

### Answer on Question #38213, Physics, Other

#### Question:

Two spaceships traveling .6 and .9 respectively come upon a planet that measures  $4.5 \times 10^{12}$  m. Find the radius that each ship will measure. Please help. I now i am supposed to use  $L' = L/\gamma$  ..

#### Answer:

Length contraction is the phenomenon of a decrease in length measured by an observer of objects which are traveling at any non-zero velocity relative to the observer.

$$L = \frac{L_0}{\gamma} = L_0 \sqrt{1 - \left(\frac{v}{c}\right)^2}$$

$L_0$  is the proper length (the length of the object in its rest frame),  $L$  is the length observed by an observer in relative motion with respect to the object,  $v$  is the relative velocity between the observer and the moving object,  $c$  is the speed of light.

For first ship:

$$L = 4.5 * 10^{12} \text{m} \sqrt{1 - 0.6^2} = 3.6 * 10^{12} \text{ m}$$

For second ship:

$$L = 4.5 * 10^{12} \text{m} \sqrt{1 - 0.9^2} = 2.0 * 10^{12} \text{ m}$$