

1. THE GETAWAY

The outlaws are escaping in their getaway car, which goes $\frac{3}{4}c$, chased by the police, moving at only $\frac{1}{2}c$. Realizing they can't catch up, the police attempt to shoot out the tires of the getaway car. Their guns have a muzzle velocity (speed of the bullets relative to the gun) of $\frac{1}{3}c$.

- (a) Does the bullet reach its target according to Galileo?
- (b) Does the bullet reach its target according to Einstein?
- (c) Verify that your answer to part (b) is the same in all four (!) reference frames: ground, police, outlaws, and bullet.

2. CONSERVATION OF MASS?

Two identical lumps of clay of (rest) mass m collide head on, with each moving at $\frac{3}{5}c$. What is the mass of the resulting lump of clay?