Final Review

December 4, 2002

Final Exam will be held in Ruby Diamond Auditorium

NOTE THIS!!!

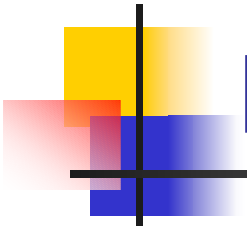
not UPL

Dec. 11, 2002 10am-noon

Bring your ID, calculator and pencil

Announcements

- The final extra credit question has a deadline of 5pm Thurs.
  - make sure to follow the instructions
- Grades from Exams 1 & 2 and the final quiz scores are available on Blackboard
  - exams are out of 100 points
  - quiz score is out of 50 points (10 highest quiz scores added together)

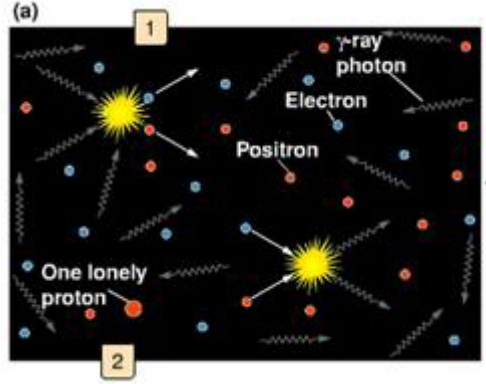


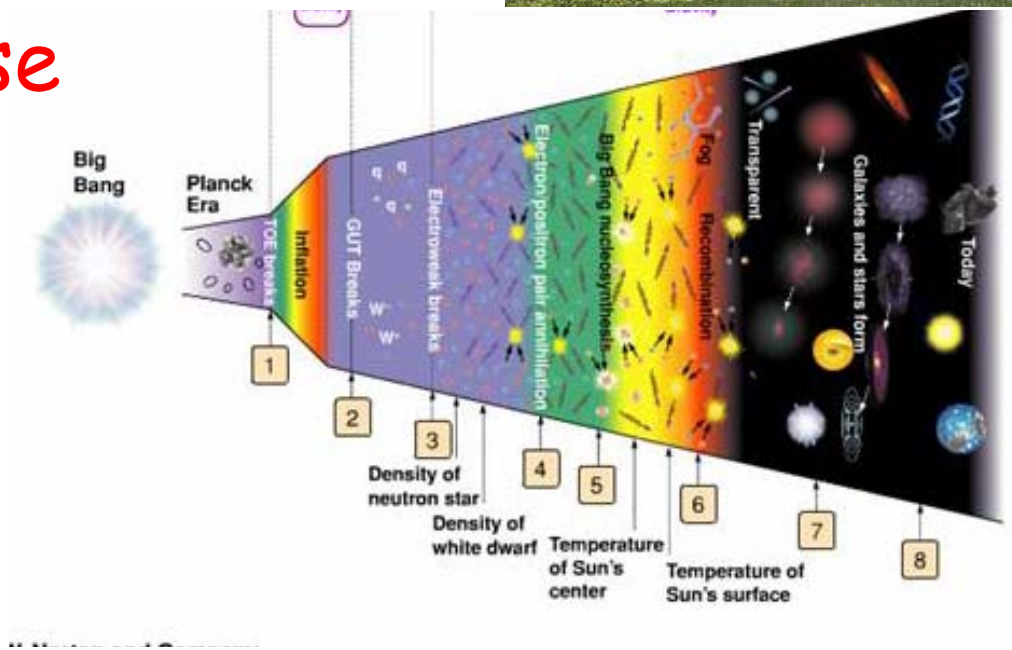
Final Exam

- Final Exam
  - we will be on the left side (facing stage) of Ruby Diamond Auditorium
  - pick up a lap board as you enter
  - find the exam with your name on it
  - bring ID, calculator, and pencil
  - there will be about 80 questions on the final exam

Review

- Early Universe
  - forces
  - particle creation/annihilation
  - a walk through time
- Life in the Universe
  - SETI
  - Drake equation





Semester Review

- Science
- Solar System
- Stars
- Galaxies
- Large Structure
- Cosmology
- Answered lots of questions (hopefully)
- Raised lots of questions (hopefully)

Equations

- This information will be provided for you on the exam:
  - $c = 3 \times 10^8$ m/s (speed of light)
  - $(P_{years})^2 = (A_{AU})^3$
  - $F = G \frac{M_1 M_2}{r^2}$
  - 1 year = 3.2×10^7 seconds
  - $L \propto T^4$
  - $\lambda \propto 1/T$
  - $I = L/4\pi r^2$

$$\tau_{MS} = 1 \times 10^{10} \text{ (years) x } \frac{\text{amount of hydrogen (solar mass)}}{\text{rate of hydrogen burning (luminosity)}}$$

$$Z = \frac{\lambda_{observed} - \lambda_{rest}}{\lambda_{rest}}$$

$$v = H_0 \times d$$

New Material

- Galaxies
  - types, active galactic nuclei
- Spiral galaxies
- Dark matter
  - rotation speed of galaxies
- Particle physics
  - quarks, elementary particles
- Telescopes
  - attributes, types, wavelengths
- Measuring distances
- Hubble's Law
- Expanding Universe
- Cosmological Redshift
- Big Bang
- Cosmic microwave background
- Fate of the Universe
  - Ω_{MASS}, Ω_{Λ}
- Shape of the Universe
- Accelerating Universe
- Bigger structure
  - groups, clusters, superclusters
- Formation of structure
- Big Bang expansion
  - inflation
- Life Beyond Earth
  - SETI

Important Older Material

- Scientific Method
- Motion of the Sun, planets, Moon
- Newton's Laws
- Seasons
- Moon's phases
- Eclipses
- Comparative geology
- Solar system formation
- Inner planets
- Outer planets
- Gravity
- Lightyear, AU
- Electromagnetic waves
- Doppler effect
- Temperature and light
- Blackbody Radiation
- Measuring properties of stars
- Classification of stars
- H-R diagrams
- Main Sequence
- Interstellar Gas/Dust
- Calculating Star's Lifetime
- Steps of Star's Life
- Types of Stars/Steps
  - Red Giant, White Dwarf, Brown Dwarf, Binary Star Systems
- Exciting Star Types
  - Nova, Supernova, Neutron Stars, Black Holes