



ASTRONOMY THROUGH THE EYES OF CULTURE & SCIENCE

ASTR 311
Akshita & Mansi

The Side of Hindu Cosmology

Fig. 1. Starry background. [www./.](#)

Hindu Cosmology (What is Kalpa)

- Kalpas (Cosmic Time)^(desk, 2024).
- One kalpa = one “day of Brahma”
- Each kalpa lasts billions of years (~4.32 billion years)
- Followed by a “night” of equal length ^(desk, 2024).



Fig. 2. A manuscript.

www.reddit.com/r/hinduism/comments/gofz2z/one_of_the_oldest_surviving_manuscripts_of_the/

CULTURAL OVERLAP

- Pulsars are rapidly spinning neutron stars that emit regular pulses of electromagnetic radiation (Gundubogula, 2025).
- Example: Vela Pulsar (~11 rotations per second)
- NASA converts radio signals- audible sound
- Produces rhythmic (NASA, n.d.), repeating beats
- In comparison to Shiva's *damru* instrument (symbol of cosmic rhythm)



Fig. 3. A Damaru. www./

“Which Brahma?”

Concept of Multiple Universes

- Story *Chaitanya Charitamrita* and *Bhagavata Purana* (Seeker, 2025 and Parasuram, 2025). Estimated composition: around 300 CE - 500 CE.
- Each universe has its own creator (Brahma)
- Concept: **Ananta Koti Brahmanda** (countless universes)



Fig. 4. Rendition of Brahma.
preperverse.github.io/blog/god-brahma/

Cyclical Nature of the Universe

- Universe follows repeating cycles
- Creation - existence - destruction - rebirth (Bhasin, 2025).
- Similar to some modern cyclic universe ideas (conceptually) (Bhasin, 2025).



Fig. 5. Representation of universal cycles.
www.dreamstime.com/circular-pattern-overlapping-rings-hinting-cyclical-nature-universe-quantum-loop-gravity-circular-pattern-image322562192.

YUGAS TIMELINE

The Yuga Cycle (4.32 mil years total) (Knowing, 2026)

Satya Yuga (1.72 mil years) - Golden Age

Treta Yuga (1.29 mil years) - Silver Age

Dvapara Yuga (864,000 years) - Bronze Age

Kali Yuga (432,000 years) - Dark Age

Pattern

- **4:3:2:1 ratio**
- Each age falls in mortality and life span
- Cycle repeats forever (Dasa, 2023)

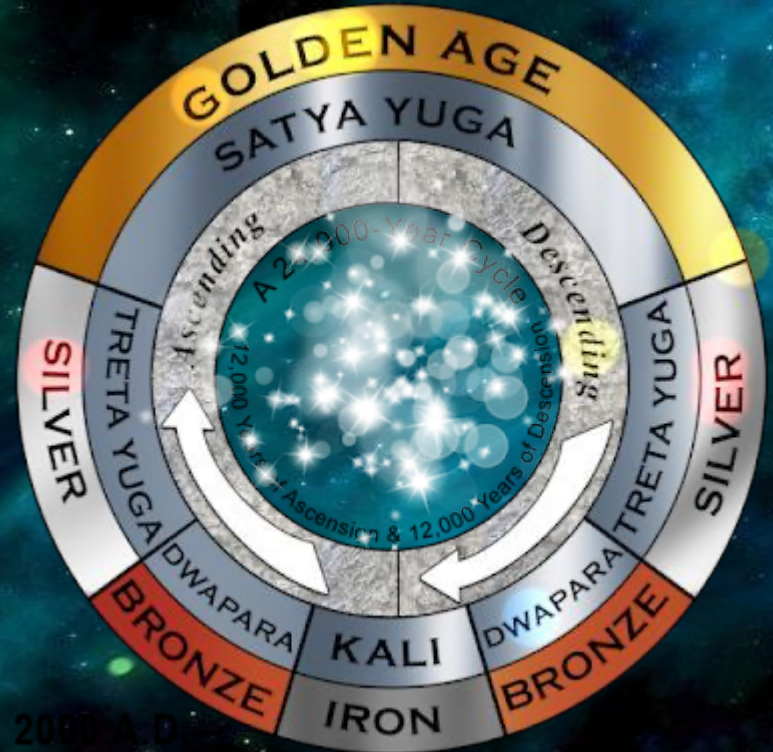


Fig. 6. Visual for the Yuga cycles. www./

Meaning and Significance of a Kalpa

- 1 Kalpa - “Day of Brahma” (creation phase).
- Followed by equal “night” (destruction / *pralaya*) (Mishra, 2024).
- Includes smaller cycles (*Manvantaras*) within it (Goyal, 2006).
- Based on symbolic, mathematical, and astronomical reasoning.
- Demonstrates early understanding of vast cosmic time.
- Interestingly close to Earth’s age (Mishra, 2024).

HOW PEOPLE CALCULATED KALPAS

- Nested time cycles
- 4 Yugas (4:3:2:1 ratio)
- 1 Mahayuga = 4.32 million years
- 1000 Mahayugas = 1 Kalpa
- 36,000 Kalpas = 1 life of Brahma

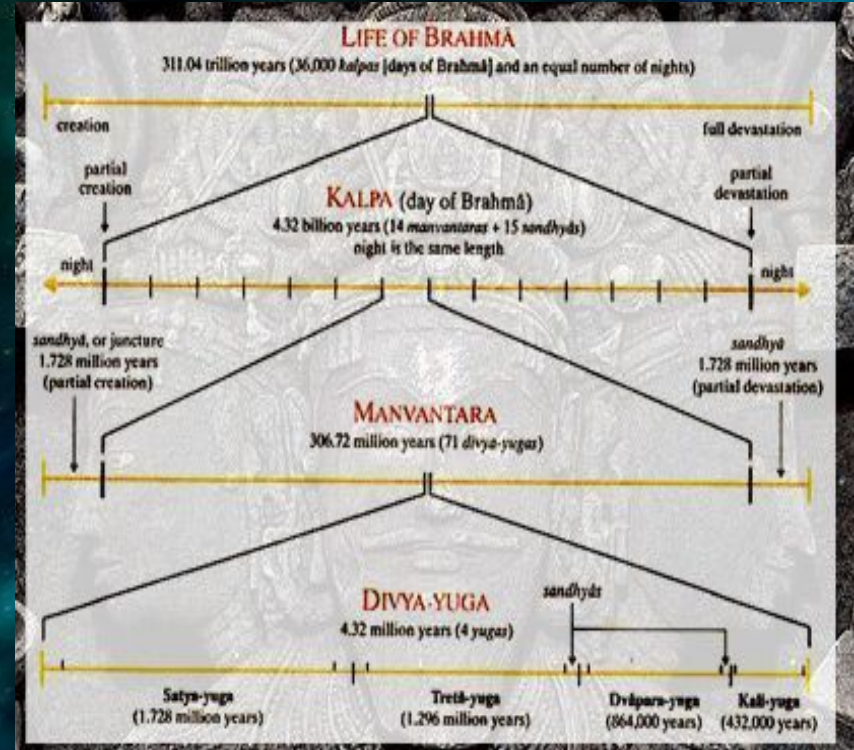


Fig. 7. Each Kalpa is composed of many other cycles.
www./

Side of Science

Cosmic Microwave Background (CMB)

- Universe was hot and dense, light couldn't travel (Soter & Tyson).
- CMB early temperature patterns and tiny fluctuations tell how universe expanded.
- Light traces back ~380,000 years after Big Bang (Cosmic Microwave Background (CMB) radiation).

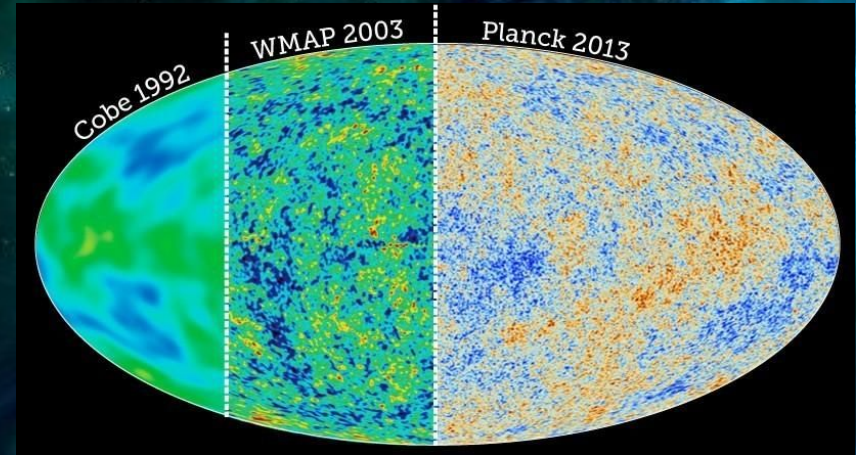


Fig. 8. Cosmic microwave background with improved resolution.
www.astroblogs.nl/2018/11/11/hoeveel-fotonen-van-de-oerknal-zit-ten-er-in-een-kubieke-centimeter/.

The Age of the Universe

- Cosmic time is estimated from universal expansion. It spans the Big Bang to today (Jalal, 2026).
- Scientists say ~13.8 billion years (Cosmic timeline - NASA science 2025):
- Oldest light (CMB),
- Hubble constant,
- Supernovae

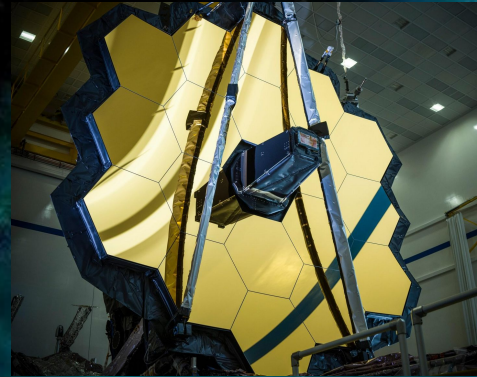


Fig. 9. The James Webb telescope has gathered information about the early universe.

www.nasa.gov/universe/nasas-james-webb-space-telescope-completes-comprehensive-systems-test/.



Fig. 10. Timeframe from the Big Bang onward.
chandra.harvard.edu/resources/illustrations/cosmic_timeline.html.¹²

Expansion of the Universe

- Galaxies are moving away from each other, proportional to distance (Schreiber, n.d.).
- Explains how fast Universe expands. (Discovering a runaway universe - NASA science 2025)
- The exact value changes as we get more measurements (Schreiber, n.d.).

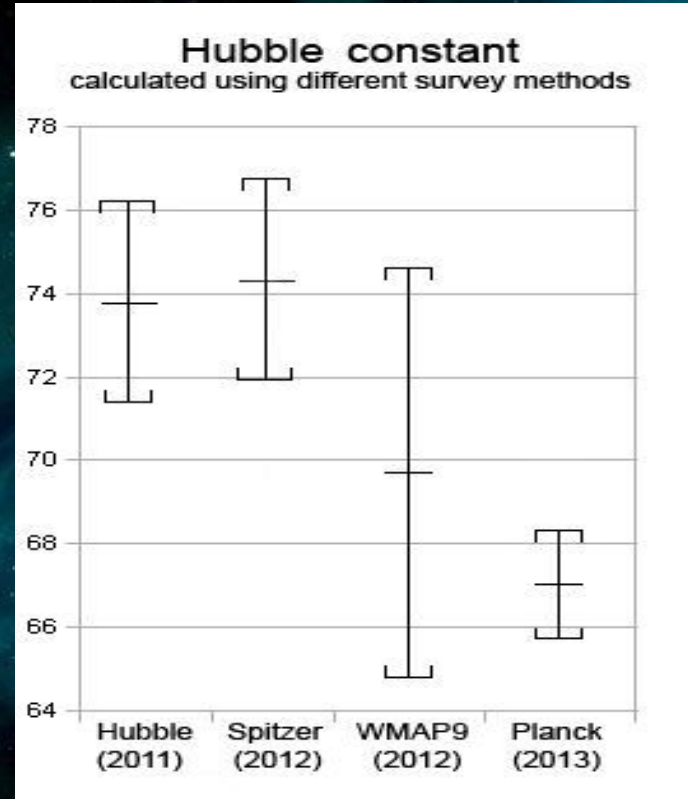


Fig. 11. The Hubble constant changes with new data.
www.physics.unlv.edu/~jeffery/astro/cosmol/hubble_tension.html.

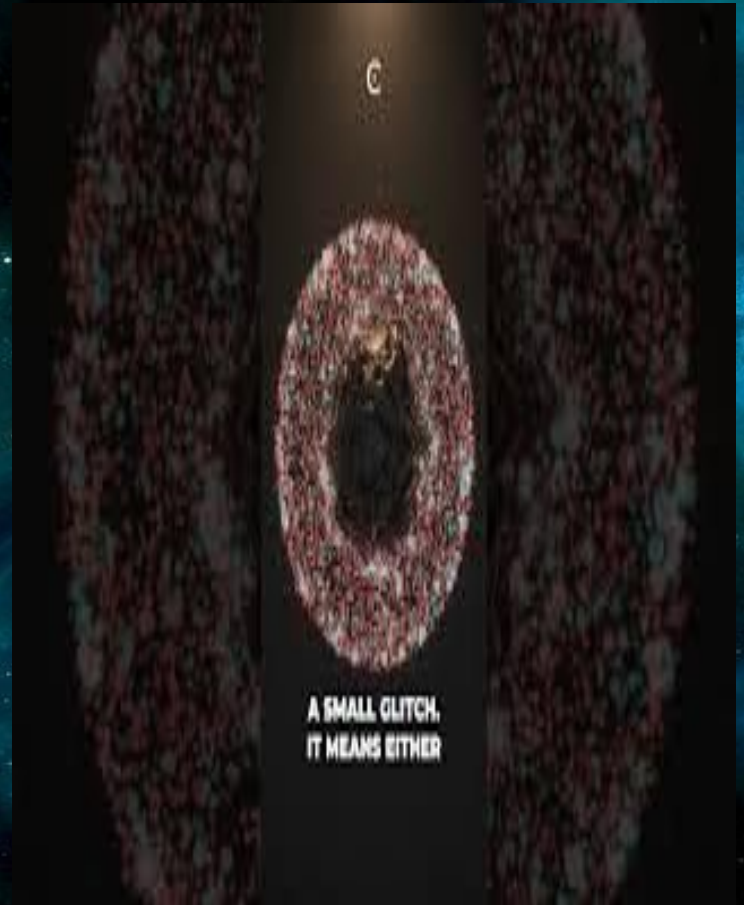
Hubble Tension

- Hubble constant isn't quite right alone
(Hubble constant and tension - NASA science 2025).

Hubble tension explains the discrepancy.

- Slower early expansion (~67–68 km/s/Mpc)
- Faster present expansion (~73–76 km/s/Mpc)

Still needs explanation (Poulin, 2025).



Supernovae

- Exploding stars release energy.
- Supernovae type Ia have consistent brightness (What is a supernova? 2021).
- Brightness changes with distance.
- Used as standards to measure distance (Supernovae n.d.).



Hindu Cosmology And Modern Scientific Time

Hindu cosmology:

- Infinite universe
- vast time scales (kalpas, yugas)

Time is in **cycles** (Raghavendra , 2023)

Modern science:

- Finite universe
- Earth \approx **4.54 billion years**

Both attempt to explain deep cosmic **time** (Raghavendra , 2023)



Fig. 12. Cosmic time concept. www./

Similarities and Differences

Similarities:

- Both explore vast cosmic time
- Both describe a changing universe
- Both attempt to explain origin and structure (S., 2025).

Differences:

- Ancient: symbolic, philosophical
- Cyclical vs mostly linear timeline
- Scientific models tested through observation (S., 2025)



Fig. 13. A nebula.

www.publicdomainpictures.net/en/view-image.php?image=565083.