

The background of the slide is a deep blue space filled with numerous small, distant stars. A brilliant, multi-colored light source, resembling a supernova or the initial expansion of the universe, is centered in the frame. From this point, a dense array of light rays radiates outwards in all directions, creating a sense of immense scale and energy. The colors of the light transition from a bright yellow-white at the center to vibrant blues, teals, and hints of purple as they spread across the dark void.

Big Bang

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What is the Big Bang?

- It's a scientific theory about how the universe started and made the stars and galaxies that we see today.
- It explains how the universe expanded from a very high-density and high-temperature state with no stars, atoms, form or structure, called singularity.
- It's said that before the Big Bang there was literally nothing at all.

History of the Big Bang

- Approximately 13,7 billion years ago, space expanded very quickly. This started the formation of atoms, which eventually led to the formation of stars and galaxies.
- In 1927 Georges Lemaître noted that an expanding universe could be traced back in time to an originating single point.
- English astronomer Fred Hoyle is credited with coining the term "Big Bang" during a 1949 BBC radio broadcast.

What's the proof that the Big Bang actually happened?

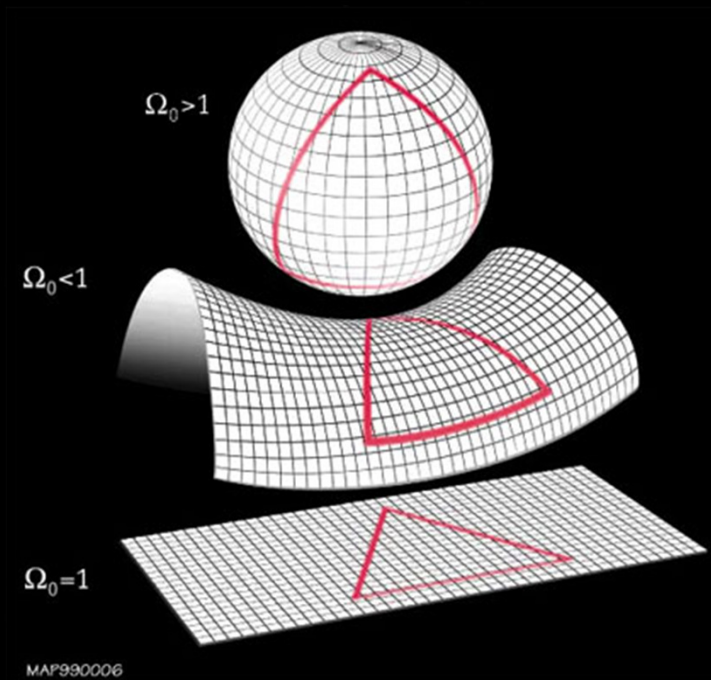
- Hubble's law: the further away a galaxy is from the earth, the faster it moves away from the earth. This supports the Big Bang theory; it suggests that the universe was once compact and is now expanding.
- Cosmic background radiation is said to be leftover radiation from the Big Bang.
- When we look at distant galaxies, it's like looking back in time because we can see how the universe has changed.
- Some elements were born because of the Big Bang. The theory predicts the amounts which were produced, and they're correct.

Problems with the Big Bang theory

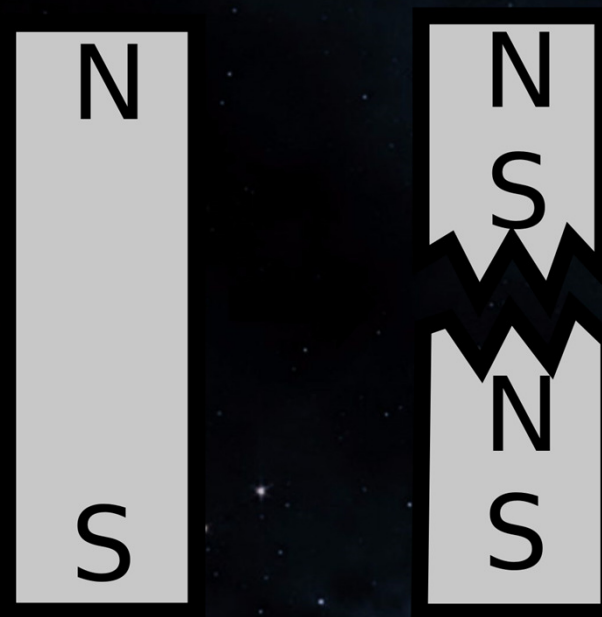
- It is said that the theory violates the laws of thermodynamics
- Baryon asymmetry: why does the universe have more matter than antimatter?
- Flatness problem: the universe appears to be close to flat, though even a small departure from the critical density grows with time; the context of Big Bang doesn't explain this.
- Horizon problem: the temperature in space is the same in every region. This shouldn't be possible.
- Monopole problem: according to the theory, there should be a lot of magnetic monopoles but they haven't been discovered in the nature yet.
- However, the Inflation theory offers explanations for these.

Pictures of the problems

Flatness problem



Magnetic monopole problem



Our future according to the Big Bang theory

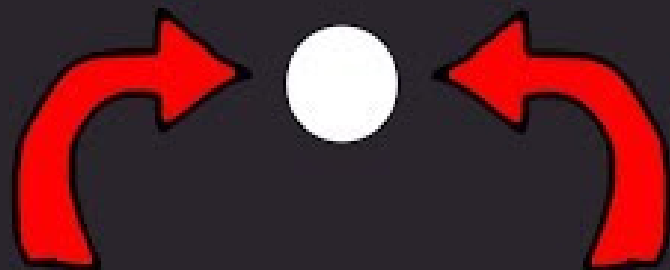
"The Big Crunch"

- The universe's mass density is bigger than the critical density
- The universe reaches maximum size, stops expanding and compacts instead
- Things will start heating up
- The universe collapses back into a small particle
- Another Big Bang is possible?

"The Big Freeze"

- The mass density is equal or below the critical density
- The expanding slows down but doesn't stop
- All the interstellar gas would be consumed so star formations would disappear, causing black holes to form.
- The temperature would reach absolute zero

BEFORE THE BIG BANG?



NOTHING?

Sources

- First picture: https://ff95bf1581c181ae3e2b-8be01e280b8e7aa4ff8eaae97998fa2c.ssl.cf1.rackcdn.com/Big-Bang-featured_160811_131610_1.jpg (6.9.2018)
- Background picture: <https://www.pixelstalk.net/dark-space-wallpapers-hd/> (5.9.2018)
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