



## In The Beginning... Evidence for the "Big Bang"

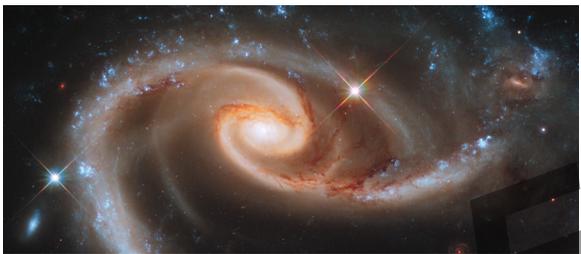
Originally, Albert Einstein believed, like most scientists of his day, that the universe was infinite into the past, without a beginning. What changed his mind?

Today, some people believe God created everything as recently as 6,000 years ago. Others think that blind chance explains why our universe is capable of supporting life. What are they missing?

The answer in both cases is recent scientific discoveries. Specifically, evidence of a beginning. And evidence that strongly supports creation by an intelligent being or, at a minimum, shows it to be nearly impossible for the universe to be an accident.

Let's start with Einstein. To make his General Theory of Relativity (GTR) work, he had to add a "fudge-factor" called the cosmological constant. This allowed the GTR to account for our universe being eternally static into the past. Then he met Fr. Georges Lemaître.

In 1927, Fr. Lemaître had put forth his theory that the universe was not static but was, in fact, expanding. While Einstein appreciated the elegant math involved, he didn't accept the idea of an expanding universe because of the far-reaching implications. Einstein recognized that an expanding universe would require a beginning.



In 1933, Einstein and Lemaître traveled together to California for a series of seminars. While there, Edwin Hubble convinced Einstein that Lemaître was correct – the universe is, in fact, expanding. Hubble had come to the same conclusion as Lemaître from a different scientific approach. He was able to show Einstein, with the help of the Mount Wilson Observatory telescope, the "red shift". This red shift proved that all observable galaxies in the universe are traveling away from our galaxy. In fact, the farther

a galaxy is from our galaxy, the faster it is traveling away from us. Einstein had to correct his GTR by removing the cosmological constant and factoring in Lemaître's math.

What was the consequence of this discovery? Lemaître reasoned that the universe had to have a beginning. An absolute beginning of the universe signifies a beginning of physical time. Since physical time conditions all physical reality (that is, physical reality does not exist without physical time), the absolute beginning of physical time must also be the absolute beginning of physical reality. Prior to the absolute beginning of physical reality, physical reality would have been nothing – utterly nonexistent.

This "nothing" could not have done anything. It could not have moved itself from nothing to something. As the ancient Greek philosophers have taught us for thousands of years, "From nothing, only nothing comes." Then how did physical reality come to exist? It must be that something beyond (transcending) physical reality did it, and this "transcendent something" is called a Creator.



Let's look at some evidence for the "Big Bang" as the creation event. In 1948, scientists Alpher, Herman and Gamow, as part of their work on Big Bang Nucleosynthesis, predicted that the universe should show remnants of the Big Bang in the form of Cosmic Microwave Background radiation. In 1965, Arno Penzias and Robert Wilson observed CMB radiation by pure accident while scanning the heavens with an antenna to map signals from the Milky Way. (For this accident, Penzias and Wilson shared a Nobel Prize in 1978.)

CMB radiation was later confirmed by two COBE satellites, the WMAP satellite and the Planck



satellite, which all show this radiation to be uniformly distributed throughout the universe and at a temperature of 2.7 degrees Kelvin, as predicted. The temperature allows scientists to date the Big Bang back to 13.8 billion years ago. "Let there be light ..."

Actually, the first light didn't appear for maybe 200 million years after the Big Bang. There is a NASA article explaining the initial light and the "red shift" mentioned above – search for "First Light & Reionization" at [jwst.nasa.gov](http://jwst.nasa.gov)

So, we have seen evidence for a beginning of the universe from:

- 1) Georges Lemaître's math
- 2) Hubble's "red shift"
- 3) CMB radiation.

Additional proof can be found in the Borde-Vilenkin-Guth Proof and other Space-Time Geometry Proofs (evaluating multiverses, bouncing universes etc. – they all require a beginning). You can get more definitive information on all of these issues by searching for this free study guide "From Nothing to Cosmos: God and Science" at [magiscenter.com](http://magiscenter.com)

## Evidence of Fine Tuning... Universal Constants and Entropy

Let's now look at universal constants and their associated anthropic coincidences. Universal constants are literally the mathematical specifications for our universe. They are the same everywhere within our universe – not just our galaxy. Anthropic coincidences are those universal constants whose values are exactly what is required for life to exist, even though the odds are highly unlikely at best. There are about 20 universal constants.

Here are a few examples:

### Entropy

(2nd law of thermodynamics – a measure of disorder. Technically, entropy is not a universal constant, but it is a recognized and measurable, statistical inevitability.)

### Speed of Light

(~186,000 m/s or ~300,000 k/s)

### Gravitational Attraction Constant

( $G = 6.67 \times 10^{-11}$ )

### Weak Force Constant

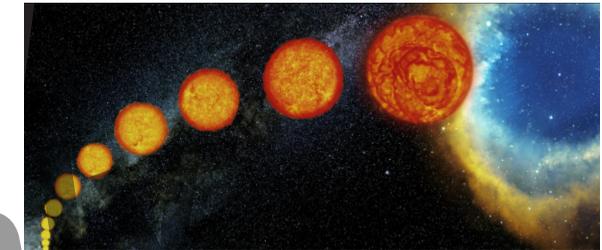
( $g_w \times 1.43 \times 10^{-62}$ )

### Strong Nuclear Force Coupling Constant

( $g_s=15$ )

### Electromagnetic Force has three associated constants:

- a) Mass of a proton ( $m_p = 1.67 \times 10^{-27}$  kg)
- b) Mass of an electron ( $m_e = 9.11 \times 10^{-31}$  kg)
- c) Electromagnetic Charge ( $e + 1.6 \times 10^{-19}$  C)



What is the likelihood that, at the Big Bang, these constants had just the right values for life to develop and continue to exist (i.e., the anthropic values)? Let's consider Entropy, the law of disorder, before we get to the universal constants. Entropy increases when a wind-up toy runs down. The spring inside the toy gets tight with the winding of a key and it seeks to get back to its normal state by unwinding. Once maximum disorder is attained (unwound spring), no further work can be done, the toy stops working unless someone winds it again. Same with our universe. Stars are working to heat space to a uniform temperature but they will likely burn out in the distant future. With no outside source for additional fuel, stars will be unable to do any work, like an unwound toy. We will be at a high entropy state, unable to generate or sustain life.

Scientist Roger Penrose calculated the odds of Entropy being low enough, at the Big Bang, for life to form at  $10^{10^{123}}$  to 1 against. DNA evidence is admissible in court to find a person guilty "beyond a reasonable doubt" since the odds against error are 42 billion to one. The odds against Entropy being low enough at the Big Bang to allow life to form in our universe are vastly higher – trillions of trillions of trillions to one. Is it more reasonable to conclude that the Entropy level is the result of chance or the work of an intelligent Creator fine tuning the universe?