Reflector

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ALCon 2016: A CapitAL CONvention

What to Look at Tonight?

Building a Civilization on Mars

Earth's Circumference: Channeling Eratosthenes

DEEP-SKY OBJECTS

THE OTHER LEO TRIO

By Dr. James R. Dire, Kauai Educational Association for Science & Astronomy

It is always exciting to view multiple galaxies in the same telescopic field of view. One of the best telescopic trios consists of the three spiral galaxies M65, M66, and NGC 3628 in the constellation Leo. Under clear, dark skies, a four-inch telescope with an eyepiece yielding one-degree field of view easily captures all of these faint fuzzies together. However, an 8- to 10-inch telescope is required to resolve some of their spiral structure. M65 and M66 are 9th magnitude, while NGC 3628 is a half-magnitude fainter.

Another triplet of galaxies in the constellation Leo consists of M105, NGC 3384, and NGC 3389. These galaxies are located 8 degrees west of M65, 9.5 degrees east of Regulus, or 1.67 degrees south of the magnitude 5.5 star Kappa Leonis. These three galaxies are contained in an area spanning a mere 10 arcminutes, so higher magnification can be used when viewing all three simultaneously. With a rich-field telescope at low magnification, these galaxies can also be placed in the eyepiece simultaneously with M95 and M96!

M105's integrated magnitude is approximately the same as that of NGC 3628. However, M105's light is concentrated over a smaller area, 5 arcminutes in diameter, making it much easier to see than NGC 3628. M105 is a giant elliptical galaxy. Its Hubble galaxy classification is E1, which means it appears nearly round. M105 is thought to be 35,000 light-years in diameter and has a mass of 140–200 billion solar masses. Both its size and mass are smaller than our own Milky Way Galaxy. A black hole at the center of M105 may be 50 million solar masses, roughly ten times more massive than the black hole at the center of the Milky Way.

M105 was discovered by Messier's assistant Pierre Méchain on March 24, 1781, a few days after he discovered M95 and M96. It is unclear why M105 never made it into Messier's original catalog. It was added to the modern Messier Catalog in 1947, along with M106 and M107, by astronomer Helen Sawyer Hogg, after finding a letter by Méchain describing them.

The second brightest galaxy in the M105 trio is NGC 3384. NGC 3384 shines at magnitude 10.9. NGC 3384's angular dimensions are 5.5 x 2.5 arcminutes. William Herschel discovered the galaxy in 1784. The core of NGC 3384 is almost as bright as M105's core. However, NGC 3384's brightness drops off much faster than M105's does away from the core. NGC 3384 was originally classified as an E7 (elongated elliptical) galaxy. More recent studies classify it as SB0, a barred lenticular galaxy. Lenticular galaxies are intermediate between spirals and ellipticals. NGC 3384 has a central black hole four times the mass of that at the center of the Milky Way.

The final galaxy in the M105 trio is NGC 3389, also discovered by Herschel in 1784. NGC 3389 is a 12th-magnitude spiral galaxy 2.7 x 1.2 arcminutes in size. All three galaxies can be spied clearly together with an 8-inch or larger telescope. These galaxies are approximately 35 million light-years distant and are all part of the M96 group of galaxies, sometimes referred to as the Leo I Group.

My wide-field image of the M105 group was taken with a Stellarvue SV102T refractor (102 mm, f/7.9) using a 0.8x focal reducer/field flattener. The exposure was 40 minutes using a Canon 30D camera. The images spans about two degrees from left to right. The brightest star in the field, to the upper right of the galaxies, is SAO 99280, magnitude 6.7. The inset view of the galaxies was taken with a 190 mm f/5.3 Maksutov-Newtonian with an SBIG ST-2000XCM CCD camera. The exposure was 30 minutes.

As can be seen in the image, elliptical galaxies demonstrate no structure at the eyepiece. The galaxy NGC 3389 is too small and faint to see any spiral structure in most amateur telescopes. However, capturing all three galaxies in the same eyepiece should be on everyone's observation list during spring galaxy searches!

You can contribute to science through Variable Star observations

By Stella Kafka, *Director, American Association of Variable Star Observers*

The mission of the American Association of Variable Star Observers (AAVSO, *www.aavso.org*) is to enable anyone, anywhere, to participate in scientific discovery through variable star astronomy. For more than 100 years, the AAVSO has been building an international community of astro-enthusiasts who strive to study and to understand some of the most dynamic, unpredictable, and fun phenomena in the night sky. The AAVSO data are everywhere: in science papers, in press releases, in observing-alert responses, and in citizen science projects. The AAVSO is beyond borders—it is an international multi-cultural collaboration, as science is. Many professional astronomers took their first steps through the AAVSO. And, because of the AAVSO, many non-professional astronomers are involved in high-profile projects.

This is not to say that variable star observing is difficult. I started my Binocular Variable Stars Observing Program as a "dare" from our members, and I got addicted to it! It is fascinating to observe a star one night, estimate its magnitude, and five nights later notice that it has changed. Witnessing with my own eyes a phenomenon that is happening many light-years away (and probably has been "broadcasting" its light for millions of years) is an amazing experience. Recording those changes and submitting them to the AAVSO International Database gives me the sense that I belong to a committed international community, and the satisfaction that my data will be used some day for a research project and can make a difference. I am now working towards my 60 observations and I can't wait to get my AL Binocular Variable Stars pin.

As we have entered a golden era of time-domain astrophysics, observations from our community are an increasingly vital resource for professional astronomers to obtain ground-based light curves of variable stars. Along with the Astronomical League, the AAVSO is continuously training and encouraging observers to improve their observing skills. You can get started at your leisure with the League's Binocular and Telescopic Variable Stars Observing Programs, you can learn more through the AAVSO's CHOICE courses and seminars, and you can join our conversations through our forums. Together, we are building a community of citizen astronomers who push the boundaries of science by contributing variable star data. I hope you will join us!