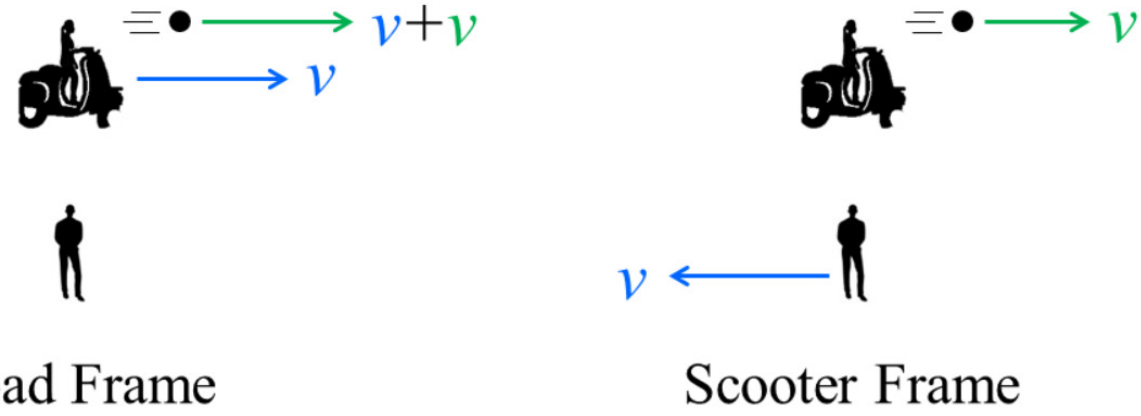
FIGURE 118

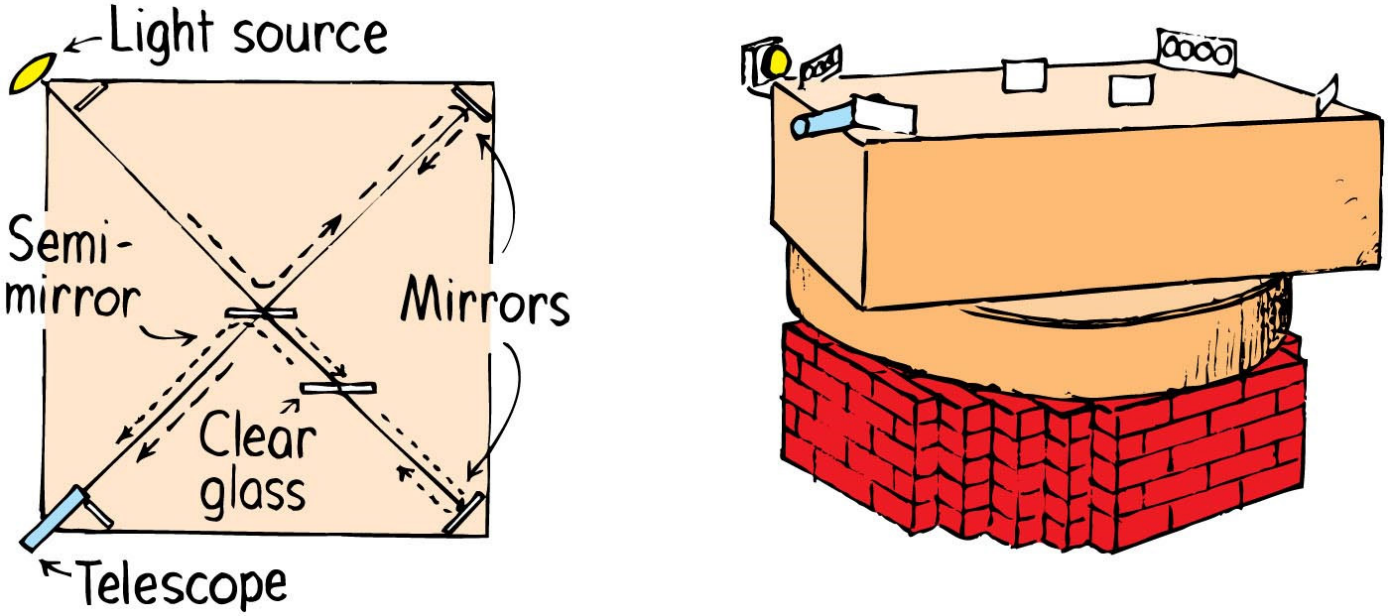


Each observer sees the other moving relative to themselves.

What does this mean for the speed of light? What happens when the scooter turns on its headlights? At what speed do the different observers see the light go?

If the speed of light is truly a constant, then this means that the speed of light is *not* relative and would be the same for both observers, which seems absurd. Physicists tried to get around this issue by saying that *c* was the speed of light relative to a universal "ether" substance that filled the universe, even in the vacuum between the stars. This would mean that as the Earth went around the Sun, our velocity relative to this stationary ether would change throughout the year, and we should measure a different speed of light. Unfortunately, all attempts to measure any change in the speed of light were failures (Figure 119).

FIGURE 119



The Michelson-Morley experiment, one of the most famous failed experiments in physics, was equipped to detect a changing speed of light, if the speed of light could in fact change. It turns out, the speed of light does not change; it is constant.