



Physicists Believe They Have Solved Proton Size Mystery

Description

In recent experiments, scientists studied the size of the proton in hydrogen atoms. They used a vacuum chamber to carry out their work.

In 2010, researchers reported the proton's radius as 0.84 femtometers. A femtometer is very small—it is one million-billionth of a meter. Later tests with heavy particles called muons confirmed this size. However, other studies gave different results.

For example, in 2018, another experiment showed a larger size. In 2019, scientists from York University measured the proton again and found it to be 0.833 femtometers. This matched the earlier 2010 result.

Now, two new studies have confirmed the proton's size once more. They used lasers to control electrons and measured energy changes. These studies also show the proton is about 0.84 femtometers.

Experts say these results should be the same no matter how scientists measure the proton. This makes the new findings important because they support the original 2010 measurement.

Vocabulary List:

1. **proton** //ˈprɒtən// (noun): a very small particle inside an atom
2. **radius** //ˈreɪdiəs// (noun): distance from the center to the edge
3. **femtometer** //ˈfɛmtəʊ,mi:tər// (noun): a very, very small unit of length
4. **vacuum** //ˈvækjuəm// (noun): a space that has almost no air
5. **confirmed** //kənˈfɜːmd// (verb): showed that an idea or result was true
6. **measurement** //ˈmeɪʒəmənt// (noun): how big, long, or small something is

Comprehension Questions

Multiple Choice

1. What did researchers report the proton's radius as in 2010?

Option: 0.84 femtometers

Option: 0.833 femtometers



Option: 1.00 femtometers

Option: 0.5 femtometers

2. What is a femtometer?

Option: One million-billionth of a meter

Option: One billionth of a meter

Option: One trillionth of a meter

Option: One hundredth of a meter

3. In what year did scientists from York University measure the proton and find it to be 0.833 femtometers?

Option: 2010

Option: 2018

Option: 2019

Option: 2020

4. What technique did the two new studies use to confirm the proton's size?

Option: Vacuum chamber

Option: Lasers to control electrons

Option: Heavy particles

Option: Chemical reactions

5. Which particles confirmed the proton's size in later tests?

Option: Electrons

Option: Photons

Option: Muons

Option: Neutrons

6. What is the proton's size as confirmed by multiple studies?

Option: 0.5 femtometers

Option: 0.84 femtometers

Option: 0.833 femtometers

Option: 0.9 femtometers

True-False

7. The proton's radius was reported as 0.84 femtometers in 2015.

8. The studies used lasers to control protons.



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9. Two new studies confirmed the proton's size once more.
 10. The results of measuring the proton's size should vary based on the method used.
 11. In 2018, an experiment showed a larger size for the proton.
 12. A femtometer is a very large measurement.

Gap-Fill

13. Researchers reported the proton's radius as 0.84 femtometers in _____.
14. A femtometer is one million-billionth of a _____.
15. The proton was measured again by scientists from York University in _____.
16. Two new studies confirmed the proton's size as approximately 0.84 _____.
17. Muons are heavy particles used to test the proton's _____.
18. Experts believe the results should be the _____ regardless of measurement method.

Answer

Multiple Choice: 1. 0.84 femtometers 2. One million-billionth of a meter 3. 2019 4. Lasers to control electrons
5. Muons

True-False: 7. False 8. False 9. True 10. False 11. True 12. False

Gap-Fill: 13. 2010 14. meter 15. 2019 16. femtometers 17. size 18. same

Vocabulary quizzes

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

1. What instrument is commonly used by astronomers to observe distant celestial objects?



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- Option: Microscope
Option: Telescope
Option: Thermometer
Option: Barometer
2. What type of spacecraft is designed to explore the surface of other planets?
Option: Orbiter
Option: Rover
Option: Satellite
Option: Probe
3. What is typically used in gaming consoles to store game data?
Option: Discs
Option: Cartridges
Option: Cloud storage
Option: Flash drives
4. What term is used for the ability of a system to imitate the functions of another system?
Option: Simulation
Option: Emulation
Option: Duplication
Option: Recreation
5. What is formed when two or more parties collaborate for a common goal?
Option: Contract
Option: Partnership
Option: Agreement
Option: Alliance
6. What term refers to improvements or new information provided for software or systems?
Option: Upgrades
Option: Updates
Option: Fixes
Option: Maintenance
7. What are tools designed for scientific measurements and observations called?
Option: Equipment
Option: Instruments
Option: Devices
Option: Machinery
8. Which element is the simplest and most abundant in the universe?
Option: Oxygen



- Option: Carbon
- Option: Hydrogen
- Option: Helium

9. What technology is used for precise cutting and measurement in various fields?

- Option: Lenses
- Option: Lasers
- Option: LEDs
- Option: Filaments

10. What term describes an event that has been postponed or rescheduled?

- Option: Accelerated
- Option: Delayed
- Option: Cancelled
- Option: Completed

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

11. The spacecraft intended to study Mars will be an _____ that remains in its orbit.

12. Studies conducted in a _____ state allow for more accurate results.

13. Astronomers often conduct _____ to gather data about celestial bodies.

14. The _____ radius is a fundamental measurement in particle physics.

15. The precise _____ of distance can be critical in scientific research.

16. Research requires specialized _____ to ensure accurate results.

17. A powerful _____ is essential for observing distant galaxies.

18. The _____ of the spacecraft was a collaborative effort between multiple teams.

19. The successful mission was due to a strong _____ between different space agencies.

20. The use of _____ has revolutionized the way scientists conduct experiments.

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

21. Scientists frequently conduct experiments in controlled environments to validate their hypotheses.



22. Software developers release an update to fix bugs and enhance features.
23. The design of the new telescope includes advanced features for better observation.
24. High-quality equipment is essential for collecting reliable data in research studies.
25. Experts in the field gathered to discuss the latest advancements in technology.
26. The partnership between universities and industries fosters innovation and research.
27. The organization conducts surveys to gather public opinion on various issues.
28. The launch of the rocket has been delayed due to unfavorable weather conditions.
29. The rover was equipped with advanced technological instruments to explore the Martian surface.
30. Hydrogen is the most abundant element in the universe and is crucial for many chemical reactions.

Answer

Multiple Choice: 1. Telescope 2. Rover 3. Cartridges 4. Emulation 5. Partnership 6. Updates 7. Instruments 8. Hydrogen 9. Lasers 10. Delayed

Gap-Fill: 11. orbiter 12. vacuum 13. surveys 14. proton 15. measurement 16. equipment 17. telescope 18. design 19. partnership 20. lasers

Matching sentence: 1. conduct 2. update 3. design 4. equipment 5. experts 6. partnership 7. surveys 8. delayed 9. rover 10. hydrogen

CATEGORY

1. Sci/Tech - LEVEL1

POST TAG

1. ESL learning
2. esl news
3. Level 1
4. proton
5. puzzle
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