‘Lost’ satellite unveils cosmic recipe for nearby universe

This composite image provided by NASA on August 20, 2008 shows the active galaxy NGC 1275 (Perseus A).

Data captured by a ‘lost’ satellite mission has provided scientists with vital information about gases in a galaxy cluster 240 million light years from Earth.

The Japanese Hitomi X-ray satellite, developed jointly by NASA and the Japan Aerospace Exploration Agency (JAXA), has given astronomers an important insight into the Perseus galaxy cluster — a collection of thousands of galaxies orbiting within a thin hot gas.

The Hitomi mission, involving University of Southampton in the United Kingdom, came to an abrupt end because of problems with its altitude control system. However, the data it captured during its 38 days in space has allowed scientists to analyse the composition of the Perseus gases and gain a deeper understanding of the stellar explosions that created them.

The gas in the Perseus cluster averages 50 million degrees Celsius and is the source of the cluster’s X-ray emission.

Using Hitomi’s high-resolution Soft X-ray Spectrometer (SXS) instrument, researchers observed the cluster between February 25 and March 6, last year, acquiring a total exposure of nearly 3.4 days.

The SXS observed an unprecedented spectrum, revealing a landscape of X-ray peaks emitted from various chemical elements with a resolution 30 times better than previously seen.

In a paper published in the journal *Nature*, researchers show that the proportions of elements found in the cluster are nearly identical to what astronomers see in our Sun.

One group of elements is closely tied to a particular class of stellar explosion, called Type Ia supernovas. These explosions entail the total destruction of a white dwarf, a compact remnant produced by stars like the Sun.

These blasts are thought to be responsible for producing most of the universe’s chromium, manganese, iron and nickel — metals collectively known as ‘iron-peak’ elements.

The study suggests that the same combination of Type Ia supernovas producing iron-peak elements in our solar system also produced these metals in the cluster’s gas.

This means both the solar system and the Perseus cluster experienced broadly similar chemical evolution, suggesting that the processes forming stars — and the systems that became Type Ia supernovas — were comparable in both locations.

“Despite the failure of the mission soon after launch, the precious few observations that we did obtain have proven to be transformational for our understanding of superheated cosmic plasmas,” said Poshak Gandhi, astronomer at the University of Southampton.

“Such plasmas outweigh known galaxies in clusters 10 to one, so are an essential component to our complete understanding of the universe,” said Mr. Gandhi, who was among a 200-strong team of scientists involved in the international collaboration.

crackIAS.com

Tux brushing tussar, cards being exchanged like cocaine packets, billionaires mingled at Illuminating India

END

Downloaded from **crackIAS.com**

© **Zuccess App** by crackIAS.com

crackIAS.com