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NEWS! *from the*
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FOR IMMEDIATE RELEASE

A unique discovery: astronomers identify the first triple radio AGN

WASHINGTON, D.C. – Astronomers from the U.S. Naval Observatory are part of a team of scientists who have identified the first radio detectable triple active galactic nuclei (AGN) system by analyzing data taken by the Karl G. Jansky Very Large Array (VLA) and Very Long Baseline Array (VLBA).

Naval Observatory astronomers Ryan Pfeifle from the Earth Orientation department, along with Nathan Secrest and Barry Rothberg from the Celestial Reference Frame department, co-authored this research.

“Triple AGN systems are incredibly rare,” said Pfeifle. “Only two have been robustly confirmed until now, and radio observations were the key to revealing the true nature of this new system.” While other triple AGN are known to exist, the ability to observe all three AGNs of this system in radio wavelengths is an important part in understanding the science behind these objects beyond our galaxy.

“The detection of three radio AGNs in this system suggests that merger environments like this may be particularly conducive to producing radio AGNs,” Pfeifle continued. “Indeed, radio emission appears to be a ubiquitous property among all three known triple AGN systems.

Radio observations may therefore be an optimal way of selecting and studying more multi-AGN systems like this."

The VLA and VLBA are radio telescope arrays owned by the National Science Foundation (NSF) and operated by the National Radio Astronomy Observatory (NRAO). The Naval Observatory uses observation time on the VLBA to collect data on AGNs to determine Earth Orientation Parameters (EOPs) as well as determine the Celestial Reference Frame (CRF) used by the U.S. Government for positioning, navigation, and timing applications.

"Building a precise, stable celestial reference frame requires selection of the most astrometrically well-behaved sources," Secrest explained. "This generally means selecting distant AGNs that are compact and uncomplicated by source structure, confusion by their host galaxies, or secondary AGNs. AGNs in pairs or triples are therefore a potential source of error, so systems such as this one should be identified and studied."

As this research contributes to better methods of identification and refinement of the AGN sources for the celestial reference frame, it also contributes to a better scientific understanding of the nature of these galaxy mergers. "Identifying and studying these systems is a win-win," said Rothberg. "Each merger we identify and study across the electromagnetic spectrum improves our ability to separate good sources from bad. We improve the celestial reference frame, but studying the rejected sources adds to our understanding of the nature of these AGN and the role they play in galactic evolution."

Their research paper titled, "The First Triple Radio AGN in an Ongoing Galaxy Merger," has been published by The Astrophysical Journal Letters, a publication produced by The American Astronomical Society.

To read “The First Triple Radio AGN in an Ongoing Galaxy Merger,” go to https://iopscience.iop.org/article/10.3847/2041-8213/ae2002.

About the U.S. Naval Observatory

The United States Naval Observatory is an Echelon-IV operational command reporting to the Commander, Naval Meteorology and Oceanography Command. Its headquarters is located in Washington, D.C., with field activities located at the Naval Observatory Flagstaff Station in Flagstaff, AZ, and the USNO Alternate Master Clock located at Schriever Space Force Base near Colorado Springs, CO. The U.S. Naval Observatory provides a wide range of astronomical data and products essential for accurate navigation and the support of communications on Earth and in space.

For more information on the U.S. Naval Observatory and its mission, go to https://www.cnmoc.usff.navy.mil/usno/.

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