PHYS 800
Special Topics in Cosmology
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Lecture 5, 9/21/16
Relativity-2
Lorentz Boost Factor
Land Speed Record

736 mph = 0.33 km/s

$\Gamma=1$
Earth Orbital Speed

$v = 30 \text{ km/s}$
$
\Gamma = 1$

365 Days
Bullet Cluster

$\nu = 4500 \text{ km/s}$

$\Gamma = 1$
Large Hadron Collider

Γ = 7500

\( v \approx 0.99999999c \)
Question (7.3)

• If it is impossible to exceed the speed of light, why is it nevertheless possible to reach Alpha Centauri, a distance of 4 lightyears, in less than 4 years of time, as measured by the space traveler?
Relativistic Mass

![Graph showing the relationship between relativistic mass (m/m₀) and velocity (v/c).]