Astronomy of the Solar System Astr 1010 * Spring 2016 MW 12:00 – 1:15 pm, 600 Langdale MW 1:30 – 2:45 pm, 170 Urban Life

- Your instructor: Dr. Douglas Gies
- Astronomy at GSU
- Web site and Syllabus
- Introductions
- Survey









• Class web site for syllabus, notes, assignments:

 $www.astro.gsu.edu/{\sim}gies/ASTR1010/$





Chapter 1 Our Place in the Universe

- What is our place in the universe?
- What language do we use to describe space?
- How did we come to be?
- What was the universe like in the past?



















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1.2 The Scale of the Universe

- What units do we use?
- How big is Earth compared to the Solar system?
- How far away are the stars?
- How big is the Milky Way Galaxy?

Units

- Distance: meter (or kilometer = 1000 m)
- Mass : gram (or kilogram = 1000 g)
- Time: second (1 day = 24 x 60 x 60 s)

Powers of 10

- Need to deal with big numbers: Earth – Sun distance = 150,000,000 km = 1.5 x 10⁸ kilometer (exponent is number of jumps to decimal)
- Also small numbers: mass of hydrogen atom = 0.00000000000000000000017 gram = 1.7 x 10⁻²⁴ gram

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Distances in Astronomy

- Astronomical Unit = the average distance between the Earth and Sun (1.5 x 10⁸ km)
- **Parsec** = the typical distance between stars as defined by the angular wobble caused by Earth's orbit (3.1 x 10¹³ km)
- Light-year = the distance light can travel in one year (9.5 x 10¹² km)

How big is Earth compared to our solar system? Let's reduce the size of the solar system by a factor of 10 billion; the Sun is now the size of a large grapefruit (14 cm diameter). How big is Earth on this scale? A. an atom B. a ball point C. a marble

D. a golf ball

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Let's reduce the size of the solar system by a factor of 10 billion; the Sun is now the size of a large grapefruit

(14 cm diameter).

How big is Earth on this scale?

- A. an atom
- B. a ball point (100 times smaller than Sun)
- C. a marble
- D. a golf ball









Big Picture of Space & Time

- "Powers of 10" (1977, Charles and Ray Eames)
- "IMAX Cosmic Voyage" (1996, Bayley Silleck) https://www.youtube.com/watch?v=qxXf7AJZ73A
- "Scale of the Universe" (2013, Cary & Michael Huang) http://apod.nasa.gov/apod/ap140112.html

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Destination	Light travel time
Moon	1 second
Sun	8 minutes
Sirius (nearby star)	8 years
Andromada Calarry	2.5 million years



	Cosmic Calendar - http://tristan.ferroir.free.fr						
December							
3	4	5	6	7			
10	. 11	12	13	14			
all 17 Eirst Vertebrate	18	19	20 First four- limbed animals	21 Variety of insects begin to flourish			
24 First dinosaurs	25 First A Mammals ancestor	26 Pangea formation and dislocation	27 First bird	28			
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