

Missing Matter of the Universe Discovered by Astronomers!

Description

A recent and groundbreaking analysis of the cosmos has elucidated the long-standing conundrum regarding the whereabouts of half of the Universe's visible matter, which has previously eluded detection.

This elusive matter resides in the vast intergalactic expanse, manifesting as enormous, imperceptible clouds of ionized hydrogen. Under typical circumstances, the identification of such components would be an insurmountable challenge; however, an extensive coalition of astronomers and astrophysicists has ingeniously devised a novel technique to unveil its concealed locations amidst the stellar void.

Survey programs unequivocally corroborate the assertion that this previously unaccounted-for baryonic matter presents itself as an intergalactic mist of hydrogen, expelled to distances beyond the active cores of galaxies than had been conventionally anticipated.

"We surmise that as we venture further away from the galactic centers, we shall recover the missing gaseous constituents," states <u>astronomer Boryana Hadzhiyska</u> from the University of California, Berkeley and Lawrence Berkeley National Laboratory.

Normal baryonic matter constitutes merely 5 percent of the Universe's matter-energy composition; the remaining figures are dominated by dark matter (27 percent) and dark energy (68 percent). The ongoing Mystery of the Missing Baryonic Matter poses significant dilemmas for the scientific community.

The challenge lies in our lack of comprehensive understanding as to the distribution of this matter. Hydrogen constitutes approximately 90 percent of the Universe by atomic count and 73 percent by mass, indicating that a substantial portion of the missing baryonic matter is indeed hydrogen. Estimates suggest that over 50 percent of the Universe's hydrogen remains unaccounted for.

Astronomers Just Found Half of The Universe's Missing Hydrogen
Although hydrogen in space can emit a soft glow, its insufficient density and irradiation render it virtually undetectable in intergalactic regions. (NASA, ESA, M. Robberto (STScI/ESA) and the Hubble Space Telescope Orion Treasury Project Team)

Ionization of hydrogen by cosmic radiation can induce a faint luminosity; however, in the intergalactic medium, such gas is too sparse and the emitted light inconspicuous, complicating detection efforts.

Employing an alternative methodology, researchers have begun probing the diminutive alterations in the light permeating the cosmic microwave background—the ancient vestige of primordial luminosity pervading the expanse.

"The cosmic microwave background serves as a universal backdrop against which all cosmic observations occur," observes cosmologist Simone Ferraro from Lawrence Berkeley National Laboratory. "Thus, we can utilize it as a transilluminating source to ascertain the presence of gaseous matter."

The passage of this primordial light through the diffuse ionized hydrogen clouds can cause detectable brightening or dimming as it interacts with the electrons within the gas, a phenomenon termed the



kinematic Sunyaev-Zel'dovich effect.

Vocabulary List:

- 1. **Elucidated** /r'lu:.sr.der.trd/ (verb): Made something clear; explained.
- 2. Conundrum /kə'nʌn.drəm/ (noun): A confusing and difficult problem or question.
- 3. Corroborate /kəˈrɒb.ə.reɪt/ (verb): Confirm or give support to a statement theory or finding.
- 4. Imperceptible /, Impər'sεptəbl/ (adjective): Impossible to perceive; very slight or gradual.
- 5. Luminosity /,luː.mɪˈnɒs.ɪ.ti/ (noun): The intrinsic brightness of a celestial object.
- 6. Kinematic /,kin.ə'mæt.ik/ (adjective): Relating to the motion of bodies and the forces involved.

Comprehension Questions

1. What has recent analysis of the cosmos elucidated?

Option: The whereabouts of half of the Option: The Option: The Whereabouts of half of the Option: Th

Option: The existence of dark energy Option: The composition of dark matter Option: The density of intergalactic expanse

2. What is the main component of the elusive matter discussed in the text?

Option: Dark matter Option: Ionized hydrogen Option: Dark energy Option: Cosmic radiation

3. What percentage of the Universe's matter-energy composition is constituted by normal baryonic matter?

Option: 27% Option: 68% Option: 5% Option: 90%

4. What is the main challenge discussed regarding the missing baryonic matter?

Option: Detection in intergalactic space



Option: Distribution within galaxies Option: Interaction with dark matter Option: Absorption of cosmic radiation

5. What is the primary methodology employed to detect the missing gaseous matter?

Option: Direct observation using telescopes

Option: Analyzing data from satellites

Option: Observing alterations in cosmic microwave background

Option: Measuring planetary movements

6. What is the term used to describe the phenomenon of detectable brightening or dimming caused by the interaction of light with electrons within ionized hydrogen clouds?

Option: Cosmic radiation effect

Option: Dark energy shift

Option: Sunyaev-Zel'dovich effect

Option: Interstellar diffusion

True-False

- 7. Half of the Universe's visible matter had been previously undetected.
- 8. The missing baryonic matter is mainly composed of dark energy.
- 9. Hydrogen constitutes 73% of the Universe by mass.
- 10. Detection of ionized hydrogen in intergalactic regions is straightforward.
- 11. The cosmic microwave background is used as a source to detect gaseous matter.
- 12. The Sunyaev-Zel'dovich effect refers to the interaction of light with dark matter.

Gap-Fill

13. Hydrogen constitutes approximately	% of the Universe by atomic count.
14. The remaining percentage of the Universe's matter-e	nergy composition is dominated by dark matter (
%) and dark energy (%).
15. Estimates suggest that over	_% of the Universe's hydrogen remains



unaccounted for.	
16. Astronomer Boryana Hadzhiyska is affiliated with the University of California,	
and Lawrence Berkeley National Laboratory.	
17. Cosmologist Simone Ferraro works at Lawrence Berkeley National	
18. Researchers have ingeniously devised a novel technique to unveil the concealed locations of missing	
gaseous constituents amidst the void.	

Answer

Multiple Choice: 1. The whereabouts of half of the Universe's visible matter 2. Ionized hydrogen 3. 5% 4. Detection in intergalactic space 5. Observing alterations in cosmic microwave background 6. Sunyaev-Zel'dovich effect

True-False: 7. True 8. False 9. True 10. False 11. True 12. False **Gap-Fill:** 13. 90 14. 27 15. 50 16. Berkeley 17. Laboratory 18. stellar

CATEGORY

1. Health - LEVEL6

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