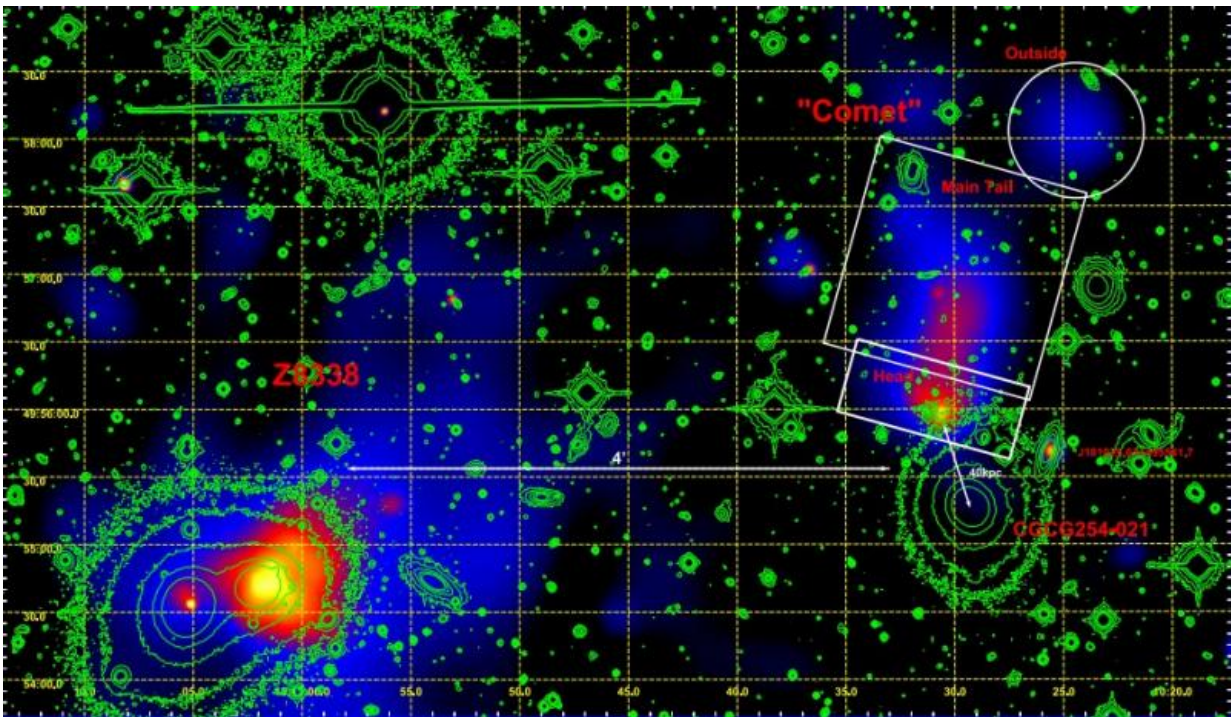


Astronomers discover the longest galaxy-scale stripping process ever observed

November 7 2015, by Tomasz Nowakowski



Adaptively smoothed X-ray image of galaxy cluster Zwicky 8338. Credit: Gerrit Schellenberger, Thomas Reiprich.

(Phys.org)—Astronomers from the University of Bonn in Germany, have discovered what appears to be the longest X-ray tail associated with a stripping process from a galaxy on a large scale. This galaxy with the enormous X-ray tail is a member of a galaxy cluster known as Zwicky

8338. The researchers detailed their findings in a paper published on Nov. 2 in the *Astronomy & Astrophysics* journal.

Gerrit Schellenberger and Thomas Reiprich observed Zwicky 8338 using NASA's Chandra X-ray observatory. They found out that one of the [galaxies](#) grouped in this cluster showcases a very long X-ray [tail](#), which is approximately 248,000 light years in length. What is surprising is that the galaxy must have lost all of its X-ray emitting gas very recently.

"It is likely the longest X-ray tail associated with a stripping process from a galaxy with the largest separation from the host galaxy ever detected," they wrote in the paper.

The observed galaxy, designated CGCG254-021, is located slightly more than one million light years from the center of Zwicky 8338. The researchers discovered that it resembles a comet, having distinctive features like a 'head' and a 'tail'. The head, as it is described in the paper, is brighter than the galaxy's tail, which is simply an elongated structure of diffuse emission.

The scientists indicate that in the region outside the main tail, the temperature seems to be significantly higher than any part of the tail but still much lower than in the surrounding cluster region. They found out that the head is cooler than the tail, possibly due to a dense cool core.

The researchers also tried to determine the chemical composition of this comet-like galaxy.

"Despite the large uncertainties, there might be indications that the tail has a much lower abundance of heavy elements than the head of the comet, which is again consistent with the head being the remnant of a cool core," the paper reads.

The curious case of CGCG254-021 could bring important results in the field of cosmology and could improve our understanding about galaxy clusters. The crucial role in the stripping process as seen in this comet-shaped galaxy is played by the intracluster medium (ICM). It is a very hot plasma located at the center of a [galaxy cluster](#). This plasma is enriched with heavy elements, such as iron. The researchers believe that the interaction of the ICM with subclusters or galaxy groups can produce bright X-rays and long tails such as the elongated tail described in this study.

"Halo gas and the cold inter stellar medium (ISM) from the galaxy can then be stripped and interact with the ICM. Part of the gas from the galaxy is then used for new stars, either in the galactic halo or outside the galaxy in the ICM," the researchers note.

They point out that the amount of gas that apparently has been stripped from the galaxy is very high; the galaxy could lose almost all of its gas to the ICM. If the researchers are able to confirm this through the analysis of a longer observation, there would be a chance to study in detail the properties of this interaction for such a luminous and massive object. They conclude that a deeper X-ray observation is needed to characterize more detailed properties as well as a definite scenario for the interaction history.

More information: *Astronomy & Astrophysics*,
[www.aanda.org/articles/aa/pdf/ ... 15/11/aa27317-15.pdf](http://www.aanda.org/articles/aa/pdf/.../15/11/aa27317-15.pdf)

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