Astronomy 350: Introduction to Cosmology

Lecture 1
Aug 27, 2012

Announcements:
- Welcome!
- Pick up syllabus

Today's Agenda

1. Overview and Appetizer

2. Course Mechanics

3. Relativity demonstration
   (weather permitting)

Introductions

Getting to know us

`www: A201 Staff`

Getting to know you

- First course with me? Welcome!
- Returning veterans–welcome back!

  I salute your bravery! Hope triumphs over experience!

Getting to Know You: iClicker Poll

Vote your conscience! = Say what you *really* think!
No answers are wrong!

There is evidence that the Universe has expanded from an initial **hot**, **dense**, state = **big bang**

In your opinion, how strong is evidence for the big bang?

A Way strong! Airtight!

B Pretty strong, a best bet, but not a sure thing

C Not so strong, a risky bet

D Totally weak! And the evidence has other explanations

E There isn't any real evidence for a big bang

Welcome!

This course sweeping in scale
science applied to the biggest picture
$\rightarrow$ the most sweeping course you can take
this side of Green street.

Note: you are (at great expense)
attending the **Univers**ity of Illinois
you have been promised the Universe...
$\rightarrow$ it's right there in the name!

In this course, **we deliver!**

Huge range of scales in space and time

in space:

subatomic 10^{-33} cm, to the solar system 10^{10} km across

to Milky Way 100,000 light-years across,

to edge of observable universe 10's of billions of light years,

to unobservable universe beyond

also sweeping in time:

10^{-43} sec after big bang

to billions of years in future of cosmos

Taking Astr 350 Here and Now: A Wise Choice

Great **time** to take the course:
This very moment is the Golden Age of Cosmology
new results flooding in–some during this semester!
⋆ Fall 2011: third time a Nobel Prize given for cosmology!

> We are very lucky to live in an age in which we are still making discoveries. It is like the discovery of America–you only discover it once.
>
> – Cosmologist Richard Feynman, *The Character of Physical Law*

Also great **place** to take this course:
Illinois national and world player in cosmology
both theoretical and observational
⇒ getting it from the horse's mouth–so to speak

Appetizer: Course Goals

The Big Picture

My goal in this course:
get a familiarity with the biggest picture science can paint

- partly phenomenology–*what* we know: "just the facts"
- but also: *how* and *why* things are as we see them

  Will apply physical principles = laws of nature:

$\Rightarrow$ "get under the hood" and see what makes the universe tick

Preview of Coming Attractions

A brief, whirlwind tour

$\rightarrow$ don't need to take notes...

Business

Syllabus

will highlight main points here...

you should **read the whole thing carefully**

Note: this course will rely heavily on the Web.

course page is source for all course information and assignments

Prerequisite:

Credit for an introductory course in Astronomy

ASTR 100, 121, 122, or 210

Please speak to me if you haven't done this!

Note: Physics and Calculus are **not** required!

If you have had these, great, but no problem if you haven't!

Relativity Demonstrated!