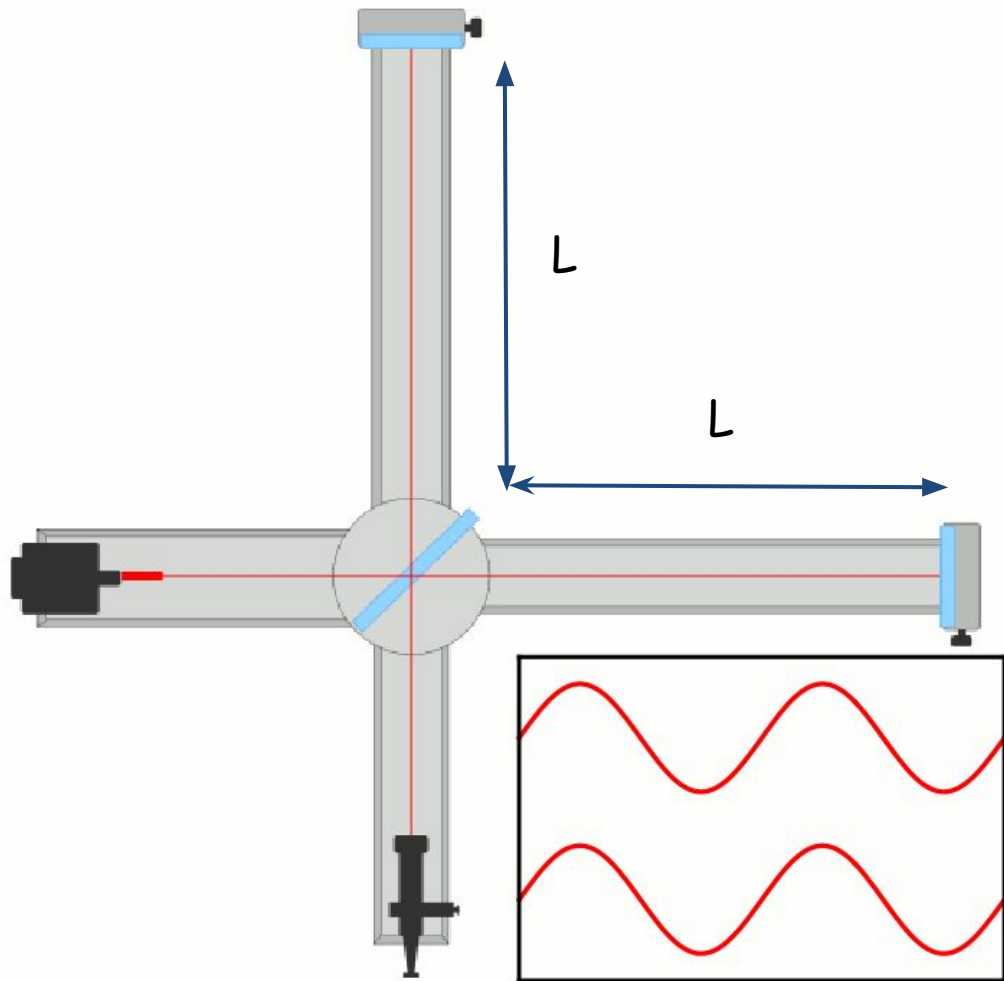
In the 19th century, physicists called it “**ether**”(以太).



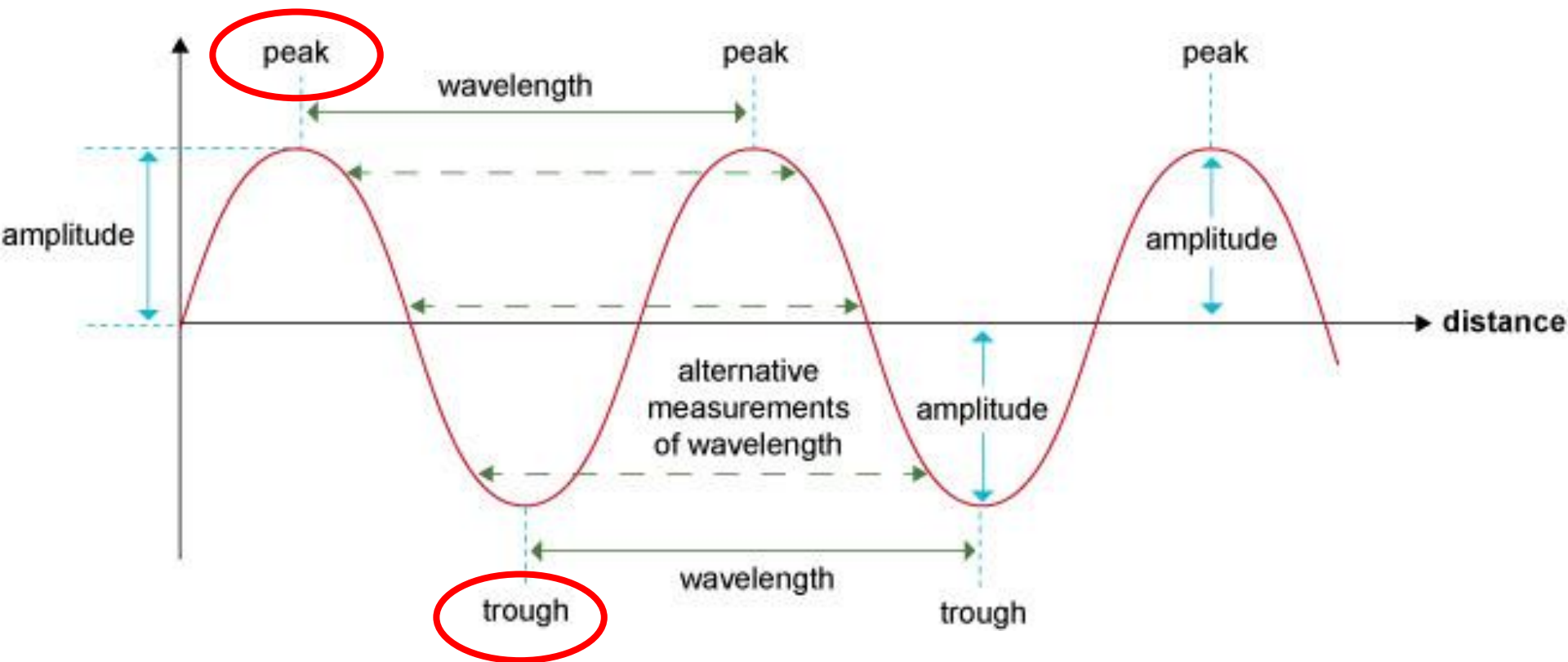
Let's try to prove it.

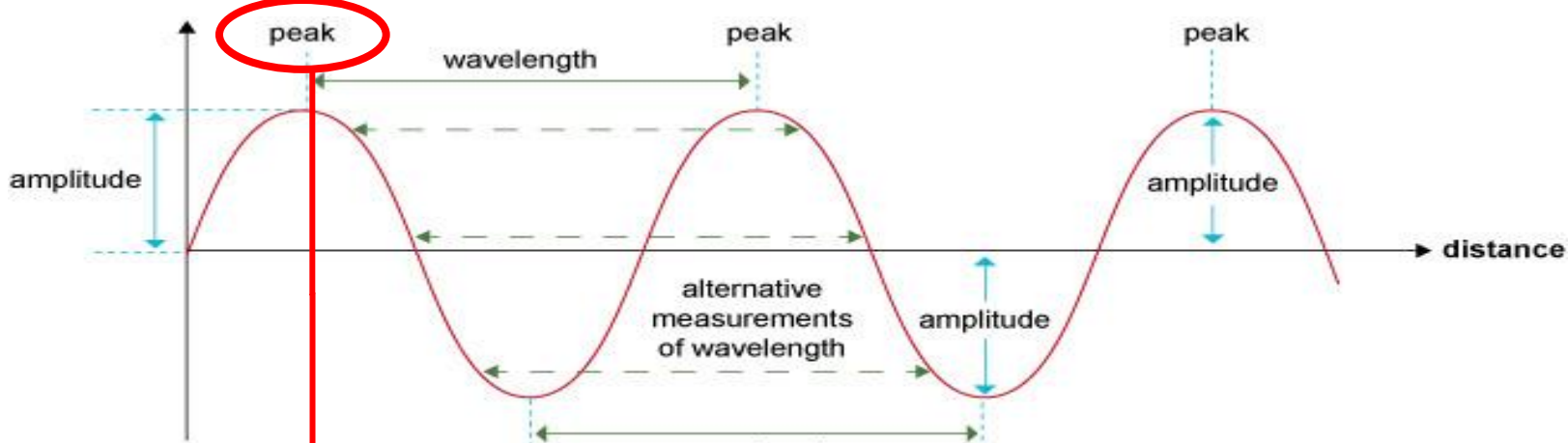




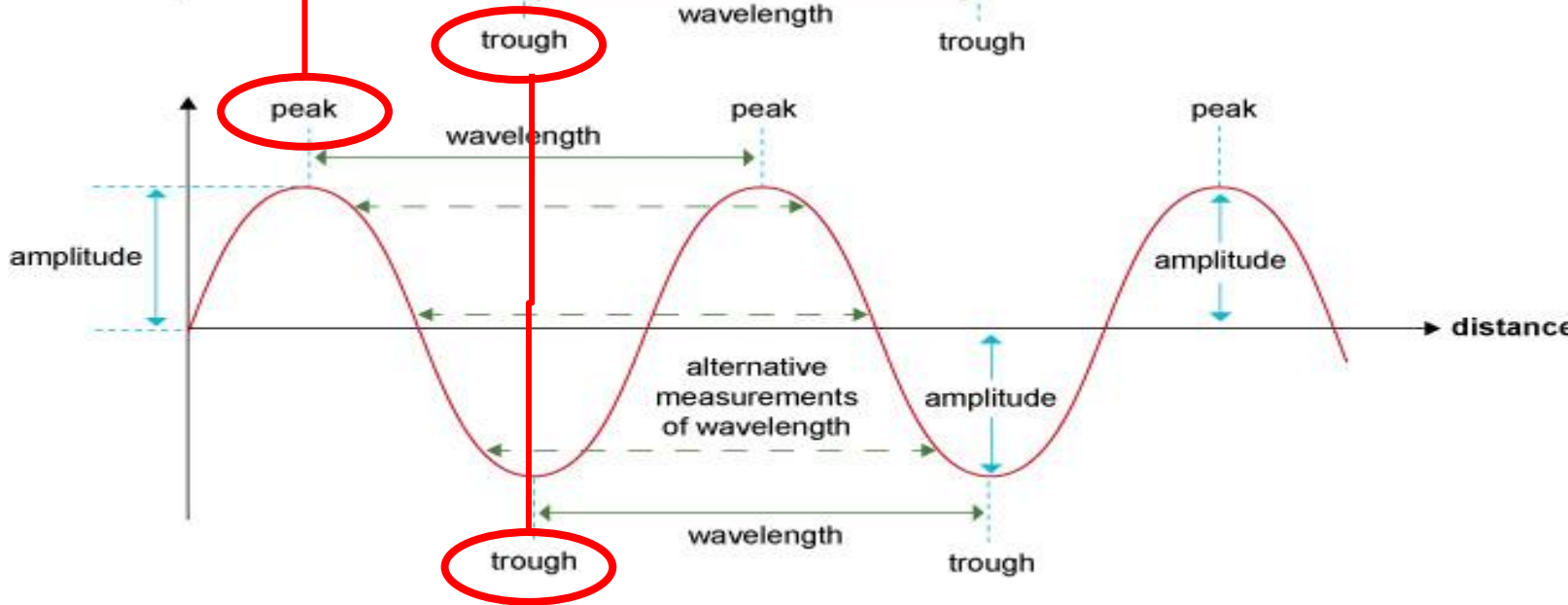


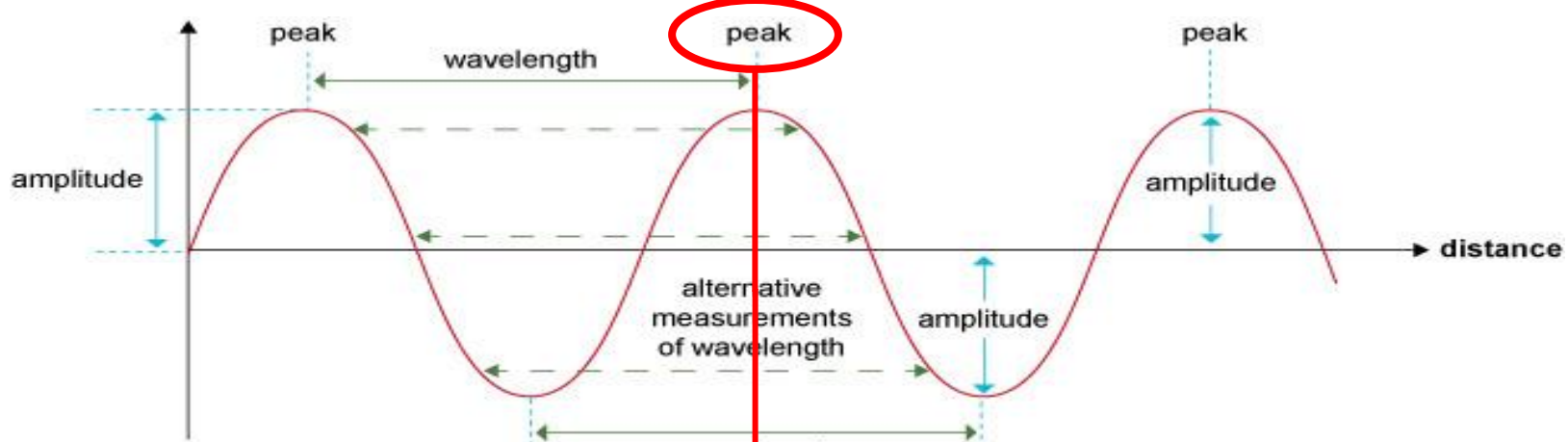
Let's see how waves get added.



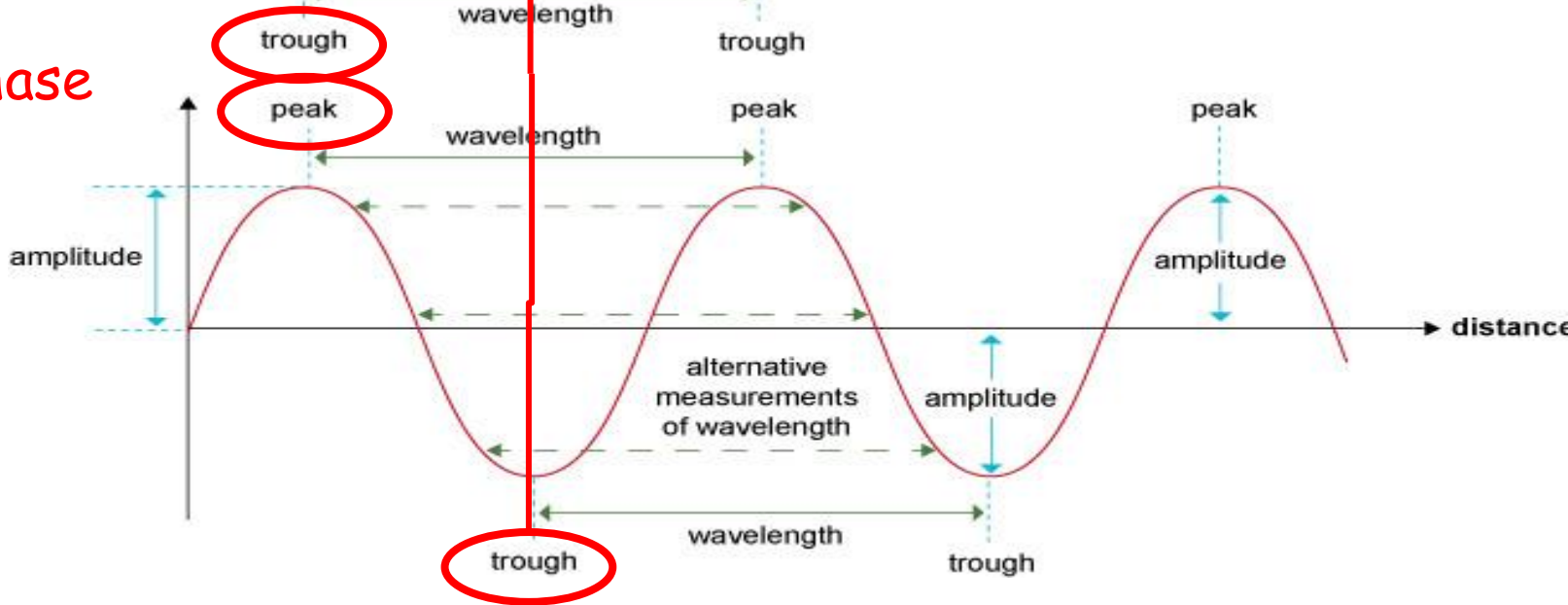


In phase

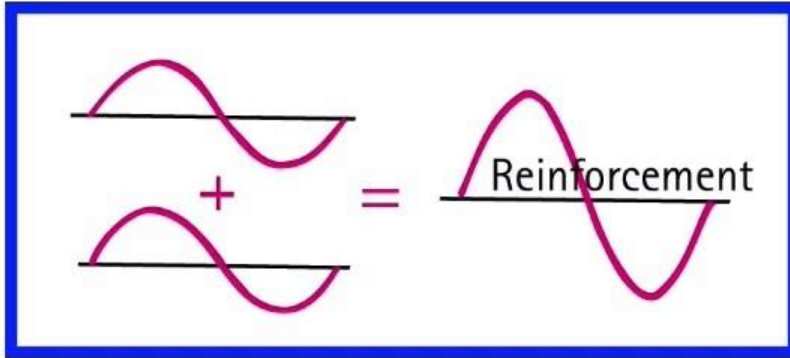




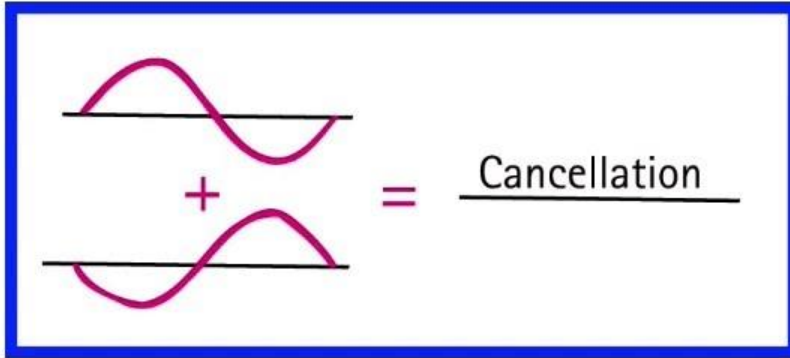
Out of phase



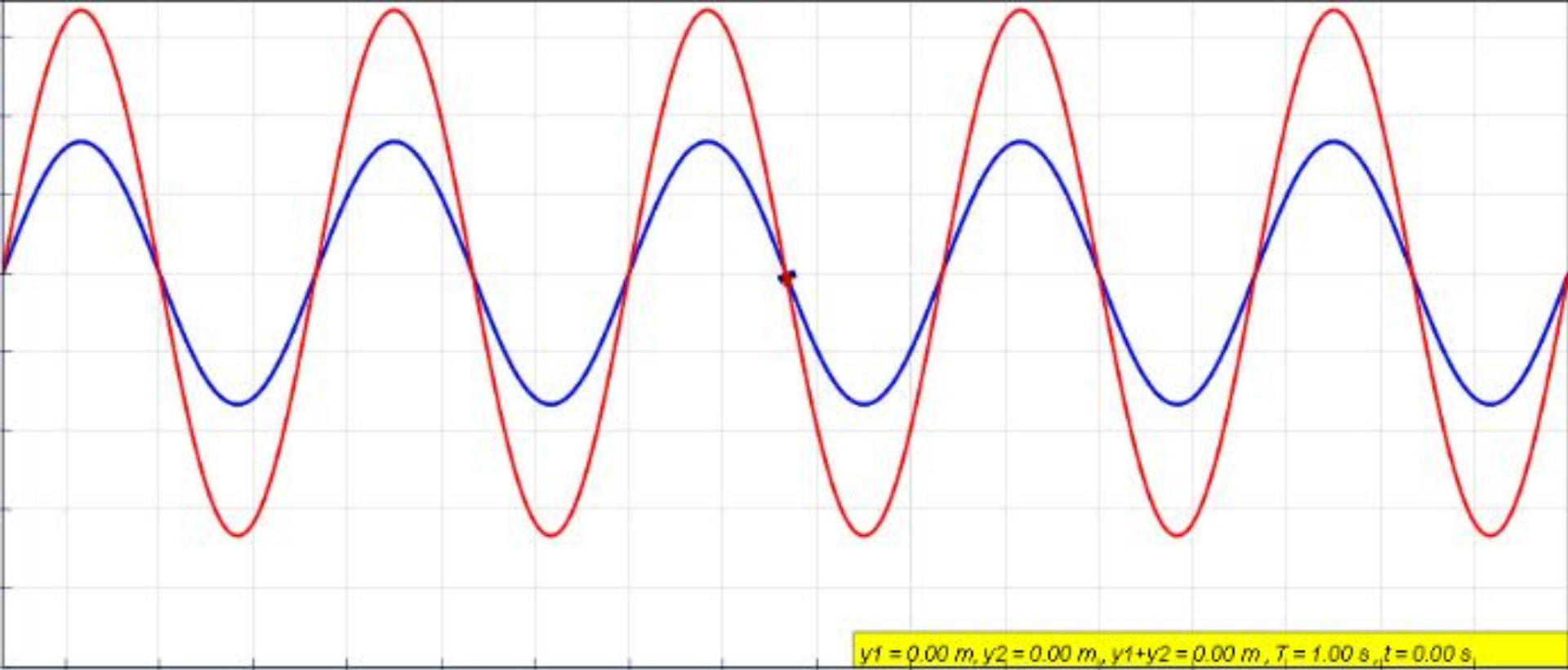




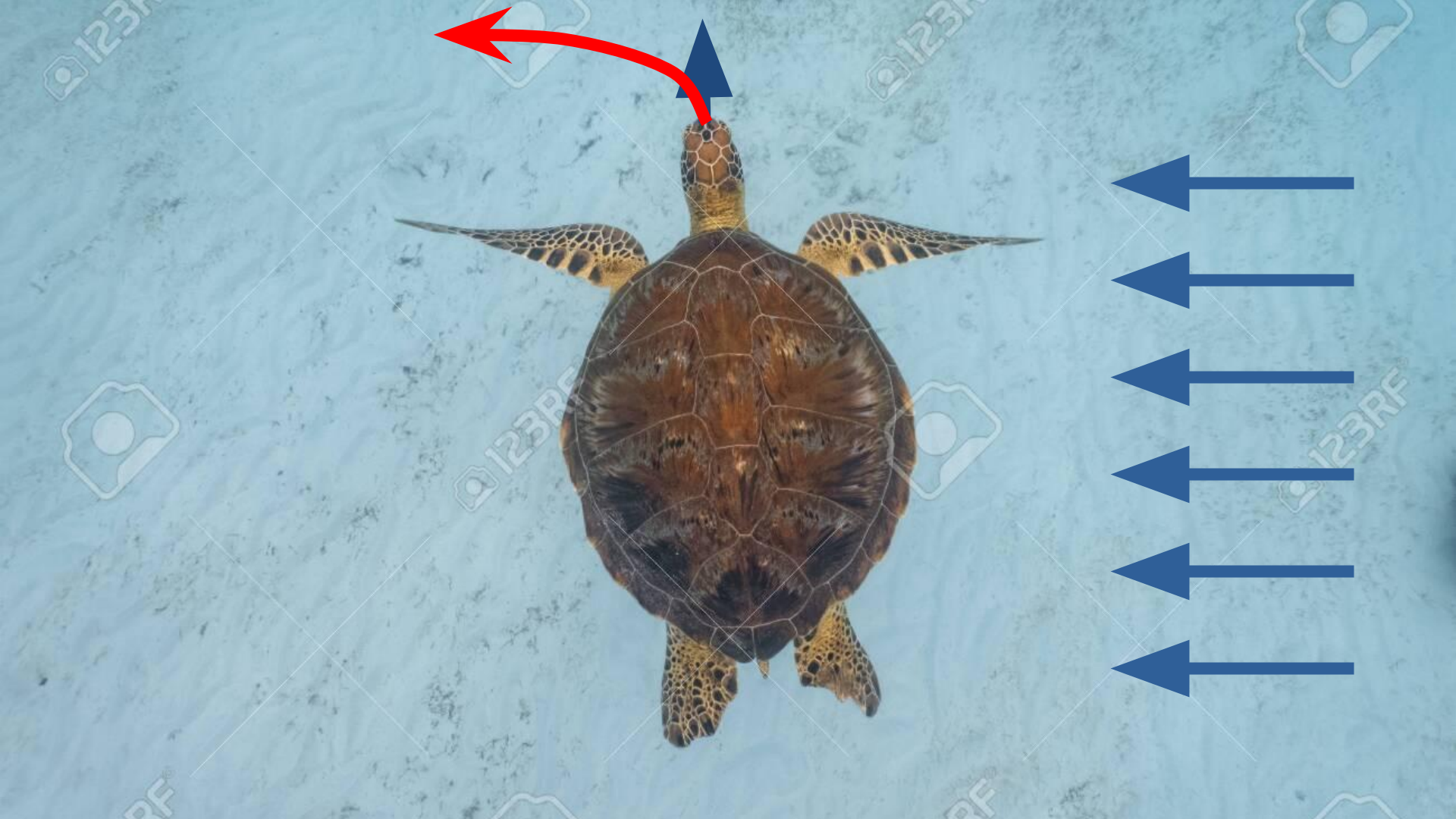
**Constructive  
Interference**

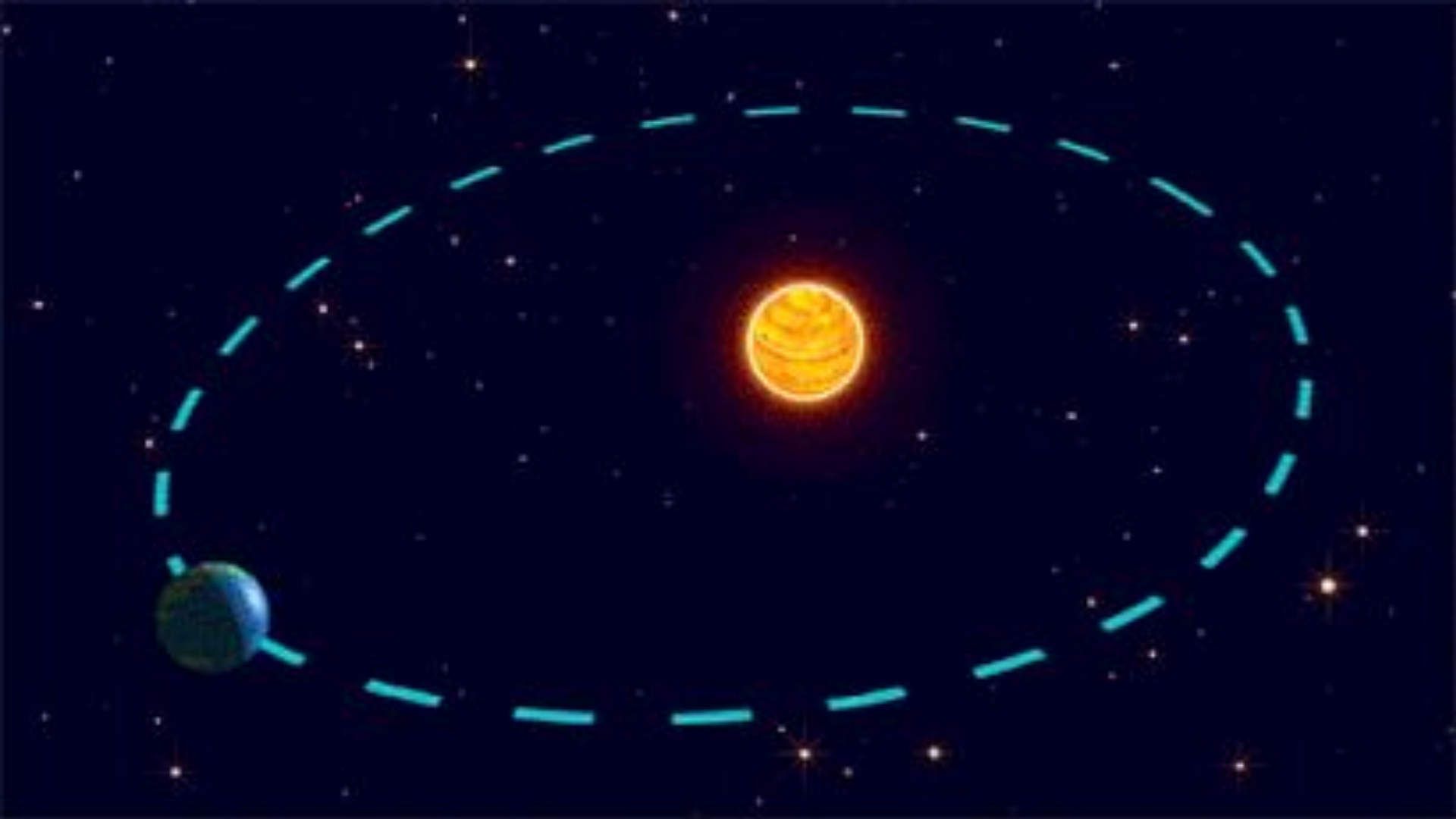


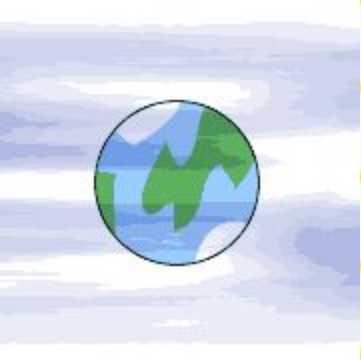
**Destructive  
Interference**



Let's go back to our experement.



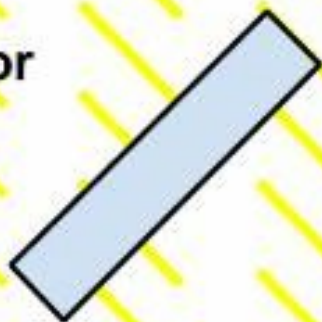




# Michelson-Morley Experiment

———— mirror

half mirror



| mirror

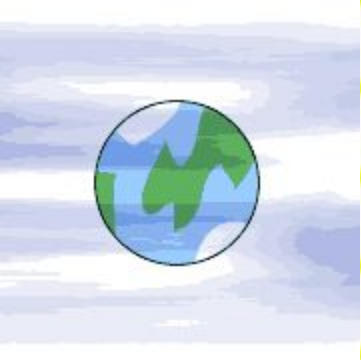


a



b





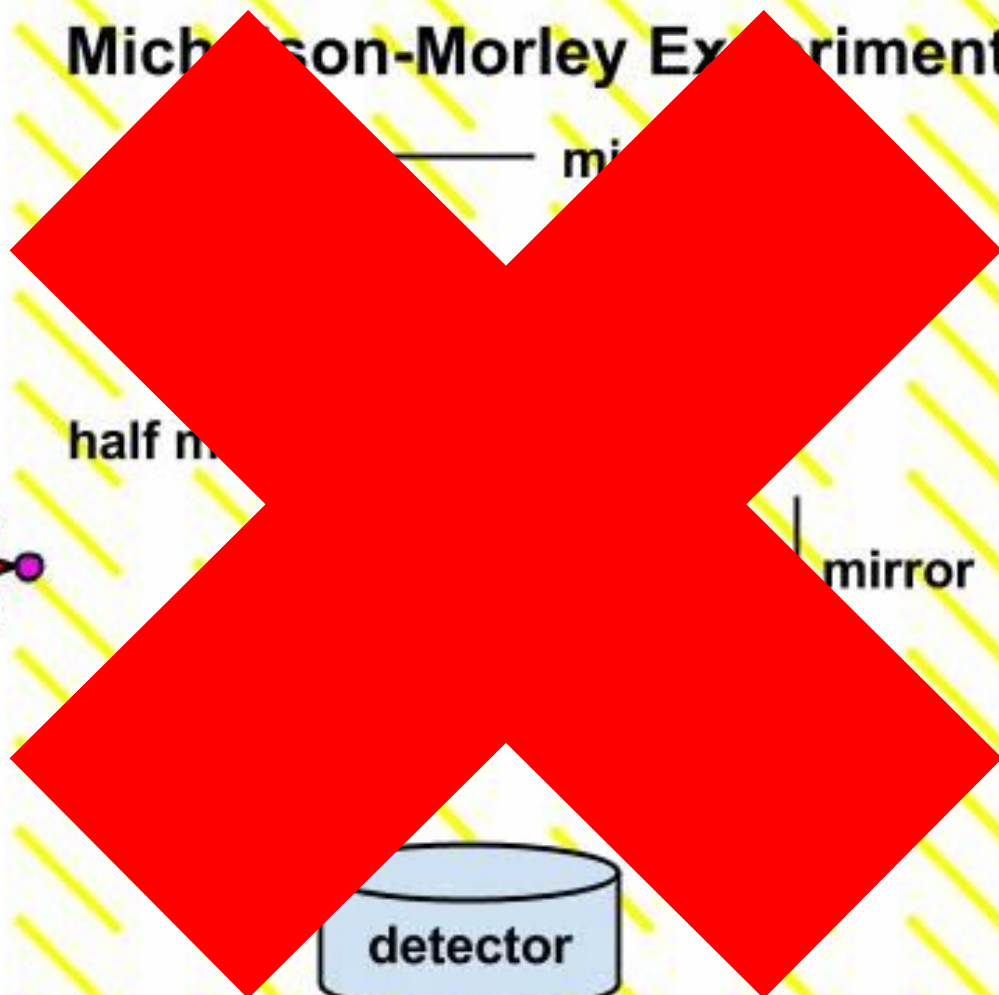
# Michelson-Morley Experiment

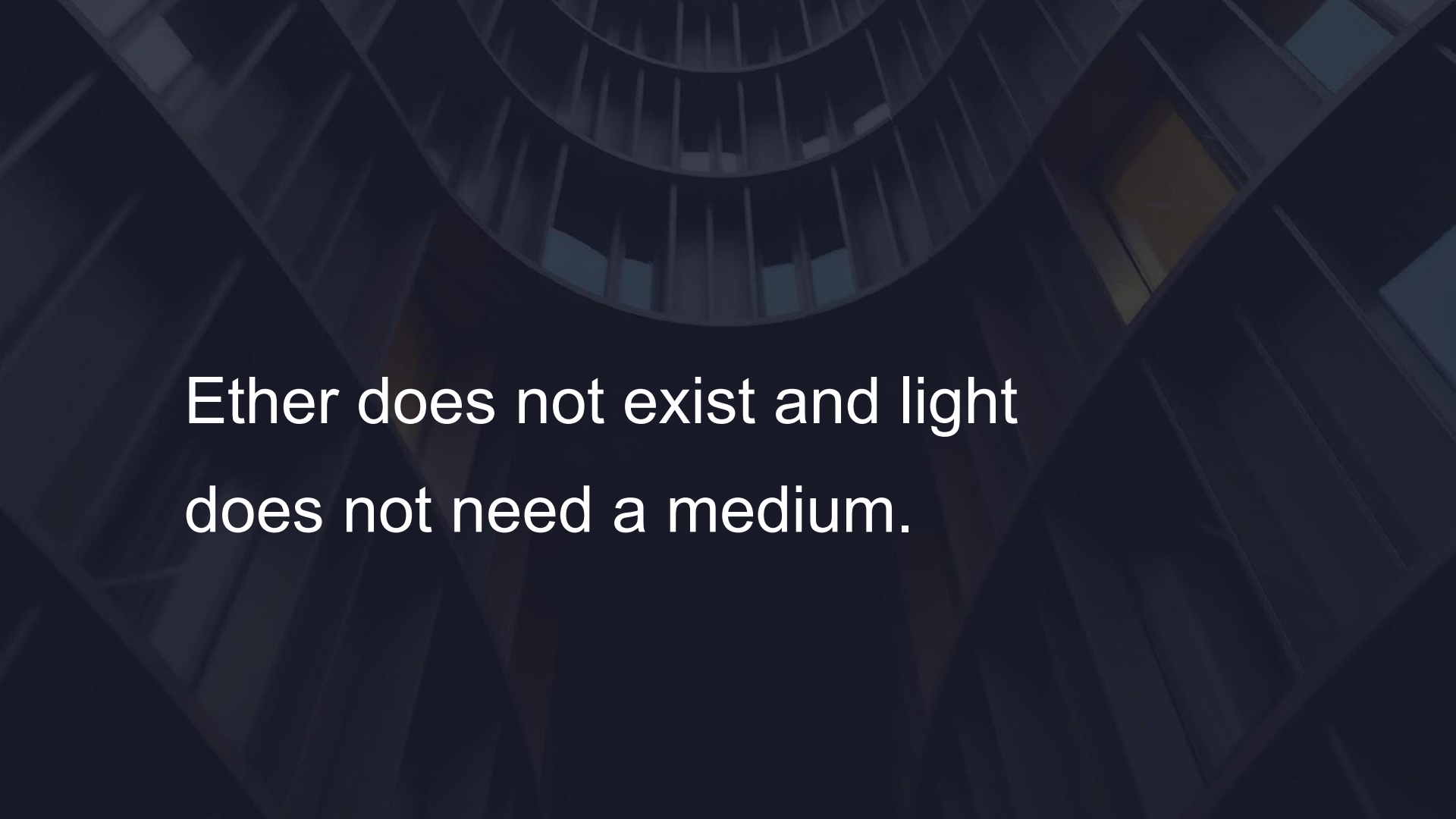
— mi

half m



mirror





Ether does not exist and light  
does not need a medium.

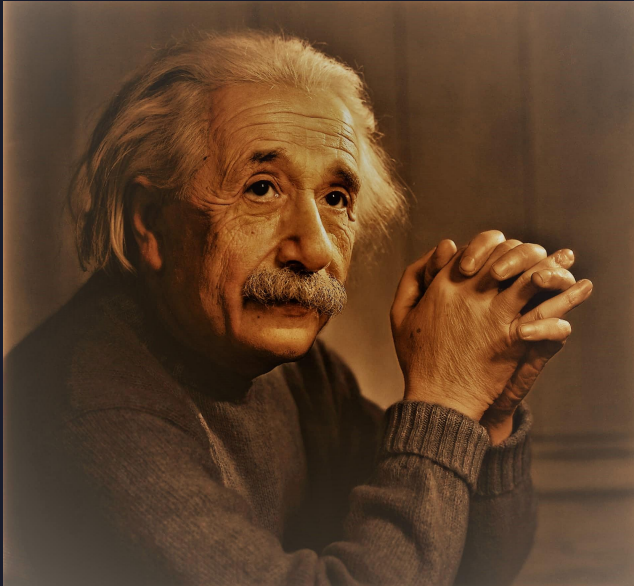


“A man must be big enough to admit his mistakes, smart enough to profit from them, and strong enough to correct them.”

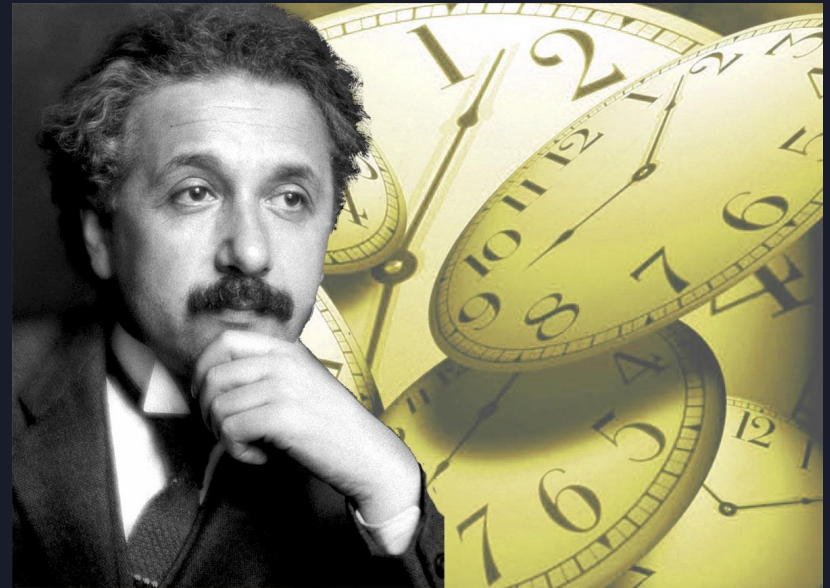
—John C. Maxwell

# Next time

Albert Einstein



special relativity





Dismissed!