AST 302

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Agenda

- Announce:
  - Read Ch. S2 by Thursday
- Pass out syllabus & discuss
- Review what we learned last semester
- Preview what we'll learn this semester
- Lab Stuff

What we learned

- Sense of Scale (distance game)
- Where we are in the Universe
- Physics:
  - Forces
  - Conservation
  - Quantum nature
  - Basic Chemistry (matter/energy)
  - Light
- Telescopes
  - Mounts
  - Design principles/types
    - Reflector/Refractor
    - Optical,Radio,Xray,Gamma ray
  - How to use…celestial coordinates
- History of Astronomy
  - Ancients
  - Brahe, Kepler, Galileo, Newton
- What is Science?
  - Scientific notation
  - Lab procedure
  - Uncertainty in measurements
- Solar System
  - Its features
  - Its formation
  - Planetary detail

What We Learned: Scale

- Size of Earth…diameter is
  - 1,000 miles
  - 10,000 miles
  - 100,000 miles
  - 1,000,000 miles

What We Learned: Scale

- Size of Earth…diameter is
  - 1,000 miles
  - **10,000 miles—actually 7,900 miles**
  - 100,000 miles
  - 1,000,000 miles

What We Learned: Scale

- Size of Sun…diameter is
  - 1,000 miles
  - 10,000 miles
  - 100,000 miles
  - 1,000,000 miles

What We Learned: Scale

- Size of Sun…diameter is
  - 1,000 miles
  - 10,000 miles
  - 100,000 miles
  - 1,000,000 miles—actually 862,400 miles

What We Learned: Scale

- Size of hydrogen atom…diameter is
  - 10^{-15} m
  - 10^{-10} m
  - 10^{-5} m
  - 10^{-0} m

What We Learned: Scale

- Size of hydrogen atom…diameter is
  - 10^{-15} m
  - 10^{-10} m
  - 10^{-5} m
  - 10^{-0} m

What We Learned: Scale

- Size of hydrogen nucleus…diameter is
  - 10^{-15} m
  - 10^{-10} m
  - 10^{-5} m
  - 10^{-0} m

What We Learned: Scale

- Size of hydrogen nucleus…diameter is
  - 10^{-15} m
  - 10^{-10} m
  - 10^{-5} m
  - 10^{-0} m

What We Will Learn

- Relativity
  - Special—time dilation, length contraction
  - General—curvature of spacetime
- The appeal of Unraveling Nature
- More Quantum/Particle Mechanics
- Stars
  - Stellar evolution
  - Creation of the elements
  - Stellar Death
    - Supernova
    - Neutron Stars
    - White Dwarfs
    - Black holes
- Galaxies
  - Basic Features
  - Galaxy types
  - Evidence for Dark Matter
  - Evolution
  - Quasars / AGN
- Cosmic Expansion
  - Standard candles
  - Hubble's Law
- The Universe itself
  - Structure formation
  - Composition (dark energy, dark matter, regular stuff)
  - Its eventual fate
  - Its birth (Big Bang, Inflation)
- ET Life?

Lab

- Difference between accuracy & precision
- Difference between error & uncertainty
- Science/Lab is about arguments
- Is being open minded good? Then is being completely open minded best?

Today's Lab

- Measure dimensions and mass of objects
- Calculate their densities
- Determine their materials