

ASTR 250

Fundamentals of Astronomy

MWF 11-12 Steward 208



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Fundamentals of Astronomy

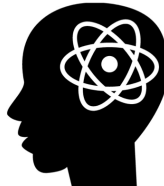


Dr. Yancy Shirley
Office Hours: N310
Tu/Th 10-12 + appointment
yshirley@email.arizona.edu

Need help with your 1st or 2nd year
Astronomy and Physics major classes???

ATOMM

Astronomy Major Help Center



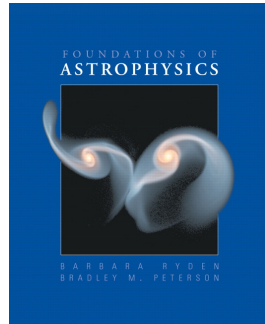
Monday through Friday

2:00 – 4:00 PM

3rd Floor Library
Steward Observatory

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Fundamentals of Astronomy



Course prerequisites: PHYS 141 or 161H
MATH 129 (Calculus II)

Grades

Homework: 75%

Midterm: 10%
Feb 27th 11-12

Final Exam: 15%
May 6th 10:30-12:30

- There will be several in-class problems where you will work in groups of 2-3. You need to be in class to get full credit.
- Take home problems should be your own individual work
- Emergencies happen! If you cannot turn in a homework on time, **email me prior to class** and we will work out a plan. Otherwise late homework will not be accepted.
- If you miss a problem, you may correct it and hand it in with the **next** homework to get half the missed credit back
- The lowest homework is dropped in calculation of the grade

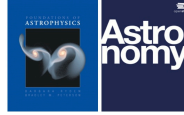
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Fundamentals of Astronomy

<http://eldora.as.arizona.edu/~yshirley/Arizona/AST250/>

[Syllabus](#)

Pre-reqs: PHYS 141/161H, MATH 129
 Homework: 75%, Exams 25%
 A(>90%), B(>75%), C(>60%), D(>50%)
 Midterm: Feb 27th 11am
 Final Exam: May 6th 10:30-12:30



CURRENT SCHEDULE

FA = Foundations of Astrophysics, As = Astronomy

Date	Homework	Topic	Reading
W Jan 09		Introduction (Slides) (Video)	FA: As:Chapter 1
F Jan 11	Homework 1	Distance and Angle (Board) (Slides)	FA: As:Chapter 19.1-19.2
M Jan 15		MARTIN LUTHER KING JR. DAY - NO CLASS	
M Jan 14	Homework 2,3	Sky Coordinate Systems (Board) (Slides)	FA:Chapters 1.1-1.3 As: Chapter 2.1
W Jan 16	Homework 4,5	Local Sidereal Time & Hour Angle (Board) (Slides)	FA: Chapters 1.4-1.6 As:
F Jan 18		FLANDRAU PLANETARIUM (SkyChart)	
M Jan 21		MARTIN LUTHER KING JR. DAY - NO CLASS	
W Jan 23	Homework 6,7	Spherical Trig (Board.pdf) (Law of Cosines/Sines Derivation)	
F Jan 25	Homework 8	Properties of Light (Slides)	FA: As: Chapter 5.1-5.2
M Jan 28	Homework 9,10	Flux & Luminosity (Board) (Lunar Eclipse - Jan31)	FA: Chapter 13.2 As:
W Jan 30	Homework 11,12	Magnitudes (Board) (Slides)	FA: Chapter 13.2 As: Chapters 17.1-17.2
F Feb 01	Homework 13	Blackbody Radiation (Board) (Slides)	FA: pages 140-143 As: Chapter 5.2

When we look up at the moon, we are looking into the past... it takes 1 second for light to travel from the Moon to the Earth.



A Scale Model



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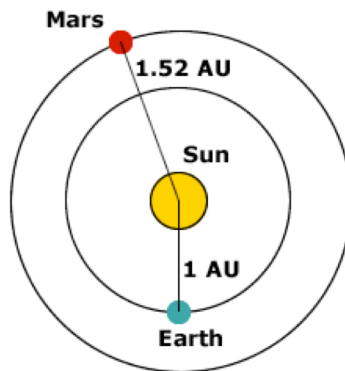


Set the Earth to a 6cm ball, or a 1:200,000,000 scale model

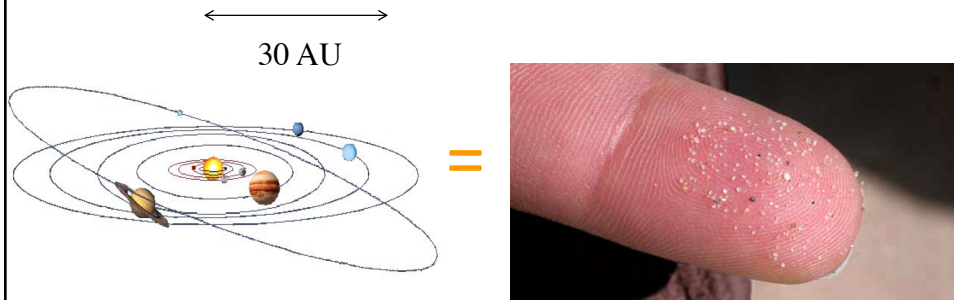
- The Moon is a marble at your arm span
- The Sun is a 7 m ball (about the height of Old Main) 700 m away (about the length of the UofA mall)
- The Solar System is the size of Tucson
- The nearest star is 1/2 distance to the moon!

Definition: Astronomical Unit

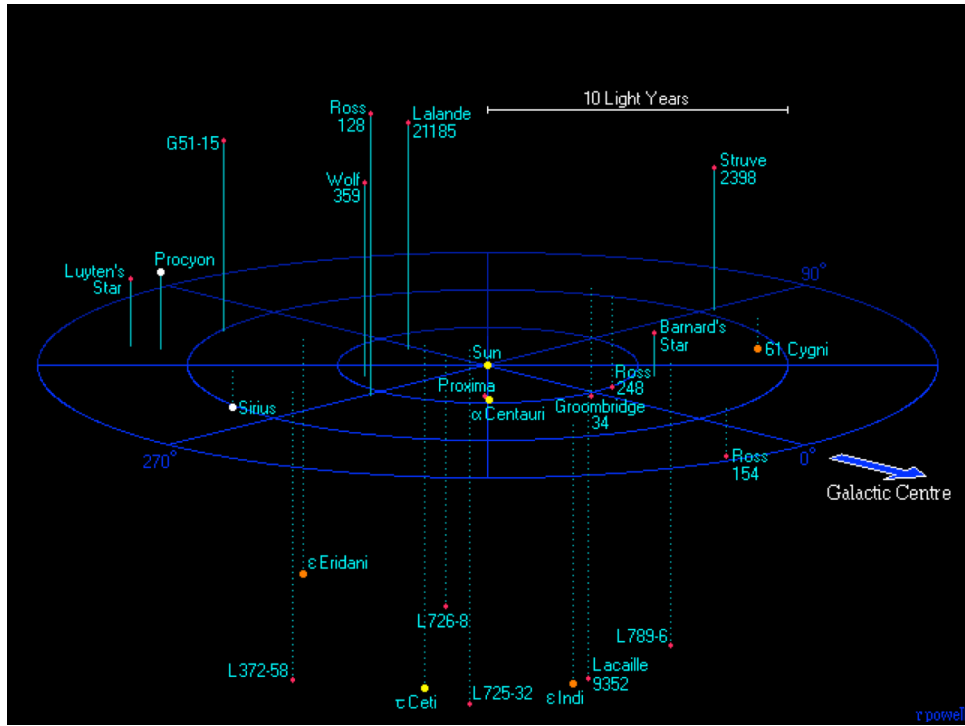
- The mean **distance** between the Earth and the Sun
- 1.496×10^{13} cm
- Denoted as 1 “AU”

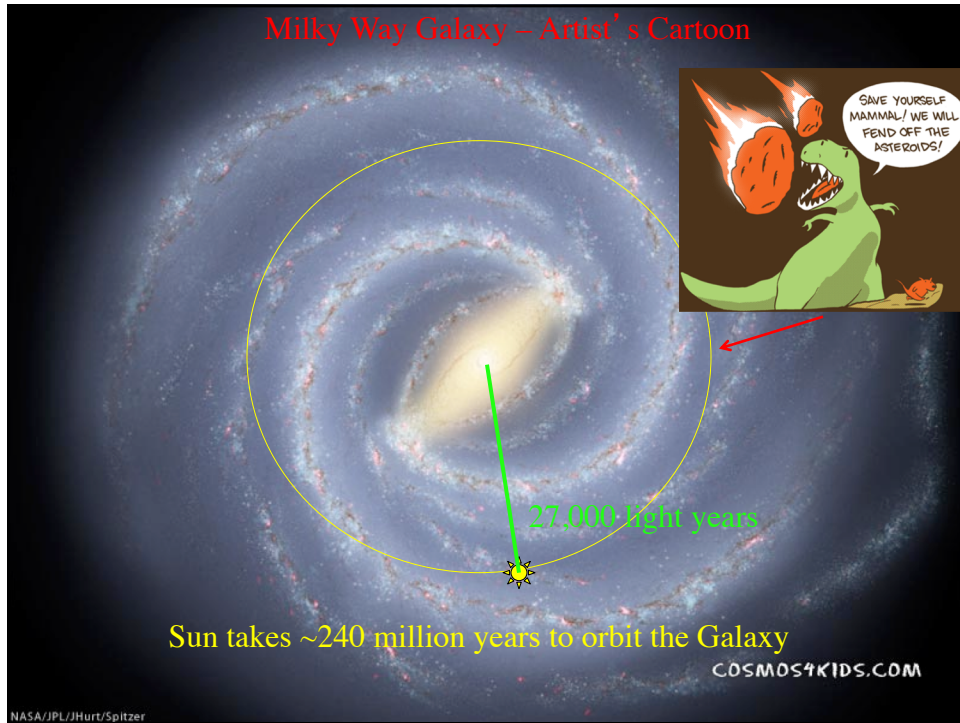


Reduce the scale by a factor of 50,000,000

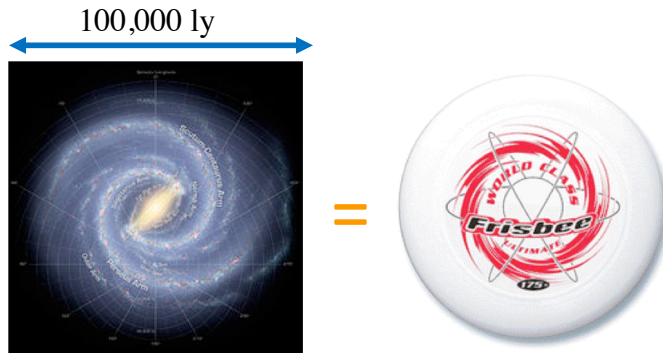


- The Solar System is a 1mm grain of sand
- The distance between stars is ~ 10 m
- The Milky Way is the Tucson-Phoenix distance
- The MW has > 1 trillion stars

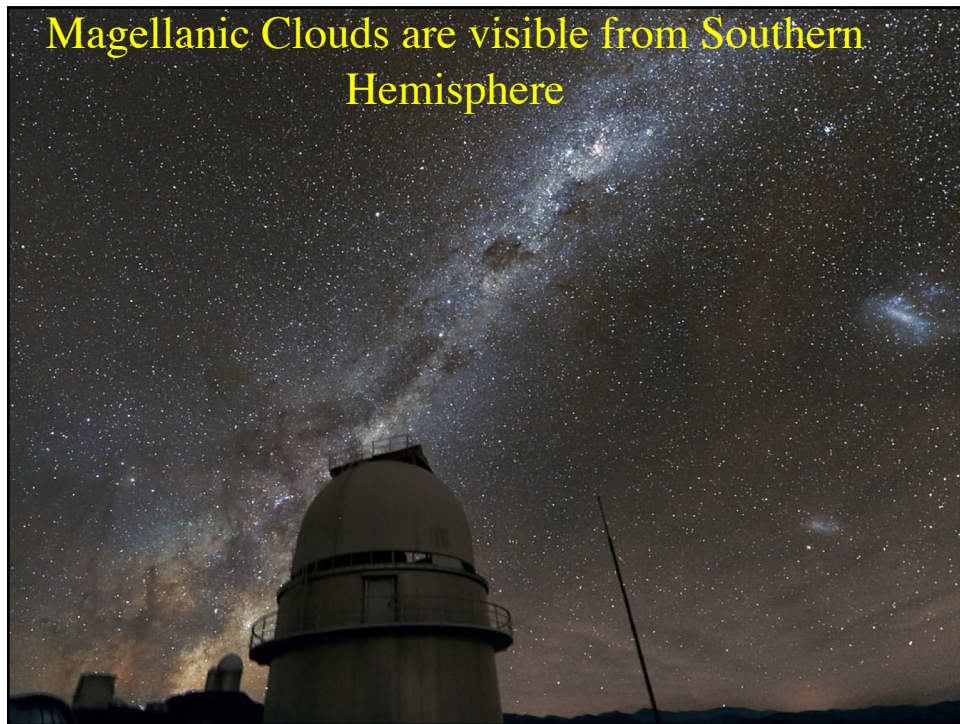
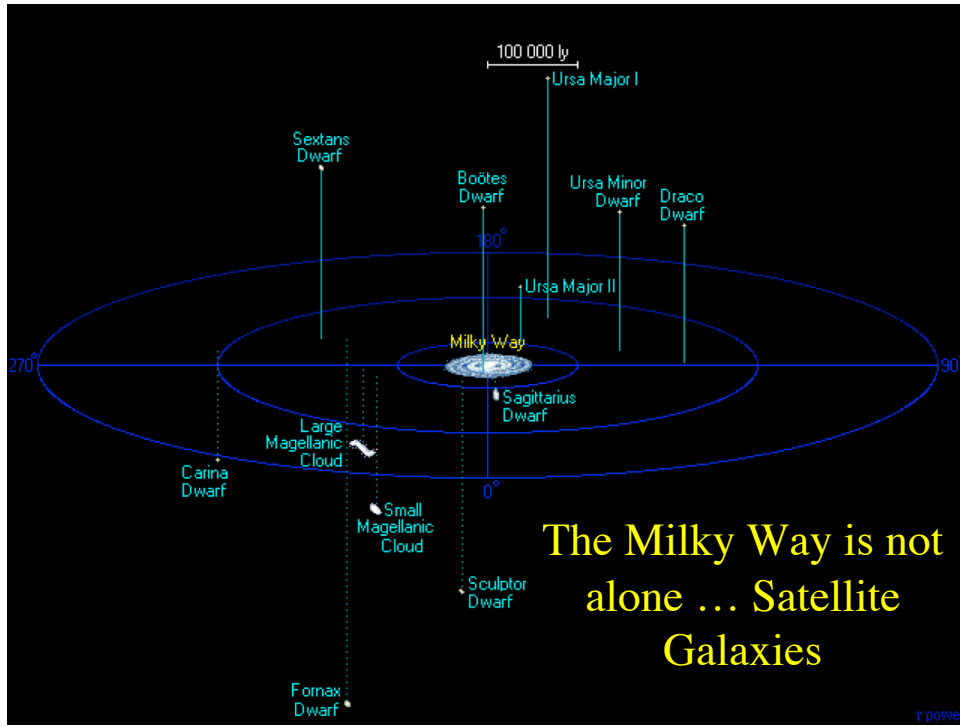


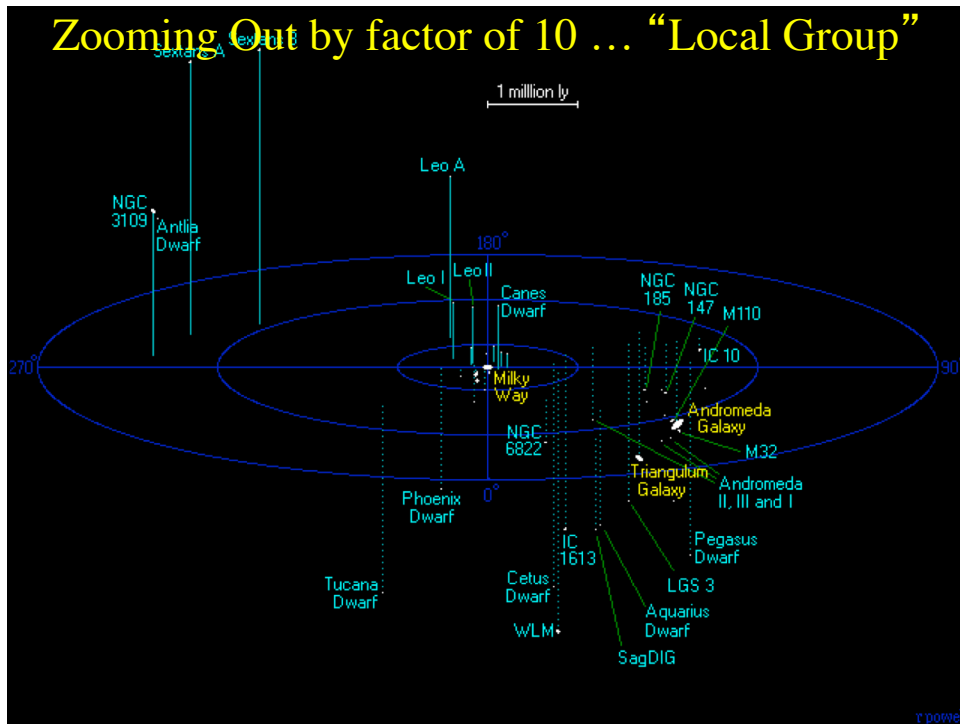
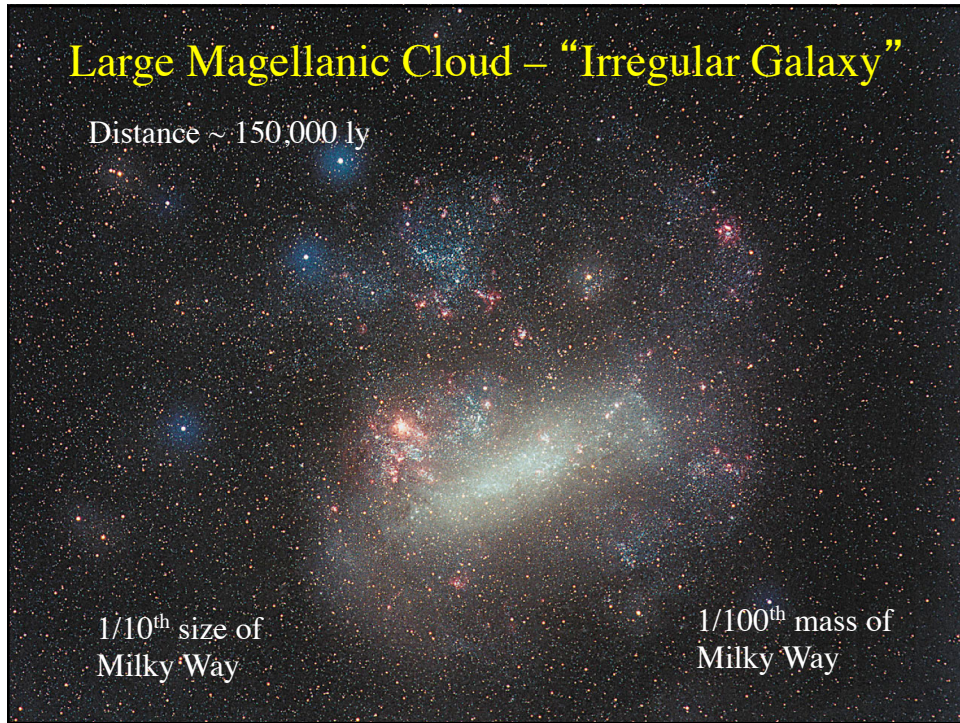


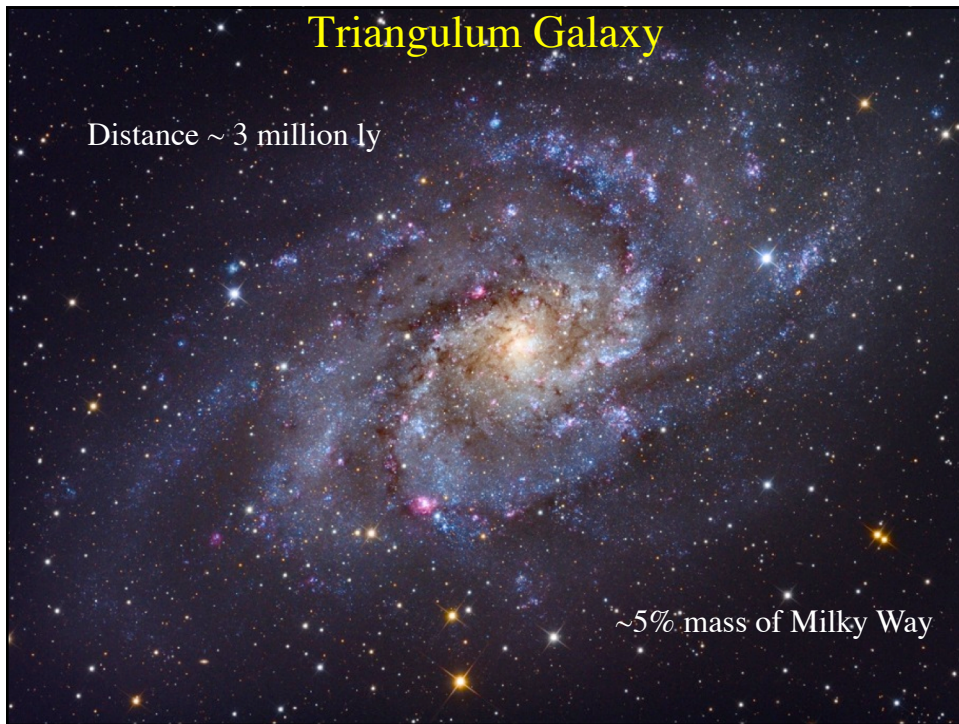
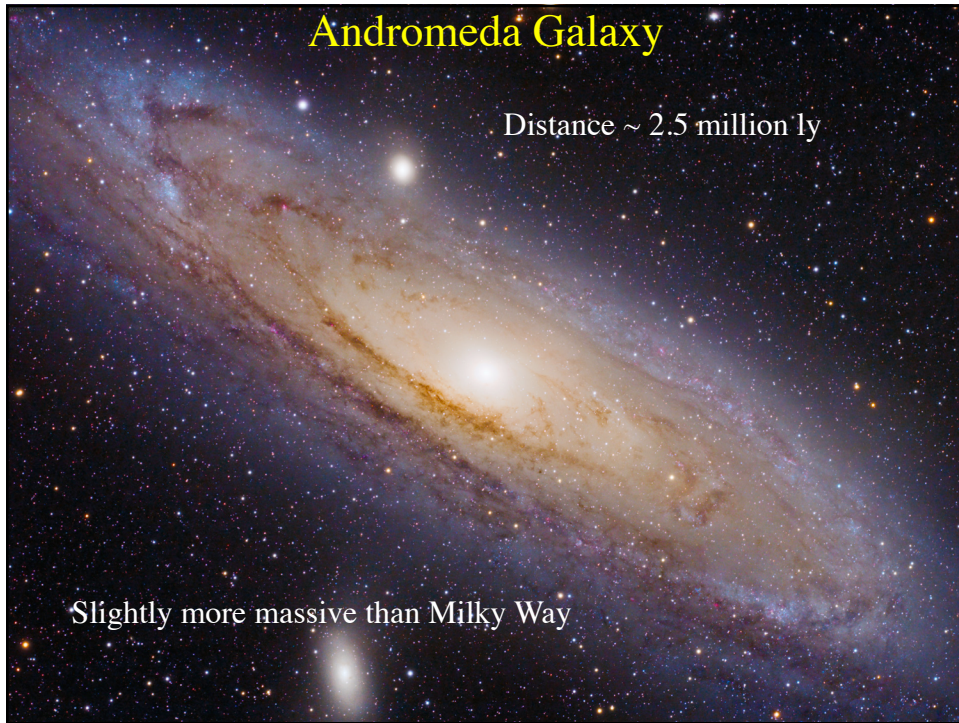
Now reduce by another factor of 1,000,000

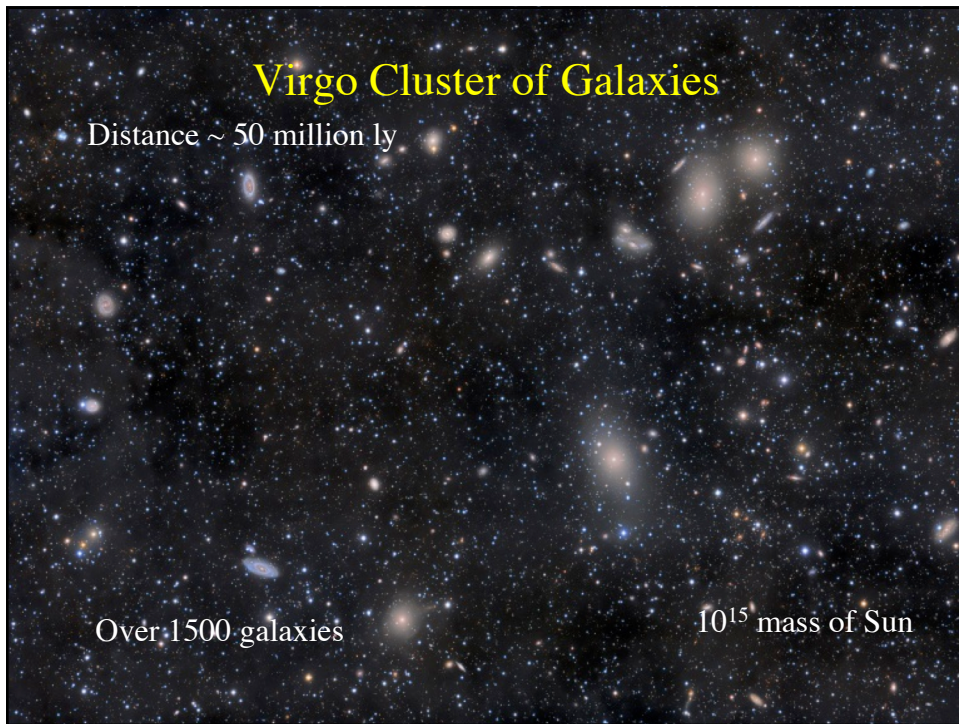
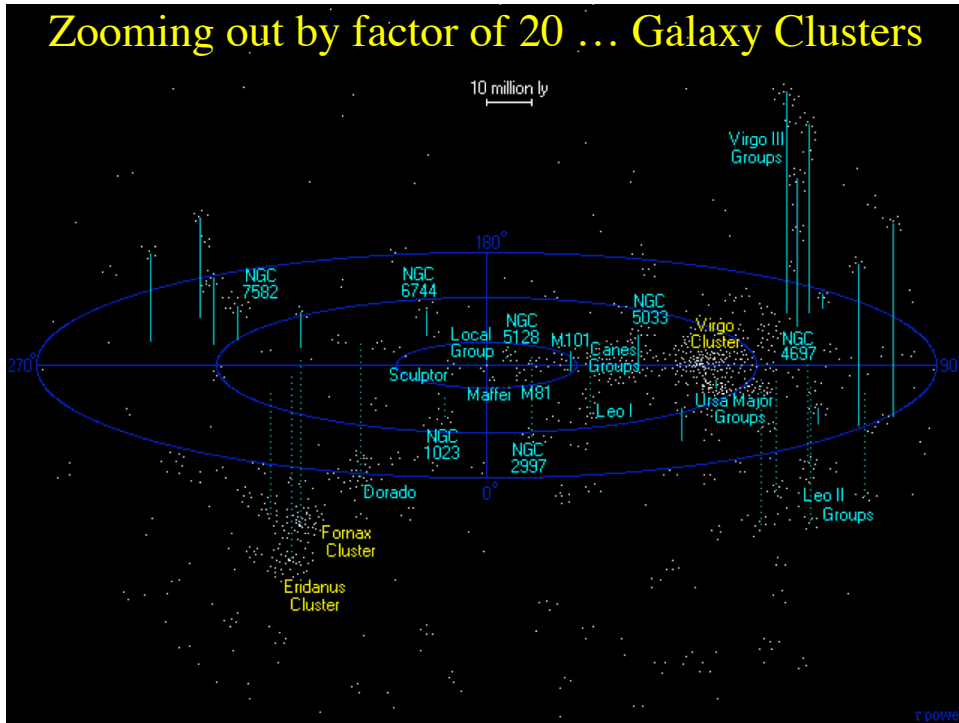


- The Milky Way is the size of a frisbee
- The nearest galaxy is 7 m away
- Radius Visible Universe ~80 miles
- $>10^{11}$ galaxies within visible Universe

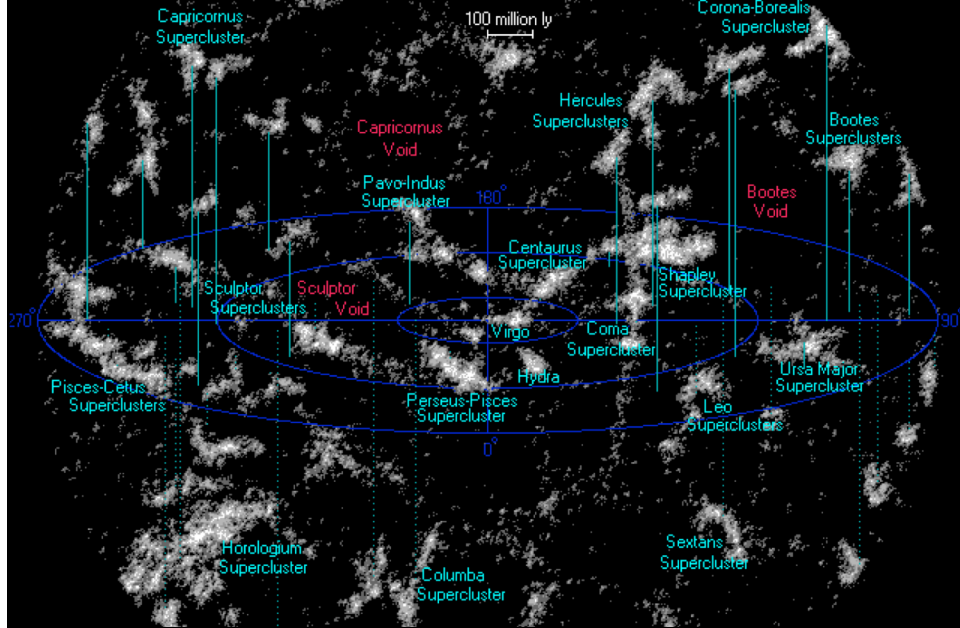




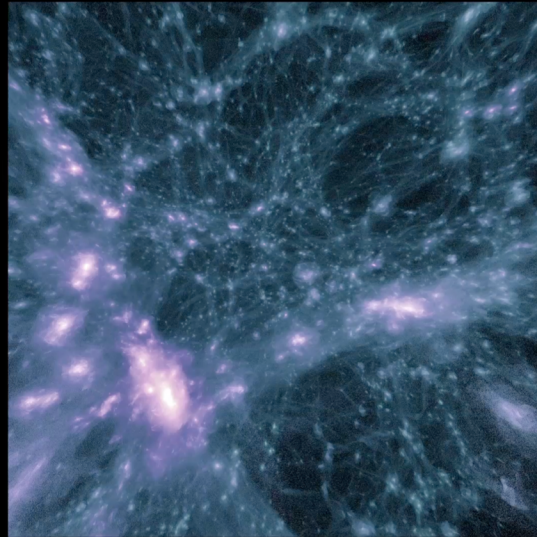




Zooming out by factor of 10 ... SuperClusters



On largest scales **Gravity** has organized galaxies into filaments 100s of millions light years long



Simulation courtesy Dr. Brant Robertson (UCSC)



Cosmic Microwave Background: The farthest we can see back...

Radiation signature from 300,000 years after the Big Bang

