

Length Contraction

Physics II: Modern Physics

College of the Atlantic

1. Anastajia and Beowulf have a set of chopsticks. Each chopstick is 2 cm long. Beowulf gets on a spaceship traveling at half the speed of light, in a direction parallel to the chopsticks. The chopsticks remain behind on earth.
 - (a) What is the length of the chopsticks in Beowulf's frame?
 - (b) How fast would Beowulf have to go so that the chopsticks in his frame had a length of 1cm?
2. Suppose $\beta = 3/5$. In this case
 - (a) What is γ ?
 - (b) What is $\sqrt{1 - \beta^2}$?
 - (c) If an object has a rest length of 10 meters and you see it moving at a speed of β , what length do you observe?
 - (d) If an object a rest length of 8 meters and you are moving at a speed of β with respect to that object, what is the object's length?

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