

# The Extremely Slow Expansion in the Early Universe

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February 1, 2025

## Abstract

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300,000 years after the Big Bang, the first atoms formed. Subsequently, matter began to clump together, giving rise to stars and galaxies. As matter accumulated, its mass increased while its motion velocity decreased significantly. Simultaneously, under the influence of gravity, the expansion rate of the universe was substantially reduced, leading to a period of extremely slow expansion. During this period, stars and galaxies developed, grew, and matured. Subsequently, as temperatures continued to drop, dark energy came into play, and the universe entered a phase of slow expansion, gradually accelerating to reach the Hubble velocity.

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Keywords: Dark energy, Expansion, Hubble, Universe

The mainstream view on the origin of the universe is that it originated from a Big Bang 13.8 billion years ago. Subsequently, it has gone through stages of inflation, slow expansion, and accelerated expansion [1]. (Fig1)

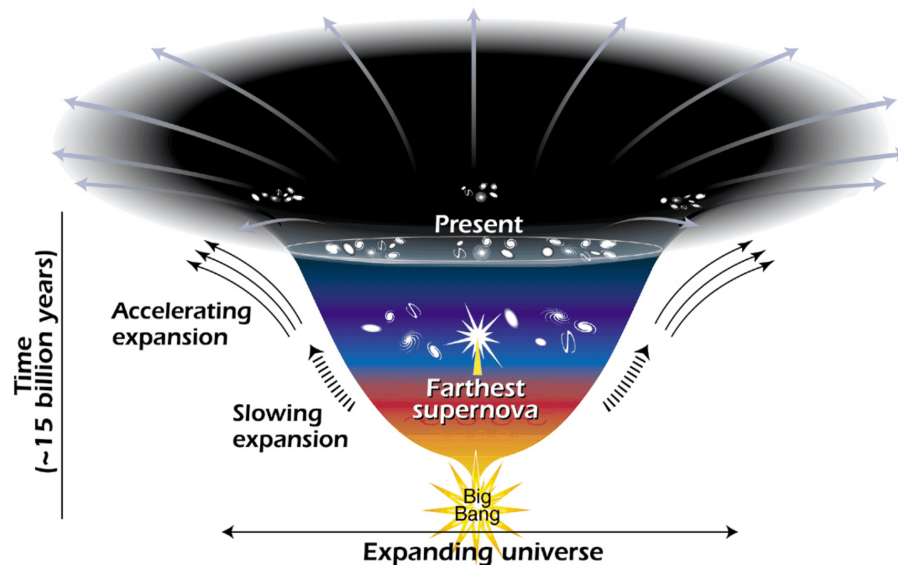


Fig 1. Image: NASA/STSci/Ann Feild

This paper hypothesizes that an era of extremely slow expansion occurred after cosmic inflation and before the slow expansion phase.

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During this period, stars and galaxies developed, grew, and matured. Subsequently, as temperatures continued to drop, dark energy came into play, and the universe entered a phase of slow expansion, gradually accelerating to reach the Hubble velocity.

Therefore, the age of the universe is over 13.8 billion years. We can find mature stars and galaxies that are older than 13.8 billion years.

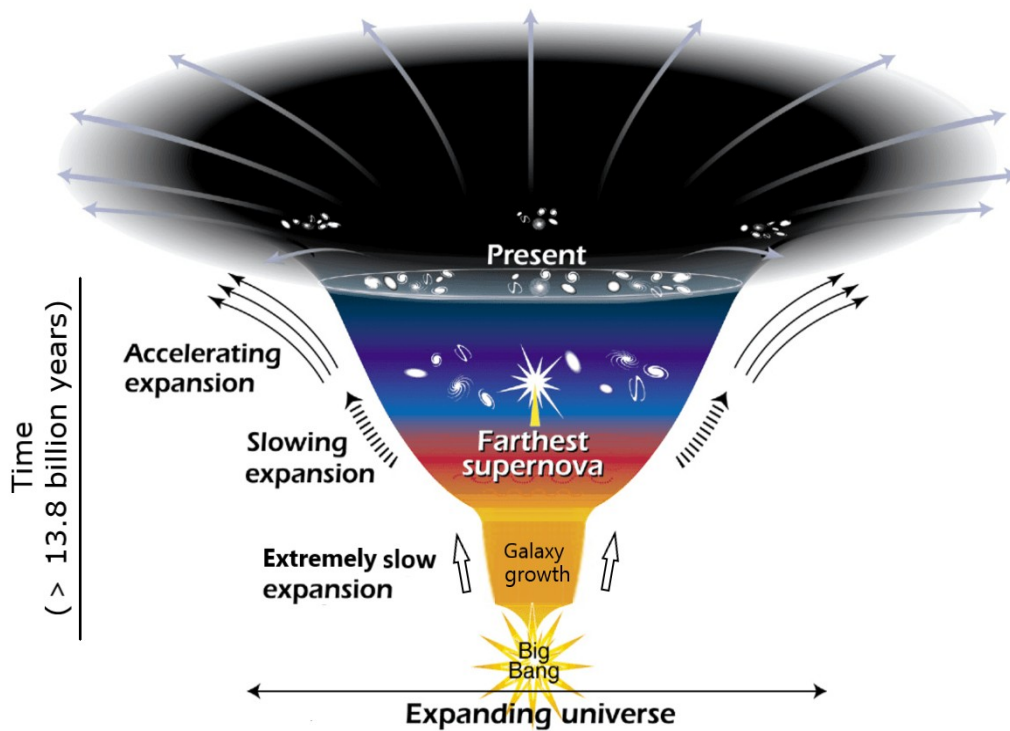


Fig2. Compared with Figure 1, an extremely slow expansion expansion stage has been added. It is during this stage that stars and galaxies develop, grow, and mature.

## Reference

- [1] Riess et al. (1998). "Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant". arXiv:astro-ph/9805201, <https://arxiv.org/abs/astro-ph/9805201>
- [2] Wang, Zhengxi. 2022. "Central Universe", viXra:2309.0001, <https://vixra.org/pdf/2309.0001v3.pdf>