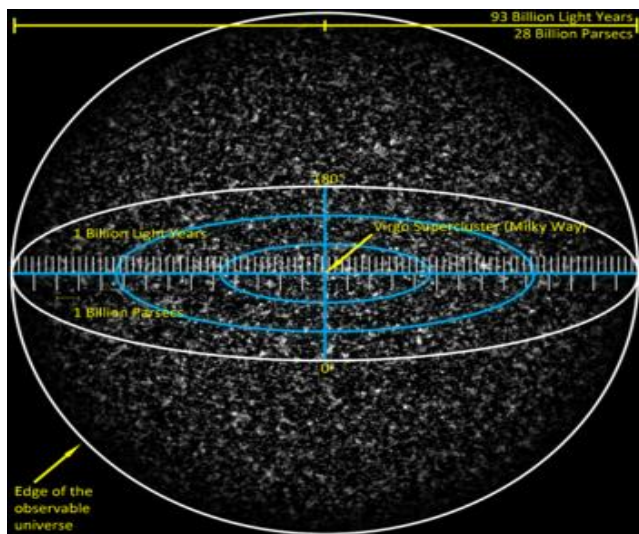


KINEMATICS

Units 4 & 5 Dr. John P. Cise, Professor of Physics, Austin Community College, 1212 Rio Grande

St., Austin Tx 78701 jpcise@austincc.edu & NYTimes November 2, 2011 by Dennis Overbye. Please send a e-mail to Dr Cise on how you used this Physics application from the NYTimes. Thanks! DR Cise



INTRODUCTION: At left you can see the Universe is About 46 Billion (10^9) light years in radius. It is estimated to Be about 400×10^9 galaxies in the universe. A light year is the distance traveled by light in one year at 186,000 miles/s. **QUESTIONS:** (a) Find distance traveled by light In one year in miles? (b) Find volume of universe in (light years)³? (c) Find volume of universe in (miles)³? (d) Assuming uniform spacing between galaxies, how much volume (in light years)³ & (miles)³ of space does each galaxy occupy? **HINT:**

Volume of sphere = $\frac{4}{3} (\pi) r^3$, $X = V t$

ANSWERS: (a) $5,866 \times 10^{12}$ miles (b) 4.21×10^{32} (light years)³ (c) 8.5×10^{70} miles³ (d) 1.0525×10^{23} (light years)³/galaxy , 2.12×10^{59} miles³/galaxy

Empty Times Square Is Fantasy; The Stranger Stuff Is Science

You might want to think twice, if you cherish your notions of reality, before accepting a ride from Brian Greene.



"The Fabric of the Cosmos," with Brian Greene, uses visual tricks to illustrate quantum paradoxes.

Step into a taxi, a Jeep, a [space shuttle](#) or even onto an escalator with this boyish Columbia University physicist and best-selling author, and you may soon find your watch acting weirdly, the landscape outside turning into a funhouse mirror or the uniqueness of your own identity called into question. So it goes, over and over again, in the course of "[The Fabric of the Cosmos](#)," a four-part tour of the universe that begins on "Nova" on [PBS](#) on Wednesday. Hosted by Dr. Greene, it is based on his 2003 book of the same title. **Our universe, with its hundreds of billions of galaxies**

spread out over billions of light years, might be only an infinitesimal fraction of all that exists in a nearly endless sea of unreachable bubble universes. That idea, which solves a lot of problems —

including that [dark energy](#) prying our own cosmos apart — has caused bitter strife among physicists, some of whom think it is a betrayal of Einstein's dream of a single theory of nature.

But Steven Weinberg, a Nobel laureate from the University of Texas, Austin, says, "There are no principles built into the laws of nature that say that theoretical physicists have to be happy."