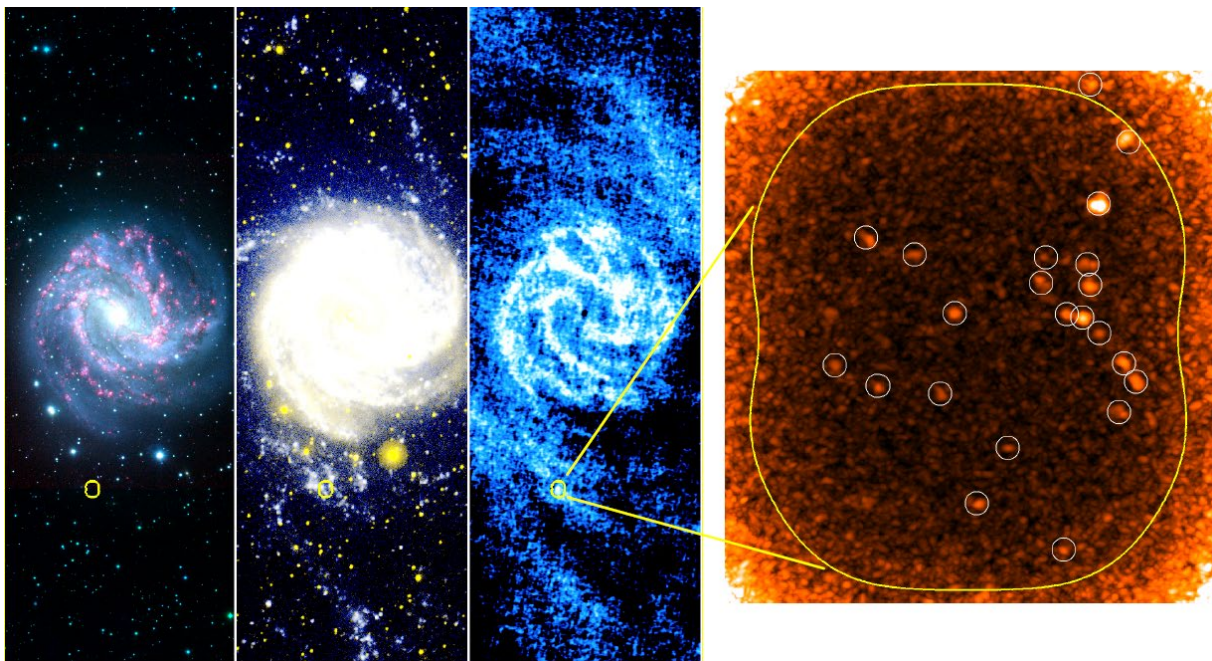


**January 8, 2024 – AAS News-** The mystery of star formation in galaxies continues to intrigue astronomers worldwide. Yet a key question remains just how and why and where do stars form in the Universe? A new discovery from an international team of astronomers provides a significant clue to star formation.

Led by Jin Koda, Professor in the Department of Physics and Astronomy, the research team used the Atacama Large Millimeter/submillimeter Array (ALMA) and investigated the far edge of the spiral galaxy M83, at a distance of 15 million light years from earth. They uncovered 23 concentrations of a dense molecular gas called “molecular clouds,” which are evidence of the birthing region of stars.

Molecular clouds are a typical site for star formation in the inner parts of galaxies. When it comes to the far edges of many galaxies, scientists had yet to understand how and why stars form because they could not pinpoint their formation sites. Yet, a surprising number of very young stars are known to exist at the far edges of many galaxies. The discovery of these 23 molecular clouds appears different from their counterparts in the typical star-forming sites in galaxies. The large bodies of these clouds were not visible like “normal” molecular clouds—only their star-forming dense cores, the "hearts" of the clouds, were observed. This new research finding opens the door to a better understanding of the process of star formation in the Universe in general.



**Caption:**

*Research on the far edge of galaxy M83 reveals unusual star formation in an extreme environment. This area, outlined in yellow, is shown in data from several different instruments. From left to right: optical image from CTIO, ultraviolet image from GALEX, HI 21cm image from VLA and GBT, and CO(3-2) image from ALMA. In this last image, the star-forming “hearts” of molecular clouds, circled with white, are shown. Credit: Jin Koda*

**Reference** “First Detection of the Molecular Cloud Population in the Extended Ultraviolet Disk of M83,” Koda, J., Watson, L., Combes, F. et al 2022, *Astrophysical Journal* 941, 3