**Source:** [[KBPhysicsMasterIndex]]

# 1 | Special Relativity

- If events are apart for observers to see, two observers have to record the time and compare notes
- It will take time (sound/light) from an event to get from the event to the observer; the travel time needs to be taken into account, and if the objects are moving, calculating time travel would be extremely tricky
- Human senses also have certanty

## 1.1 | Space and Time

- Because it is impossible to observe a result independent of a refrenece point, each observe would idealy want a clock of identical construction
- Laws of inertia (newton's first law) is not true for every coordinate system, i.e.…
  - The rotationon of the Earth, if we set the coornate 0,0 at the center of Earth, causes everything around earth to seem to be rapidly rotating around earth
  - Hence, it would seem like a force would be wildly acting upon all objects around Earth for their velocity to accelerate rapidly
- If an object is translating through one coordinate system, it would be uniformly translating to another coordinate system of the same type that itself is uniformly translated uniformly

## 1.2 | The Principle of Relativity

**Note: this is not the theory of relativity**

*Laws of Physics should be the same in all inertial refrence frame.*

- Classical mechanics => does apply
- Electromagnatism => not sure

There is no true rest frame of the universe; because if so, the theories of mechanics would be "wrong" in all other systems other than the rest frame and will need adjustment. Furthermore, if there is a rest frame, the "physics" on the moving frame would need to account for the velocity of the moving frame.

However, measuring the motions of dfferent celestial bodies, it seems like the motion w.r.t. any frame is governed by the same law. i.e. if you are on earth, your velocity flips (you go around the sun) every half a year. But, w.r.t. earth's frame at any time of the year, physics is no different. So…

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Maxwell's equations of electromanitism. Speed of a ~wave: $\frac{1}{\sqrt{\epsilon_0 \mu_0}}$