



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 [astronomer Boryana Hadzhiyska](#) 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** /ɪˈluː.sɪ.deɪ.tɪd/ (verb): Made something clear; explained.
2. **Conundrum** /kəˈnʌn.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** /,ɪmpərˈseptəbl/ (adjective): Impossible to perceive; very slight or gradual.
5. **Luminosity** /,luː.mɪˈnɒs.ɪ.ti/ (noun): The intrinsic brightness of a celestial object.
6. **Kinematic** /,kɪn.əˈmæt.ɪk/ (adjective): Relating to the motion of bodies and the forces involved.

Comprehension Questions

Multiple Choice

1. What has recent analysis of the cosmos elucidated?
Option: The whereabouts of half of the Universe's visible matter
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-energy 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

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. Which trait refers to the ability to adjust to new conditions?

Option: Cannabidiol

Option: Adaptability

Option: Therapeutic

Option: Innovative

2. What is the term for explaining or clarifying a concept?

Option: Nuanced

Option: Elucidate

Option: Imperceptible

Option: Jurisdictions

3. Which type of psychology focuses on observable behaviors?

Option: Behavioural

Option: Infiltrate



Option: Context-sensitive

Option: Kinematic

4. Changes resulting in profound shifts are known as:

Option: Engender

Option: Transformations

Option: Cognitive

Option: Luminosity

5. Which word means to increase rapidly in numbers?

Option: Conundrum

Option: Proliferates

Option: Corroborate

Option: Serendipitous

6. What term relates to processes involving perception and reasoning?

Option: Equilibrium

Option: Cognitive

Option: Cannabidiol

Option: Diligent

7. Which word describes the atmosphere or mood of a place?

Option: Ambience

Option: Culminated

Option: Antigenic

Option: Phenotype

8. What is the term used to describe areas or domains of authority?

Option: Therapeutic

Option: Efficacy

Option: Jurisdictions

Option: Assumptions

9. Something that is extremely difficult to detect is said to be:

Option: Imperceptible

Option: Kinematic

Option: Diligent

Option: Antigenic

10. What term describes the introduction of new ideas or methods?

Option: Innovative

Option: Nuanced

Option: Conundrum



Option: Elucidated

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. Many scientific theories are based on _____ that serve as starting points for research.
12. The concept of supply and demand is often used to explain market _____.
13. _____ equations describe motion without considering the forces causing it.
14. The discovery of penicillin was a _____ result of Alexander Fleming's accidental observations.
15. The professor _____ the complex theory in a way that all students could understand.
16. Solving this philosophical _____ requires deep contemplation and critical thinking.
17. Scientists seek to _____ their findings through repeated experiments and data analysis.
18. The _____ of the stars in the night sky depends on their size and temperature.
19. Months of hard work and preparation _____ in a spectacular performance.
20. Success in any field often requires a _____ work ethic and focus.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

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|---|
| 21. The effectiveness of the teaching method depended on considering the unique circumstances of each student. |
| 22. To foster a sense of unity and collaboration among team members the leader worked diligently to promote mutual respect. |
| 23. The calming music had a soothing and healing effect on the patients aiding in their recovery process. |



24. The drug's ability to produce the desired results was tested rigorously by the research team before it was approved for use.
25. The spy managed to penetrate the enemy's defenses and gather crucial information without being detected.
26. The artist's painting depicted subtle variations in color and shading showcasing the complexity of the subject.
27. The cozy cafe had a warm and inviting atmosphere making it a favorite spot for locals to relax and socialize.
28. The company's groundbreaking technology revolutionized the industry setting new standards for efficiency and creativity.
29. The study focused on the potential health benefits of the natural compound found in cannabis plants.
30. The observable traits of an organism influenced by both genetic and environmental factors make up its distinct characteristics.

Answer

Multiple Choice: 1. Adaptability 2. Elucidate 3. Behavioural 4. Transformations 5. Proliferates 6. Cognitive 7. Ambience 8. Jurisdictions 9. Imperceptible 10. Innovative

Gap-Fill: 11. Assumptions 12. Equilibrium 13. Kinematic 14. Serendipitous 15. Elucidated 16. Conundrum 17. Corroborate 18. Luminosity 19. Culminated 20. Diligent

Matching sentence: 1. Context-sensitive 2. Engender 3. Therapeutic 4. Efficacy 5. Infiltrate 6. Nuanced 7. Ambience 8. Innovative 9. Cannabidiol 10. Phenotype

CATEGORY

1. Health - LEVEL6

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