

Cosmology—the History of the Universe (Williams WSP-ASTR 010)

Instructor: Josh Winn, Harvard–Smithsonian Center for Astrophysics
Office:
Telephone: Weekdays: _____, Weekends: 617-718-9440
Email: jwinn@cfa.harvard.edu
Meeting times: Monday–Thursday, 10 a.m.–Noon
Classroom: Physics 114

Description: An introduction to scientific cosmology and the application of the laws of physics to the universe as a whole. The emphasis will be on understanding the evidence for the Big Bang model without detailed training in physics or mathematics. How far away are stars, and why do they shine? How old and how large is the universe? The expansion of the cosmos, the creation of the elements, and the formation of stars and galaxies. Modern elaborations to the model, including dark matter and dark energy. Speculations on particle physics in the very early universe, and the significance of life. *No prerequisites.*

Schedule (*approximate*):

Lecture no.	Date	Topic
1	M Jan 6	Cosmology is about the universe.
2	T Jan 7	The universe contains stars.
3	W Jan 8	The universe is dark.
4	R Jan 9	The stars are made of hydrogen and helium.
5	M Jan 13	The universe is old.
6	T Jan 14	The universe is large.
7	W Jan 15	Big Bang I. The universe is expanding.
8	R Jan 16	Big Bang II. The universe was hot.
9	M Jan 20	Big Bang III. Hydrogen and helium are primordial.
10	T Jan 21	What holds galaxies together?
11	W Jan 22	What is the dark matter?
12	R Jan 23	How and when did galaxies form?
13	M Jan 27	What is the geometry of the universe?
14	T Jan 28	Is the expansion of universe accelerating?
15	W Jan 29	Why is the universe so uniform?
16	R Jan 30	Is the universe designed for life?

Format: 60 minute discussion, 10 minute break, 50 minute lecture

Textbook: None. Daily readings will be handed out by the instructor.

Evaluation: Participation in class discussion of daily homework problems (50%), a final paper of approximately 2,000 words (50%)