The Galilean transformation between S' and S is:

$$x = x' + vt$$

The Lorentz transformation will introduce a γ, where do you think it goes? And why?

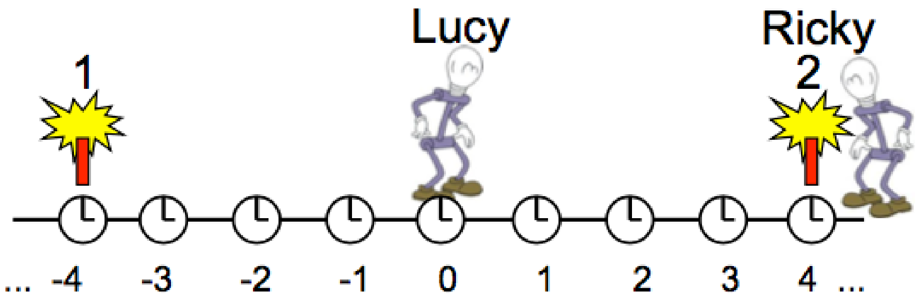
ANNOUNCEMENTS

- Quiz 6 (Due next Monday)
  - Use special relativity to investigate the effects of particle detection
  - Compare two events observed from different frames
- Homework 12 (Due next Monday)
  - Will accept through Wednesday

In the moving frame K' (moving with velocity $+v$ in the x direction), we make a measurement that an object is at a location x_0', what is the location x_0 of the object in the rest frame K? Use the Galilean transformation for now.

A. $x_0 = x_0' + vt$
B. $x_0 = x_0' - vt$
C. I'm confused

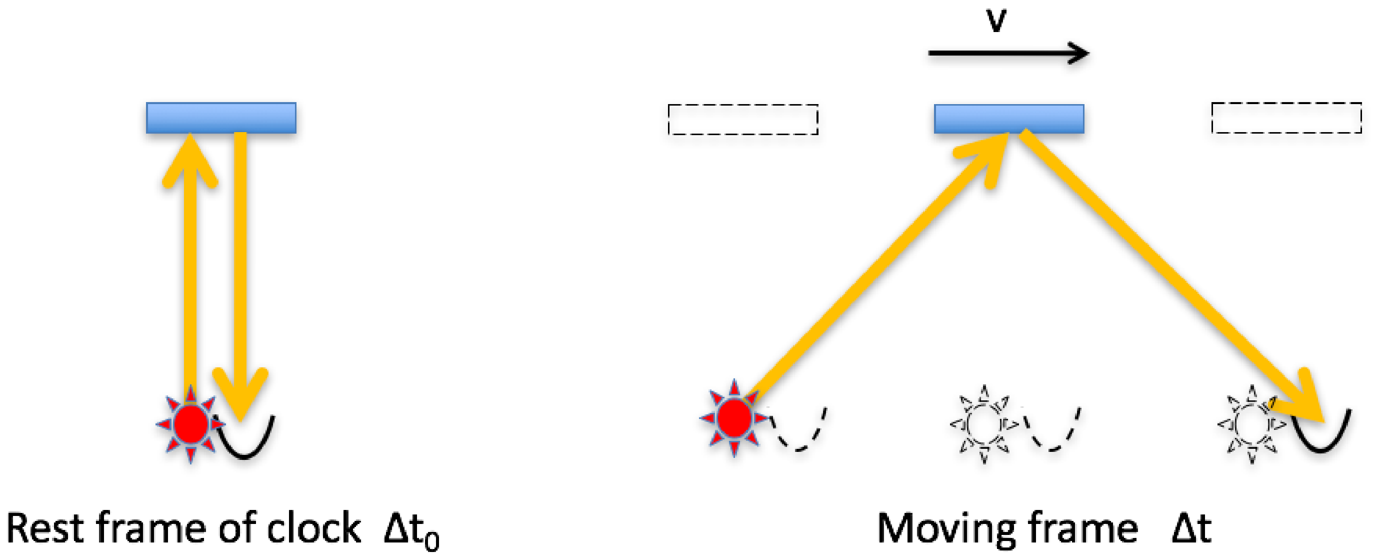
Hint: Yours truly got it wrong yesterday!



Two firecrackers explode. Lucy, halfway between the firecrackers, sees them explode at the same time. Ricky (same reference frame as Lucy) is next to firecracker 2. According to Ricky, which firecracker explodes first?

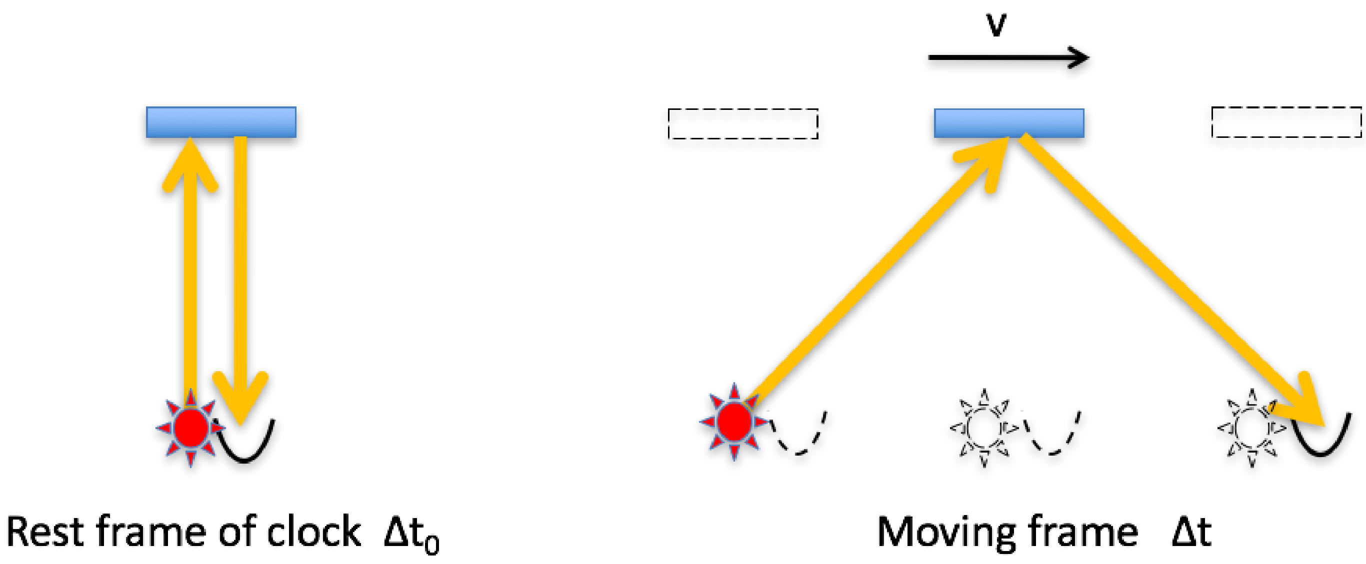
A. Both explode at the same time
B. Firecracker 1 explodes first
C. Firecracker 2 explodes first

Hint: Separate what Ricky "sees" from what he would observe.



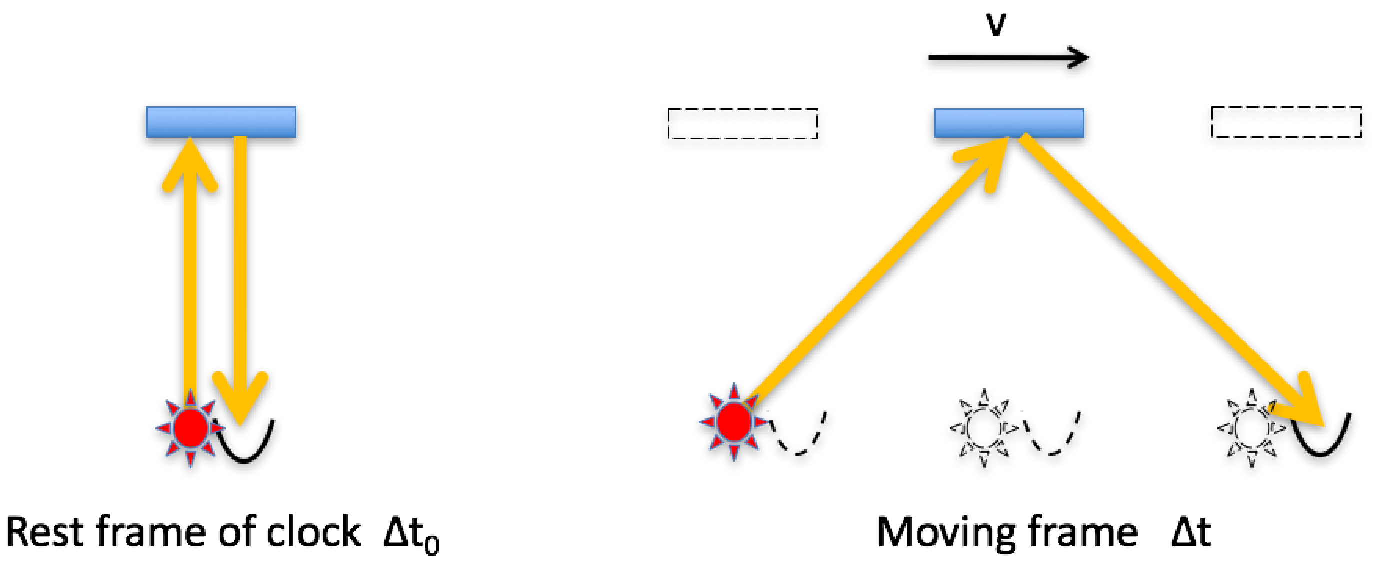
In which frame of reference is the time between tics of the clock **longer**?

A. Rest frame of clock
B. moving frame
C. no difference



What is the **minimum** number of observers needed in the **rest frame** to measure the "tic"?

A. 1
B. 2
C. 3
D. More than 3
E. ???



What is the **minimum** number of observers needed in the **moving frame** to measure the "tic"?

A. 1
B. 2
C. 3
D. More than 3
E. ???

I have a stick of length L sitting in front of me. In the reference frame of a passing train, (moving parallel to the stick) what is the measured length of the stick?

A. L
B. γL
C. L/γ
D. I'm sure it's B or C, but not sure which one
E. It depends

In particle decay the rate of decay is proportional to the number of particles left,

$$\frac{dN}{dt} = -\lambda N$$

If we start with N_0 particles, what's the fraction of remaning particles in a time Δt?

A. $N_0 e^{-\lambda \Delta t}$
B. $N_0 e^{+\lambda \Delta t}$
C. $N_0 e^{-\Delta t/\lambda}$
D. $N_0 e^{+\Delta t/\lambda}$
E. Something else

In a particle detection experiment, the fraction of particles detected is:

A. underestimated
B. overestimated
C. the same as

if we use the time of flight in the detector frame.

In our particle detection experiment, the fraction of particles detected at a given location in detector frame will be:

$$e^{-\lambda \Delta t}$$

What is Δt in this case?

A. The time to traverse from the source to the detector
B. The time observed on the clock on the wall
C. The time observed by the particles in their frame
D. None of these
E. More than one of these

Is the time interval (Δt) between two events Lorentz invariant?

A. Yes
B. No

Is the proper time interval ($\Delta\tau = \frac{\Delta t}{\gamma}$) between two events Lorentz invariant?

A. Yes

B. No

I'm in frame S, and you are in is in Frame S', which moves with speed V in the $+x$ direction.

An object moves in the S' frame in the $+x$ direction with speed v'_x. Do I measure its x component of velocity to be $v_x = v'_x$?

A. Yes

B. No

C. ???

I'm in frame S, and you are in is in Frame S', which moves with speed V in the $+x$ direction.

An object moves in the S' frame in the $+y$ direction with speed v'_y. Do I measure its y component of velocity to be $v_y = v'_y$?

A. Yes

B. No

C. ???