

Special Relativity: Some Useful Questions

- What is it?
- Why should we believe it?
- Why did it take an 'Einstein' to figure it out?
- What does it tell us about the world?
- What does it all mean?
- How is it used?

What is it?

- Physics: The very fast
- Physics: Electromagnetism
- Physics: Space and time
- Philosophy: Laws of physics
- Philosophy: There is no 'preferred state.'
- Philosophy: Spacetime

Why should we believe it?

- Philosophy: Theoretical simplicity
- Evidence: Half-life
- Evidence: Atomic clocks
- Evidence: GPS
- Evidence: Particle accelerators

Why did it take an 'Einstein' to figure it out?

- Humans don't have 'hands on' experience with the very fast.
- Scientists believed that all waves required a medium.

What does it tell us about the world?

- Philosophy: Laws of physics
- Philosophy: There is no 'preferred state.'
- Philosophy: Spacetime
- Physics: Time dilation
- Physics: Length contraction
- Physics: Simultaneity and order of events
- Physics: Past, future, and elsewhere

What does it all mean?

- Our common-sense notions of space and time are wrong.
- But our common-sense notions work just fine in typical (low speed) situations.

How is it used?

- Anything moving very fast (particle accelerators)
- Anything where time must be measured very precisely (GPS)