

AQA A-Level Physics

12.3 Special relativity

Flashcards

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What was the aim of Michelson-Morley experiment?



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To prove that there was ether by showing that the speed of light changed with different rotations in respect to the ether.



What was the expectations of the
Michelson-Morley experiment?



What were the expectations of the Michelson-Morley experiment?

It was expected that when rotating the blocks and the mirrors by 90 degrees, the interference pattern seen should change as the speed of light should be changing in respect to the ether.



What was the significance of the failure of the Michelson Morley experiment?



What was the significance of the failure of the Michelson Morley experiment?

The interference pattern didn't change with the rotation therefore concluding that the speed of light is constant and there is no ether.



What are the two postulates of Einstein's theory of special relativity?



What are the two postulates of Einstein's theory of special relativity?

- Physical laws have the same form in all inertial frames.
- The speed of light in free space is invariant (always c for all observers).



What is time dilation?



What is time dilation?

Time runs slower for an observer when observing a moving object than it does for the object itself. This effect increases greatly as you approach the speed of light.



Why is time dilation a consequence of special relativity?



Why is time dilation a consequence of special relativity?

Since the speed of light is the same in all frames, the relative speed of an object moving at the speed of light would vary to that of another observer, observing both objects and their relative speeds.



What is proper time?



What is proper time?

The time observed by the object, or an observer that is stationary with respect to the moving object.

Known as t_0 .



How does muon decay provide evidence
for time dilation?



How does muon decay provide evidence for time dilation?

The intensity of muons with distance decreased less than expected. This is because the half life to human observers is much larger than the actual half life of the muon due to time dilation.



How does special relativity effect lengths?



How does special relativity effect lengths?

Length contraction is another conclusion to be drawn, an observer parallel to an moving object will observe a shorter length than an observer at rest relative to the rod.

