Editorial

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Popular science commentary: the cosmo universe we know since the big bang

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Editorial

Introduction: German physicist Alexander Friedmann[1] observed the existence of singularity of Albert Einstein Field Equations of General Relativity. That gave a clue of our universe the cosmology. A Roman Catholic Priest and Belgian physicist Georges Lemaître[2] observed the recession of Nebulae and proposed that is the consequence of the singularity in 1931. In the contrary to Albert Einstein original static universe assumption, Erwin Hubble[3] was able to estimate when was the Big Bang. Initially, the singularity may be characterized as a black hole because no light can leak through the dense hot plasma, until 3 billion years later the full (Max Planck) Black Body Radiation (BBR) spectrum become available. By definition the wavelength $\lambda = vT$ is equal to the speed v (or relative speed Δv) times the period T, a source moving at a constant speed vs away from an observer X. The moving source sends out light waves at a constant frequency f_s, with a constant wavelength λ_s at the speed of light c. The observer measures the wavelength the waves, the Doppler frequency shift is given by: $f\Delta f = c\Delta v$, where Δv is the relative speed between source and observer along the line joining them, Δf is the change in frequency, c is the speed of the wave and f is the unshifted frequency of the wave emitted. that is speed times periods. One can apply the redshift first proposed by **Erwin Hubbl**e the Doppler frequency redshift to estimate measured BBR happened about 10.8 billion years ago and determine the Big Bang happened early at 13.8 billion years ago. Accepting the result, Albert Einstein decided to thank Hubble for providing the redshift data basis z for modern cosmology of Nebulae and visits the Mount Wilson Observatory where a large 60" optics is available at Pasadena LA CA. Unfortunately, Hubble suffered the stroke led to his death without received the Nobel Prize (64 years old 1889-1953). Among the universal gravitation attraction force, there are balanced repulsive forces due to the heat expansion. Another is disorder entropy that will never be decreased as noticed by another famous scientist never received the Nobel Prize.

Physics of atoms, fire, iron, water, molecules, life

Stephen Hawkins applied the quantum mechanics uncertainty principle to the Big Bang which states

$$\Delta E \Delta t \geq 1/2\hbar, \quad (1)$$

where $1/2\hbar \approx 5.27286 \times 10^{-35}\ J \cdot s$. Although the particles are not directly detectable, the cumulative effects of these particles are measurable**.** Besides Hawkins prediction of quantum fluctuation, it took a long time to condense from the big bang hot charge plasma singularity to Black holes are the ultimate monster of general relativity. conceived and named by John Wheeler,[4] into atomic physics beginning with the simplest Hydrogen, denoted by **H**, which has a positive charged nuclei called the **proton p**, Z=1, to capture an orbital electron **e.** The discovery of the neutron N=1 discovered by James Chadwick in 1932, by created a new means of nuclear transmutation, they can be doubled to form atomic Helium, He, namely

$$\text{Atomic\#}\ A = \text{Proton\#}\ Z + \text{Neutron\#}\ N \quad (2)$$

e.g. Helium **Proton Z=2; Neutron N=2;** $\mathbf{A_{Helium}} = \mathbf{Z} + \mathbf{N} = 2 + 2 = 4.$

Then, hot Helium fusion into solar energy which can produce a full el**e**ctro**m**agnetic (EM) light wave: BBR about 3 billion years later after the big bang. Thus the singularity of big bang may be called by Wheeler and Hawkins as black hole. The statement was a curious parallel of the second law of thermodynamics, which states that the entropy, or degree of disorder within an object, should also never decrease. In 1971, Stephen Hawking proposed the area theorem, which set off a series of fundamental insights about black hole mechanics. The statement was a curious parallel of the second law of thermodynamics, which states that the entropy, or degree of disorder within an object, should also never decrease. With Oxford mathematician Roger Penrose, he showed that if there was a Big Bang, the nuclear atomic number is the sum of protons Z and neutrons N. Then the Z of Helium is given as 2 as follows. Carbon is Z=6 fused by 3 Helium's, and Oxygen 8 by 4 Helium's.

$\mathbf{Z_{Helium}} = 2$; $Z_{Carbon} = 3 \times 2 = 6$, **Carbon** added one more **Helium, in other words, 4 helium's** are fused to give the $Z_{Oxygen} = \mathbf{8}$ **and with neutron 8;** the atomic number $A_{Carbon} + A_{Helium} = A_{Oxygen}$,

Iron has the symbol Fe and atomic number $A_{Fe} = 56$, where $Z_{Fe} = 26$, (3)

meaning it contains 26 protons, 26 electrons, and typically 30 neutrons in its total nucleus having 56. It is, by mass, the most common element on Earth, forming much of Earth's outer and inner core. It is the fourth most abundant element in the Earth's crust, **being mainly deposited by meteorites in its metallic state**. Thus iron power entered migration animals, through iron dusts into the turtles, elephants, birds etc. as providing the navigation direction. Now our Earth has water, heat, oxygen, iron and combustible material. Earth's molten iron core provided furthermore the magnetic field. Then, came the Phosphate becomes bio-chemical energy sources in the bacteria called mitochondria organelles entering the homo sapiens and migrating animals as biochemical energy and vegetable plants call chlorates under the solar energy.

"DoE explain supernova is the colossal explosion of a star. Scientists have identified several types of supernovae. One type, called a "core-collapse" supernova, occurs in the last stage in the life of massive stars that are at least eight times larger than our Sun. As these stars burn the fuel in their cores, they produce heat. This heat produces pressure that pushes outward against the forces of gravity that pull inward on the star. For most of the life of a star, inward gravity and outward pressure are in balance and the star is stable. But as a star burns through its fuel and begins to cool, the outward forces of pressure drop. When the pressure drops low enough in a massive star, gravity suddenly takes over and the star collapses in just seconds. This collapse produces the explosion we call a supernova.

Supernovae are so powerful they create new atomic nuclei. As a massive star collapses, it produces a shockwave that can induce fusion in the star's outer shell. These fusion reactions create new atomic nuclei in a process called nucleosynthesis. Supernovae are considered one of the original sources of the elements heavier than iron in the Universe. Even the iron in your blood can be traced back to supernovae or similar cosmic explosions from long before our Sun had formed. Supernovae are thus essential to life.

After a core collapse supernova, all that remains is a dense core and hot gas called a nebula. When stars are especially large, the core collapses into a black hole. Otherwise, the core becomes an ultra-dense neutron star.

Another type of supernova, called a thermal runaway supernova, can occur when two stars orbit each other, and one or both of those stars is a white dwarf. White dwarfs are the remains of a star roughly the size of our Sun when it runs out of fuel. If the stars in one of these binary systems collide, or if one of the white dwarfs absorbs enough matter from the other star, the white dwarf can become a supernova."

Earth & Theia: In the solar system, the twin planets are **Earth** and **Theia. The difference is** that **Theia** has no iron and rock while the **Earth** has both. In this sense, **Theia** tends to be weaker when in collision against each other. Consequently, **Theia** is left with no water and oxygen to become the current moon. That also gave the opportunity to the Earth to attract more meteorites carried with ice/water to the Earth enough to fill current five major oceans on Earth: the Pacific, Atlantic, Indian, Arctic, and Southern (Antarctic), while the number of seas is much larger, with around 50 recognized seas glob.

Conclusion

"Lastly, Iron is produced in the cores of massive stars during the final stages of nuclear fusion. When a star has exhausted lighter elements like hydrogen and helium, it eventually fuses silicon into iron. However, fusion stops at iron because it is the most stable element and does not release energy when fused. In the largest stars, this process leads to a supernova. During a supernova explosion, massive amounts of iron are released into space. This process is responsible for spreading iron throughout the universe, which later becomes part of interstellar dust and gas, planets, and other cosmic bodies.

Many meteorites, especially those classified as iron meteorites, are composed mainly of iron and nickel. These meteorites are remnants of ancient planetesimals or the cores of asteroids that broke apart during the formation of the solar system. Iron is a major component of rocky planets, including Earth. The dense core of most planets, including Earth, is largely composed of iron. This is true for other terrestrial planets like Mars and Mercury.

Cosmic dust: Small amounts of iron are also found in cosmic dust, which floats in space and can be found in the interstellar medium or around stars. This dust can eventually coalesce into planets or other birds whales bodies during star and planet formation. In summary, iron is forged in the cores of stars and distributed throughout the cosmos by supernova explosions. It then becomes a key component of planets, asteroids, and even small space particles.[5]

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Conflict of interest

Author declares that there are no conflicts of interest.

References

1. German physicist Alexander Friedmann observed the existence of singularity of Albert Einstein field equations of general relativity.
2. A Roman Catholic Priest and Belgian physicist Georges Lemaître observed the recession of Nebulae and proposed that is the consequence of the singularityin 1931.
3. Erwin Hubble was able to estimate by Redshift Doppler when was the Big Bang. Initially, the singularity may be characterized as a black hole because no light can leak through the dense hot plasma.
4. Thus the singularity of big bang may be called by John Wheeler and Supported by Stephen Hawkins as black hole. The statement was a curious parallel of the second law of thermodynamics.
5. A Netflix popular science Program, BBC TV series: "The Universe", narrative by Mr. Morgan Freeman.