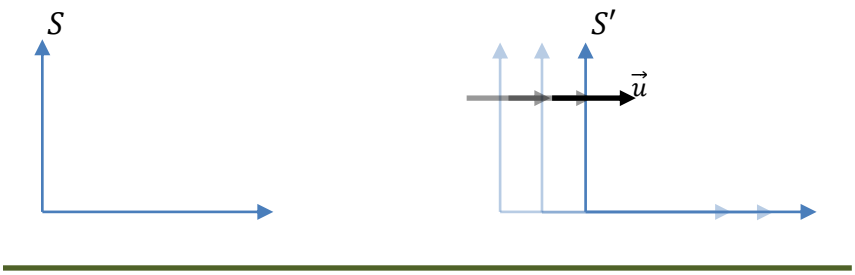
## CONCEPT: INERTIAL REFERENCE FRAMES

- A reference frame is a coordinate system that you make measurements in, and there are two types:
  - Inertial reference frames, which move at _____ velocity
  - Noninertial reference frames, which move at _____ velocity – i.e, they have _____

- Inertial references frames are always thought of as being of two types (this is by convention)
  - Rest frames: frames which have a "_____" velocity
  - Moving frames: frames which have a "_____" velocity
  - Lab frames are a common type of rest frame, which are at rest with respect to the _____ (like a lab)
  - Frames that move at the same velocity as an "event" as known as _____ frames

- There is no such thing as absolute velocity, so "zero" and "nonzero" velocity doesn't actually mean anything
  - These are just conventions established for us as humans to better understand problems
  - Out in space, far away from the surface of the Earth, a lab frame is arbitrarily chosen

- Near the surface of the Earth, we can say that some frame $S$ is our lab frame and $S'$ is our moving frame
  - By convention, $\vec{u}$ typically represents the velocity of $S'$ relative to the surface of the Earth
  - Velocities given in $S$ are typically represented by $\vec{v}$, and velocities in $S'$ by $\vec{v}'$




- Noninertial reference frames are very important in physics, too, but they won't be emphasized (or really discussed)
  - Special Relativity does NOT deal with noninertial frames – General Relativity does
  - The surface of the Earth is moving in a circle, so it's actually a _____ reference frame
  - However, the Earth rotates VERY slowly, so lab frames are basically inertial frames
  - The fact that references frames are noninertial on Earth is what gives rise to the Coriolis and centrifugal forces