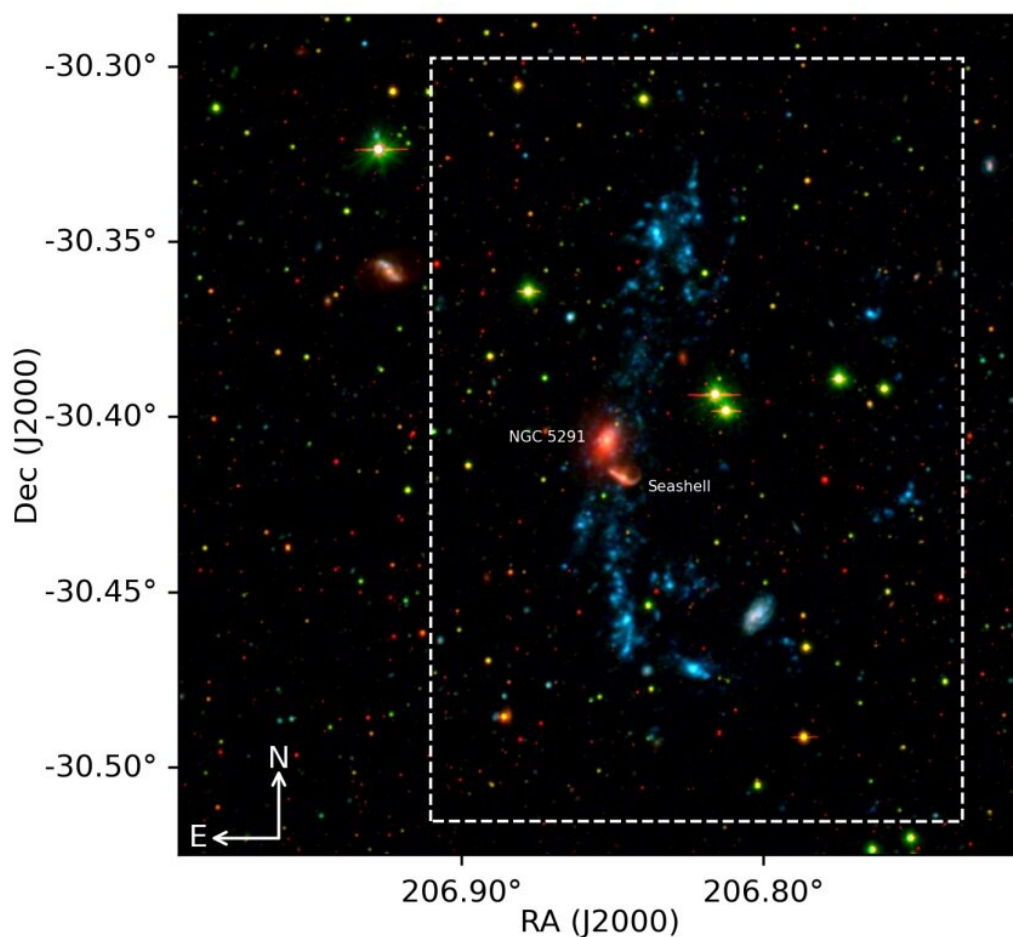


Star-forming activity in the interacting galaxy system NGC 5291 investigated with AstroSat

April 25 2023, by Tomasz Nowakowski



Color composite image of the NGC 5291 system. Credit: R. Rakhi et al, 2023

An international team of astronomers have employed India's AstroSat spacecraft to observe a system of interacting galaxies known as NGC 5291. Results of the observational campaign, published April 6 in the *Monthly Notices of the Royal Astronomical Society*, yield crucial information regarding star-formation activity in this system.

Located some 62 million light years away in the western outskirts of the galaxy cluster Abell 3574, NGC 5291 is an interacting galaxy system consisting of an early type galaxy NGC 5291 and a companion galaxy called "the Seashell" interacting with it. The system has extensions or tails, defined by knots, emerging from the galaxy.

Previous observations of the NGC 5291 revealed a giant collisional HI (neutral atomic hydrogen) [ring structure](#) connected to the system, indicating that the observed knots are star-forming complexes that may even be young tidal dwarf [galaxies](#). Further inspection of the system found that these knots are in fact young tidal dwarf galaxies (TDGs) formed from the pre-enriched gas in the tidal debris.

A group of astronomers led by R. Rakhi of the NSS College in Pandalam, India, decided to take a closer look at the star-forming activity in the knots of NGC 5291. They used AstroSat's Ultraviolet Imaging Telescope (UVIT) to conduct high-resolution ultraviolet imaging observations of the system.

"The main aim of the paper is to identify and characterize the star forming knots in the tidal tails and determine the star formation rates in these knots at the best possible resolution, taking into account dust attenuation of the ultraviolet spectrum," the researchers explained.

The observations identified a total of 57 star-forming knots that are part of the NGC 5291 interacting system, out of which 12 turned out to be new detections. The sizes of these knots range from 4,500 to 37,000

[light years](#).

The astronomers calculated the total extinction-corrected star-formation rate (SFR) of the knots, excluding the NGC 5291 and Seashell galaxies. They found that the knots form stars at a level of approximately 1.75 solar masses per year. The SFR of NGC 5291 and the Seashell galaxy is estimated to be 1.93 and 1.16 solar masses per year, respectively. It was noted that three known tidal dwarf galaxies in the system, located to the north (NGC 5291N), south (NGC 5291S) and south-west (NGC 5291SW), have relatively low SFR values of 0.3, 0.3 and 0.22 solar masses per year, respectively.

The researchers compared the SFR of NGC 5291's knots with other dwarf galaxies. They found that many of these knots have SFR values comparable to that of blue compact dwarf (BCD) galaxies.

"Many of the [knots](#) associated with the NGC 5291 system have high SFRs similar to BCD galaxies; this is characteristic of Category 1 TDGs," the authors of the paper concluded.

More information: R Rakhi et al, UVIT view of NGC 5291: Ongoing star formation in tidal dwarf galaxies at ~ 0.35 kpc resolution, *Monthly Notices of the Royal Astronomical Society* (2023). [DOI: 10.1093/mnras/stad970](#). On *arXiv*: arxiv.org/abs/2304.07244

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