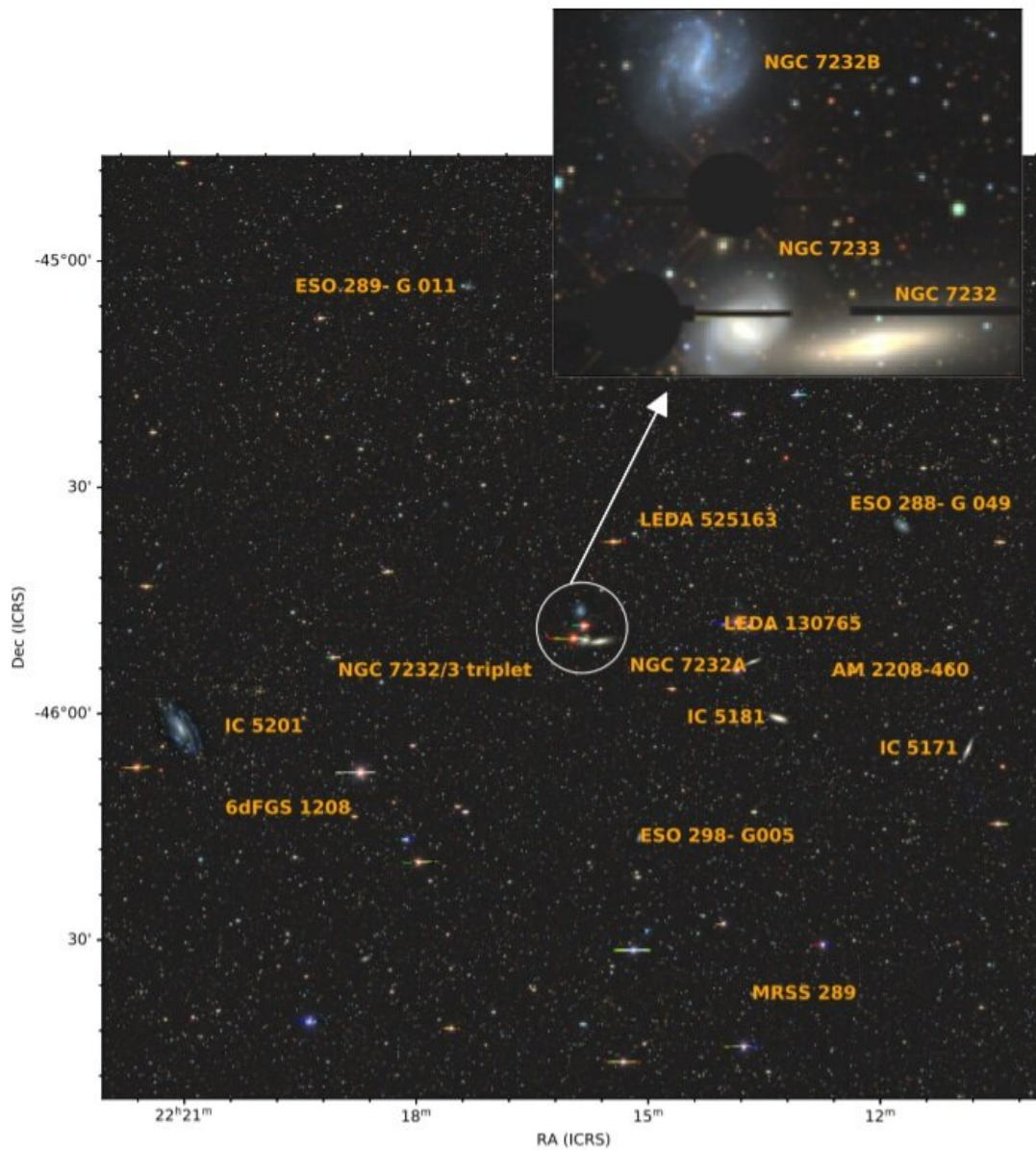


Tidal debris detected in a nearby galaxy group

May 31 2021, by Tomasz Nowakowski



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Using the MeerKAT telescope, an international team of astronomers has identified wide-spread tidal debris in a nearby galaxy group known as NGC 7232. The newly found structure is composed of cold neutral atomic hydrogen and extends over 450,000 light years. The finding is reported in a paper published May 21 on arXiv.org.

Studies show that signatures of interaction between galaxies are seen in the form of, for instance, the length and shape of tidal tails, bridges and other debris. When two galaxies orbit each other, tidal forces distort each galaxy, and these distorted regions are then ejected into intergalactic space, forming tidal tails.

Studying such features could be essential for improving our understanding about how galaxies interact with each other. Their observations have the potential even to disclose important information on galactic collisions and mergers.

At a distance of some 78 million [light years](#), NGC 7232 is a nearby galaxy group estimated to consist of at least 19 member galaxies. It showcases a multitude of gaseous features, apparent galaxy interactions, as well as gas-rich and gas-poor galaxies. This makes NGC 7232 an excellent target for observations aimed at investigating how such interactions may impact galaxy evolution.

Therefore, a team of astronomers led by Brenda Namumba of Rhodes University in Makhanda, South Africa, has employed the MeerKAT radio telescope in order to search for the signs of tidal debris in this galaxy group.

"We observed the nearby NGC 7232 galaxy group at 1.4 GHz with MeerKAT using the 4k mode (44 km/s). At comparable velocity resolution, the sensitivity of MeerKAT allows us to reach a 5-times lower rms compared to the published ASKAP data," the researchers wrote.

The observations detected extended debris of cold neutral atomic hydrogen (HI) around the core triplet galaxies in NGC 7232—known as NGC 7232/3 (consists of three spiral galaxies: NGC 7232, NGC 7232B and NGC 7233). The newly found streams extend over 20 arcminutes, or approximately 456,000 light years, what is around three times the neutral atomic hydrogen extent of the galaxy triplet.

The HI tidal debris contains an atomic hydrogen mass of 4.5 billion solar masses. This is more than a half of the total HI mass of the galaxy triplet. According to the authors of the paper, this finding provides a new understanding of where the gas resides within the core galaxy triplet and shows how galaxy interactions play an important role in the evolution of [galaxies](#) in NGC 7232.

The study also found that within NGC 7232/3, NGC 7233 and NGC 7232 have lost a significant amount of atomic hydrogen, while NGC 7232B appears to have an excess of this gas. However, they noted that in general the NGC 7232/3 galaxy triplet is not HI deficient.

In concluding remarks, the astronomers underlined that their observations look promising when it comes to further studies of star formation and atomic [hydrogen](#) distribution in galaxy groups.

"Based on the success of our MeerKAT-64 observations, we look forward to a much larger project mapping the star formation and HI gas distribution within nearby galaxy groups to assess their evolutionary state and formation history," the researchers wrote.

More information: MeerKAT-64 discovers wide-spread tidal debris in the nearby NGC 7232 galaxy group, arXiv:2105.10428 [astro-ph.GA] arxiv.org/abs/2105.10428

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