

15.6: The Planck Era

One of the biggest puzzles is what occurred during the **Planck era**. This was an extremely short time span; the instant after the Universe began. This instant is so small we cannot even measure its length with modern technology. At the beginning, the Universe was extremely hot – so hot everything was pure energy; there was no initial matter. Over time, the Universe expanded, and just like the gas expanding as it comes out of a can of compressed air, the expanding Universe cooled. By the end of the first three minutes, atomic nuclei had solidified, and the Universe was a mix of electrons, light, and nuclei. **Inflation** was the sudden and dramatic expansion of the Universe thought to have occurred at the end of the Grand Unification Theory (GUT) era. Most likely, Inflation shaped the way the Universe looks today: structured and smooth. The Universe also reached a point of critical density.

The **four fundamental forces** we observe today became distinct after the era of inflation. It appears that these four forces were, at the beginning of time, united as one force ... the Grand Unification Theory.

These Four Fundamental Forces include:

- **Gravity** is the dominant force on a large scale; the weakest of the four forces.
- **Electromagnetic** is the force that dominates atomic and molecular interactions.
- **Strong** is the force which holds atomic nuclei together.
- **Weak** is the force that mediates nuclear reactions.

This page titled [15.6: The Planck Era](#) is shared under a [CC BY 4.0](#) license and was authored, remixed, and/or curated by [Lumen Learning](#) via [source content](#) that was edited to the style and standards of the LibreTexts platform.