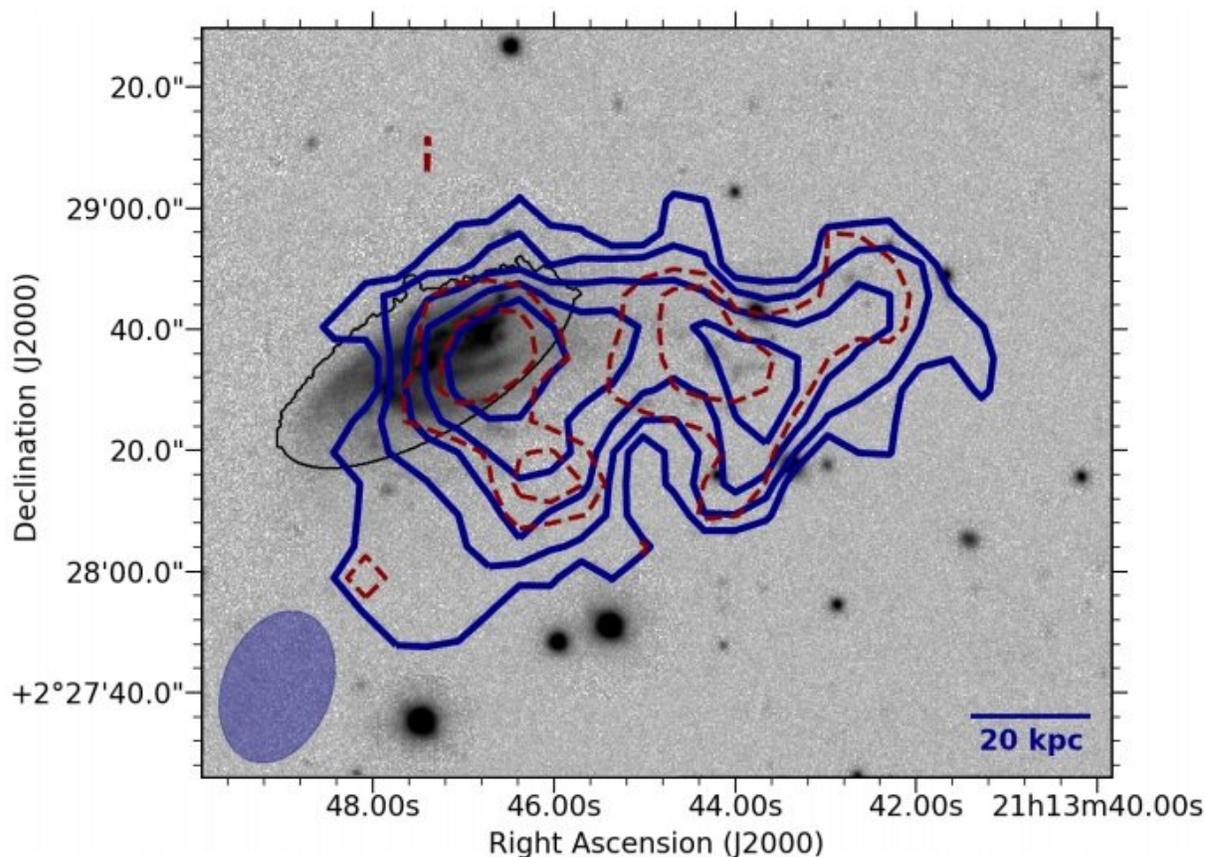


# Observations reveal gas stripping and enhanced star formation in the galaxy JO206

June 19 2019, by Tomasz Nowakowski



The VLA Hi column density contours overlaid on the V-band image of JO206 from WINGS (V-band image from Moretti et al. 2014). Credit: Ramatsoku et al., 2019.

Using the Very Large Array (VLA), astronomers have conducted

observations of neutral gas in the galaxy JO206. Results of these observations provide important information regarding gas stripping and enhanced star formation in this galaxy. The findings are detailed in a paper published June 9 on arXiv.org.

At about 85 billion solar masses, JO206 is a massive "jellyfish" galaxy hosting an active galactic nucleus (AGN) and a member of the IIZw108 galaxy cluster at a redshift of approximately 0.049. The so-called jellyfish galaxies have one-sided tails seemingly stripped from the galaxy's main body.

In the case of JO206, astronomers have assigned the highest jellyfish morphological classification of 5.0 as it showcases the most recognizable tail of debris material that is apparently stripped from the main body. The stripped tail of material is thought to be the result of ram-pressure stripping due to the intra-cluster medium (ICM) of IIZw108.

Studies of jellyfish galaxies, in particular the examination of [star formation](#) activity during the process of gas stripping, could be crucial in improving the understanding of galactic evolution in general. One method of such studies is the investigation of neutral atomic hydrogen (HI) in these galaxies.

Recently, a team of astronomers led by Mpati Ramatsoku of the Astronomical Observatory of Cagliari in Italy used this technique to study JO206. The research was focused on the galaxy's long tail of ionized gas and how this feature affects the interstellar medium, as well as star formation activity. The [observational campaign](#) was carried out using the VLA telescope as part of the GAs Stripping Phenomena survey (GASP).

"As part of the ESO MUSE GASP survey, we have studied the HI gas phase of the prototypical 'jellyfish' galaxy in the sample, namely,

JO206," the astronomers wrote in the paper.

According to the study, the neutral atomic hydrogen distribution in JO206 is perturbed and exhibits a one-sided HI tail from the optical disc. The tail extends over 293,000 light years and has an HI mass of about 1.8 billion solar masses. This means that the tail's neutral gas mass currently constitutes about 60 percent of the whole galaxy's HI mass.

The research found that JO206 is generally undergoing an enhanced star formation activity compared to similar galaxies with the same stellar mass. JO206's HI depletion time was estimated to be 500 million years, which is shorter than that of ordinary spiral galaxies observed to date.

Moreover, the astronomers detected a strong correlation between the observed cold gas and ionized emission in JO206, seen both in the galaxy main body and the tail. "This indicates a strong link between the presence of cold gas and the recent star formation across all of the galaxy," the scientists concluded.

In addition, the study also found that that the star formation efficiency in the disc of JO206 is on average about 10 times higher compared to the tail for a given HI surface density. The researchers noted that in general, the inner and outer parts of JO206 have relatively higher star formation efficiencies compared to other [galaxies](#) in the literature.

Summing up the research, the authors of the paper concluded that JO206, at its current stripping stage, still has fuel to form new [stars](#) along its tail and disc. "Comparing this galaxy with others in the GASP sample in different environments will clarify whether the environment played a pivotal role in the enhanced observed star formation or whether other specific physical conditions are responsible," the astronomers wrote.

**More information:** M Ramatsoku et al. GASP XVII. HI imaging of

the jellyfish galaxy JO206: gas stripping and enhanced star formation.,  
*Monthly Notices of the Royal Astronomical Society* (2019). DOI:  
[10.1093/mnras/stz1609](https://doi.org/10.1093/mnras/stz1609) , [arxiv.org/abs/1906.03686](https://arxiv.org/abs/1906.03686)

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