Astronomers Measure Universe’s Most Violent Wind for First Time

Description

For the first time, scientists have measured the incredible speed of hot gas erupting from the heart of M82, a galaxy that forms stars at a rate ten times faster than the Milky Way. This gas is moving at speeds exceeding 3 million kilometres per hour, capable of creating a massive outflow that extends tens of thousands of light-years into space.

This significant discovery arose from the XRISM spacecraft, a joint project by JAXA and NASA. The highly sensitive Resolve instrument onboard detected X-ray emissions from superheated iron in M82’s core. These findings, published in *Nature* on March 25, address a question that has puzzled astronomers for decades: what drives the dramatic outflow seen from this nearby galaxy?

Starburst galaxies, like M82, are intriguing to researchers due to their intense activity. They consume gas reserves rapidly, creating powerful winds and enormous outflows. Understanding these phenomena is essential for grasping how galaxies evolve and how star formation operates within them.

The researchers measured the wind speed by observing how light changes when it's moving towards or away from them, known as the Doppler effect. The high-speed iron found was found to be ejecting in multiple directions, providing data that indicated an impressive wind velocity. The temperature of the gas matched predictions, reaching around 25 million degrees Celsius.

While previous theories suggested that shockwaves from supernovae and intense star formation heated surrounding gas, XRISM has confirmed that the outflow is strong enough to expel four solar masses of gas from the galaxy each year. However, it remains unclear what happens to an additional three solar masses, creating a mystery that future studies will aim to resolve.

Vocabulary List:

1. **outflow** //ˈaʊtfloʊ// (noun): a large movement of gas moving outward
2. **erupting** //ɪˈrʌptɪŋ// (verb): bursting out suddenly and with great force
3. **emissions** //ɪˈmɪʃənz// (noun): substances or energy sent out from something
4. **superheated** //ˌsuːpərˈhiːtɪd// (adjective): heated to a much higher temperature than normal
5. **velocity** //vəˈlɑsəti// (noun): how fast something moves in a direction
6. **expel** //ɪkˈspɛl// (verb): to force something out from a place

Comprehension Questions

Multiple Choice

1. What galaxy is discussed in the text?

   Option: Andromeda
   Option: Milky Way
   Option: M82
   Option: Whirlpool Galaxy

2. What is the speed of the hot gas erupting from M82?

   Option: 1 million kilometres per hour
   Option: 2 million kilometres per hour
   Option: 3 million kilometres per hour
   Option: 4 million kilometres per hour

3. Which spacecraft was involved in the discovery?

   Option: Hubble Space Telescope
   Option: Chandra X-ray Observatory
   Option: XRISM spacecraft
   Option: James Webb Space Telescope

4. Which instrument onboard XRISM detected X-ray emissions?

   Option: Resolve
   Option: Spectrometer
   Option: Imager
   Option: Analyzer

5. On what date were the findings published?

   Option: March 25
   Option: April 1
   Option: February 15
   Option: January 10

6. How many solar masses of gas does the outflow expel from the galaxy each year?

   Option: Three
   Option: Four
   Option: Five
   Option: Six

True-False

7. M82 forms stars at a rate ten times slower than the Milky Way.

8. The temperature of the gas in M82 is around 25 million degrees Celsius.

9. The Doppler effect is used to measure the wind speed.

10. XRISM is a project solely by NASA.

11. Previous theories suggested that supernovae shockwaves may influence surrounding gas.

12. M82 is not a starburst galaxy.

Gap-Fill

13. The gas in M82 is moving at speeds exceeding _____ million kilometres per hour.

14. The significant discovery was made using the XRISM _____ spacecraft.

15. X-ray emissions were detected from superheated _____ in M82's core.

16. The researchers believe that the outflow can expel _____ solar masses of gas from the galaxy each year.

17. The temperature of the gas reaches around _____ million degrees Celsius.

18. Understanding the outflow helps grasp how galaxies _____ and how star formation operates.

Answer

Multiple Choice: 1. M82 2. 3 million kilometres per hour 3. XRISM spacecraft 4. Resolve 5. March 25 6. Four
True-False: 7. False 8. True 9. True 10. False 11. True 12. False
Gap-Fill: 13. 3 14. spacecraft 15. iron 16. four 17. 25 18. evolve

CATEGORY

1. Sci/Tech - LEVEL5

POST TAG

1. C1
2. ESL learning
3. esl news
4. first time
5. Level 5
6. universe
7. violent wind

Tags

1. C1
2. ESL learning
3. esl news
4. first time
5. Level 5
6. universe
7. violent wind

Date Created
2026/03/30
Author
aimeeyoung99