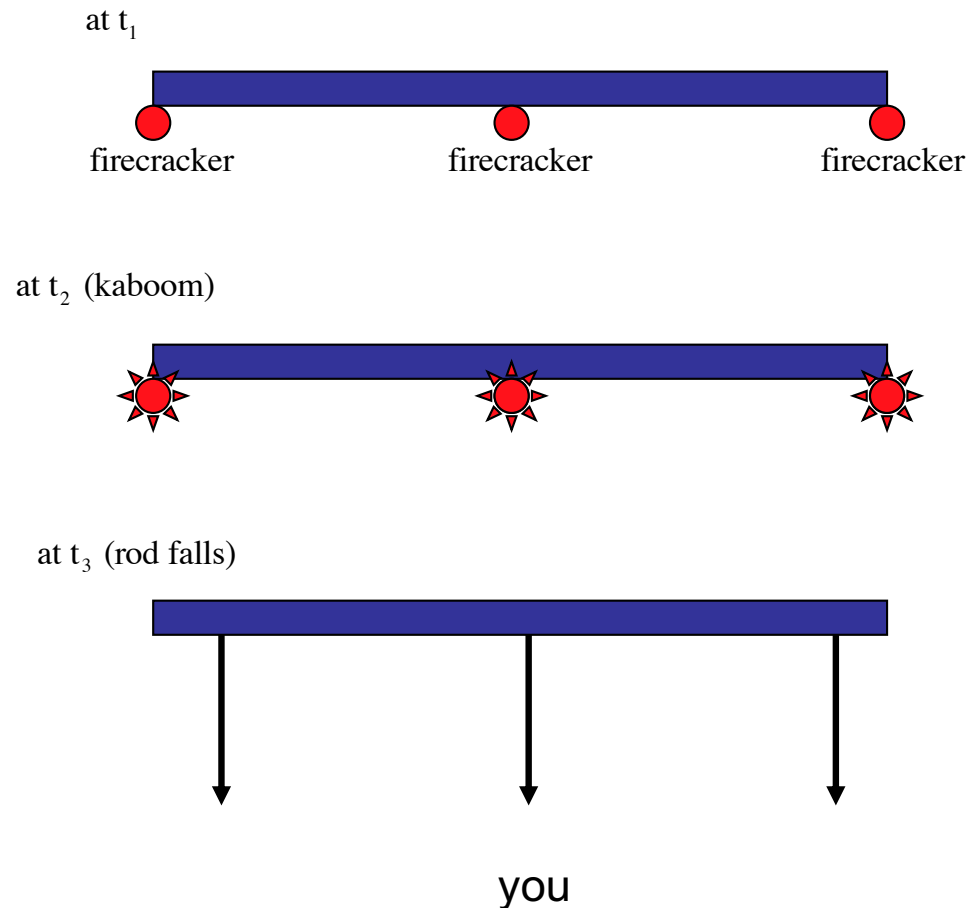


OTHER PROBLEMS AND CONSEQUENT PARADOXES

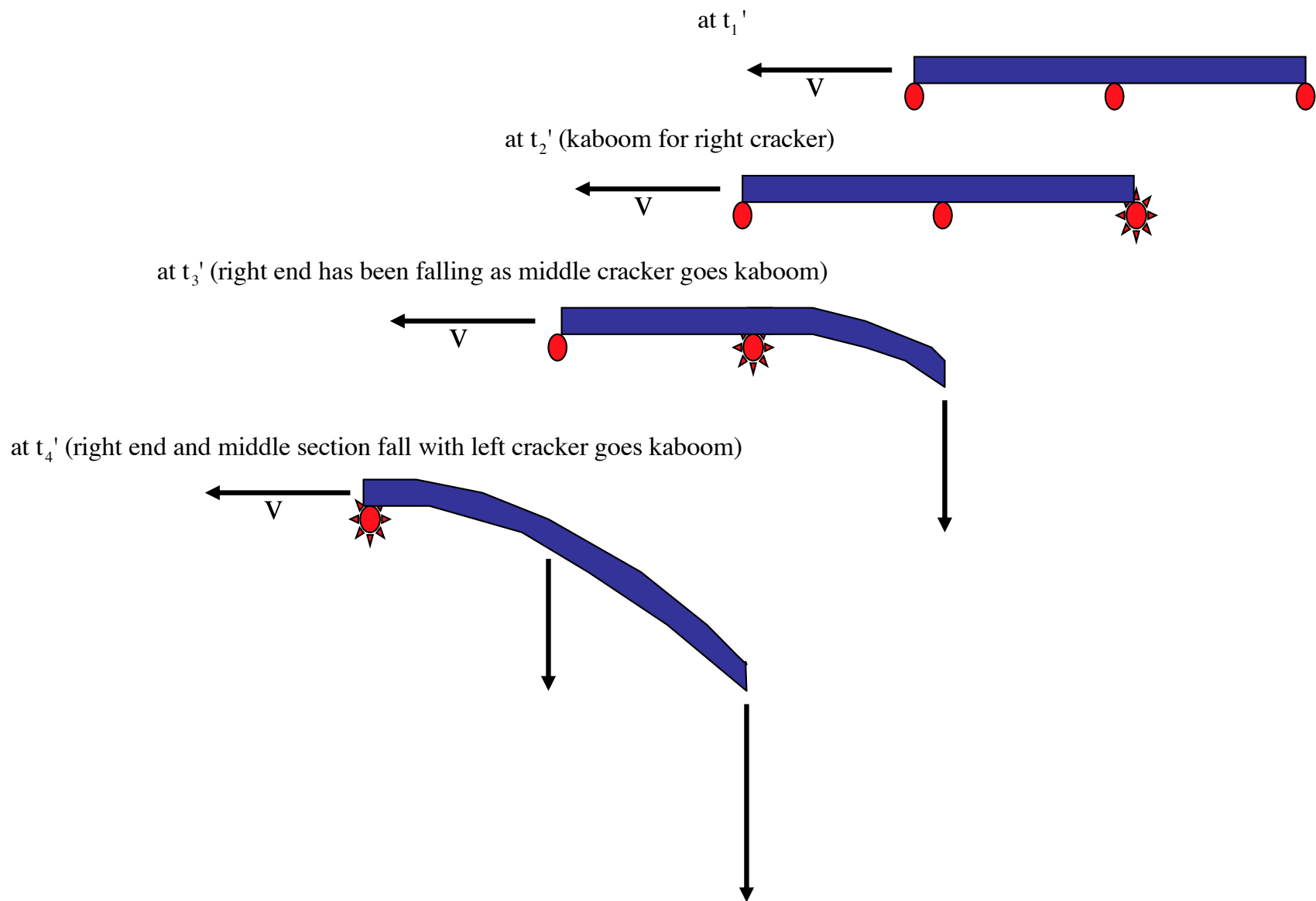
1.) Rigidity: Are bodies that are rigid and straight in one frame rigid and straight in all frames? (The answer is “no!”)

Joe supports a rod with three firecrackers that he sets to detonate simultaneously in his (the rod's) frame. When they blow, the rod falls oriented parallel to the ground.

You aren't in Joe's frame of reference. In fact, from your perspective, the rod is moving toward you at high velocity.



You will “observe” length contraction AND you will NOT see the firecrackers going off simultaneously. What you will see will be:

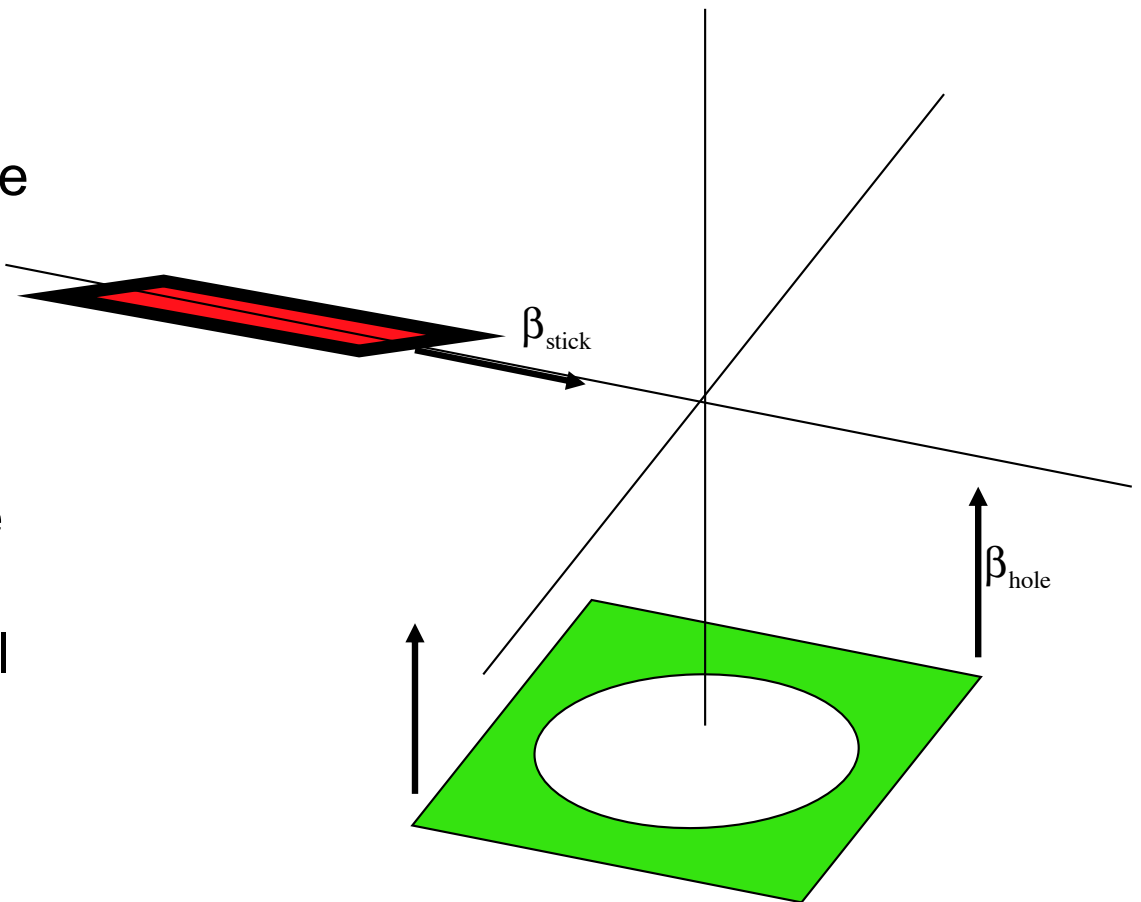


Conclusion: You can't assume that an object is rigid as "viewed" in all frames of reference.

This example was lifted from Daniel Styer's book Relativity for the Questioning Mind found online at: www.oberlin.edu/physics/dstyer/Einstein/SRBook.pdf

1.) Straightness: Is a bodies that horizontal in one frame horizontal in all frames? (The answer is “no!”)

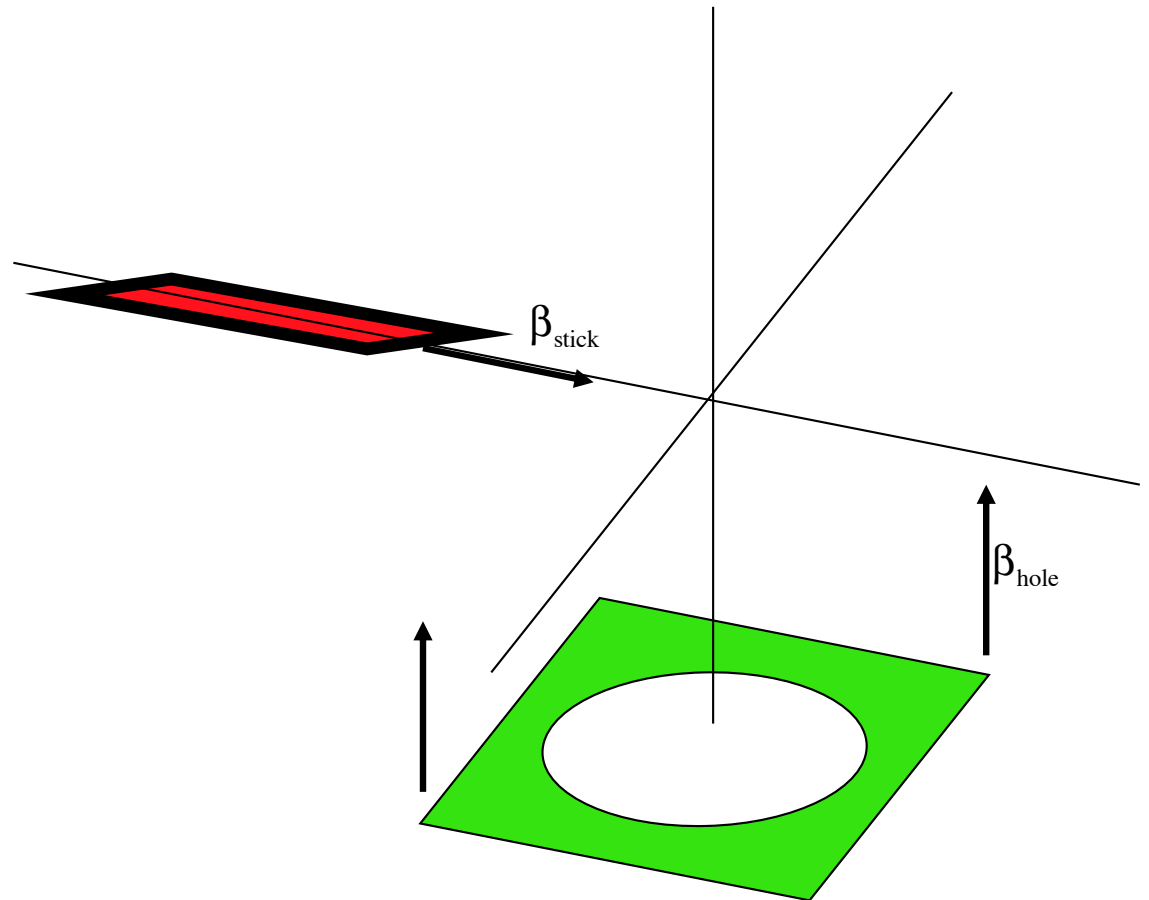
A meter stick moves to the right toward the origin with some velocity. A thin plate in the x-y plane moves upward toward the origin with its own velocity. The plate has a 1 meter hole in it. The center of the meter stick arrives at the origin at the precise time the plate with hole arrives. Will the meter stick make it through the hole, or will it collide with the plate?



From the hole's frame of reference, the meter stick will be length contracted and will fit into the hole as the hole passes through the origin.

The problem is that from the meter stick's frame of reference, the hole will be length contracted and the meter stick will not fit into the hole as the hole passes through the origin.

So which is it?



The solution: In the **hole's** frame of reference, the right side of the plate (event A) and the left side of the plate (event B) are viewed as they exist at the same time (i.e., simultaneously). In the **meter stick's** frame, they do not viewed as simultaneous events. In fact, the right side is seen to be higher than the left making the hole tilted. The tilt is enough for the meter stick to pass through the length contracted hole.

From the side:

