MONTHLY OBSERVER'S CHALLENGE

Las Vegas Astronomical Society

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&

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NGC-3077 Elliptical Galaxy In Ursa Major

Introduction

The purpose of the Observer's Challenge is to encourage the pursuit of visual observing. It's open to everyone that's interested, and if you're able to contribute notes, and/or drawings, we'll be happy to include them in our monthly summary. We also accept digital imaging. Visual astronomy depends on what's seen through the eyepiece. Not only does it satisfy an innate curiosity, but it allows the visual observer to discover the beauty and the wonderment of the night sky. Before photography, all observations depended on what the astronomer saw in the eyepiece, and how they recorded their observations. This was done through notes and drawings, and that's the tradition we're stressing in the Observers Challenge. We're not excluding those with an interest in astrophotography, either. Your images and notes are just as welcome. The hope is that you'll read through these reports and become inspired to take more time at the eyepiece, study each object, and look for those subtle details that you might never have noticed before.

NGC-3077 Elliptical Galaxy In Ursa Major

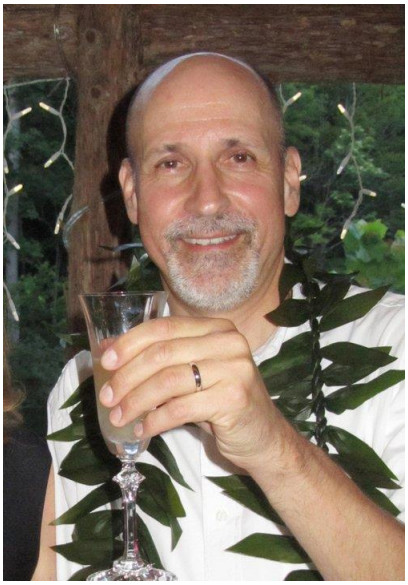
NGC-3077 is an elliptical galaxy in Ursa Major, part of a visual trio of galaxies that includes M81 and M82. It was discovered by William Herschel on November 8, 1801 and carries the Herschel designation H-286-1.

It was once designated as a Seyfert galaxy because it has an active nucleus but it no longer carries that designation due to further research.

It's often overlooked when observing M81 and M82 because it lies just outside the field and is a tad dim, though still visible in even modest telescopes at mag. 9.9 to 10.6, depending on who you reference, as a soft round-oval glow. It lies approximately 13 million light-years away. Those with low-power, wide-field eyepieces can pick up the trio of NGC-3077, M81 and M82, a spectacular view that compares to seeing the trio of M31, M32 and M110, the Andromeda galaxy complex.

Observations/Drawings/Photos

James Dire: Observer from Hawaii



NGC-3077 is a peculiar galaxy located in Ursa Major near the galaxy pair M81 and M82. The galaxy was discovered by William Herschel on November 8, 1801. Although the galaxy looks like an elliptical galaxy in the eyepiece, images of it show it has wispy edges and dark dust lanes, atypical of elliptical galaxies. Carl Seyfert included it in his list of active galaxies (now called Seyfert galaxies) in 1943. Today it is considered an irregular galaxy. Its distorted shape is probably caused by gravitational interactions with the large spiral galaxy M81, similar to Barnard's Galaxy, NGC-6822, which is equally close to the Milky Way.

Magnitude estimates for it range from 9.9 to 10.8. The galaxy is 5.3' x 4.4' in size and is located 12.8 ± 0.7 million light-years away. The galaxy is located three-quarters of a degree east-southeast of M81.

I offer three images. Image 1 was taken with a 102mm apochromatic refractor at f/6.3, using a 0.8X FF focal reducer. The camera was a Canon 30D and the exposure was 60 minutes. In all images, north is up and east to the left. Image 1 was framed to have M81 and M82 centered. NGC-3077 is labeled in the lower left-hand corner of the frame.

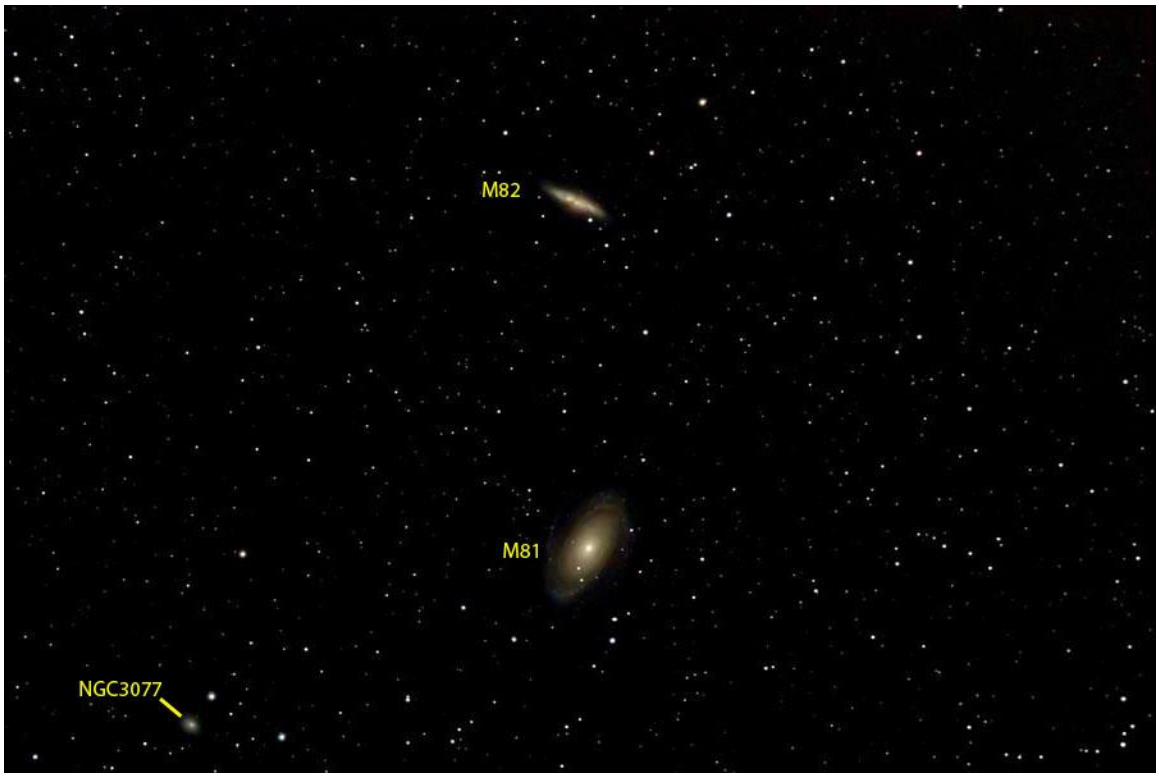


Image 2 was taken with the same optical setup, except a SBIG STF-8300C CCD camera was used. The exposure was 50 minutes. The chip size is smaller than the Canon 30D, thus M82 is not in the field of view. However, the SBIG camera has a much greater sensitivity than the Canon 30D, as apparent by the fainter stars seen in this image.

The final image was taken with a 10-inch f/6 Newtonian with a coma corrector, yielding an f/6.9 optical system. A SBIG ST-2000XCM CCD camera was used. The exposure was 100 minutes. I really need 300-400 minutes of data to bring out the wispy edges and dark dust areas of the galaxy. However, they can (barely) be seen in this short exposure. Unfortunately, time and weather didn't allow more imaging before submitting this report.

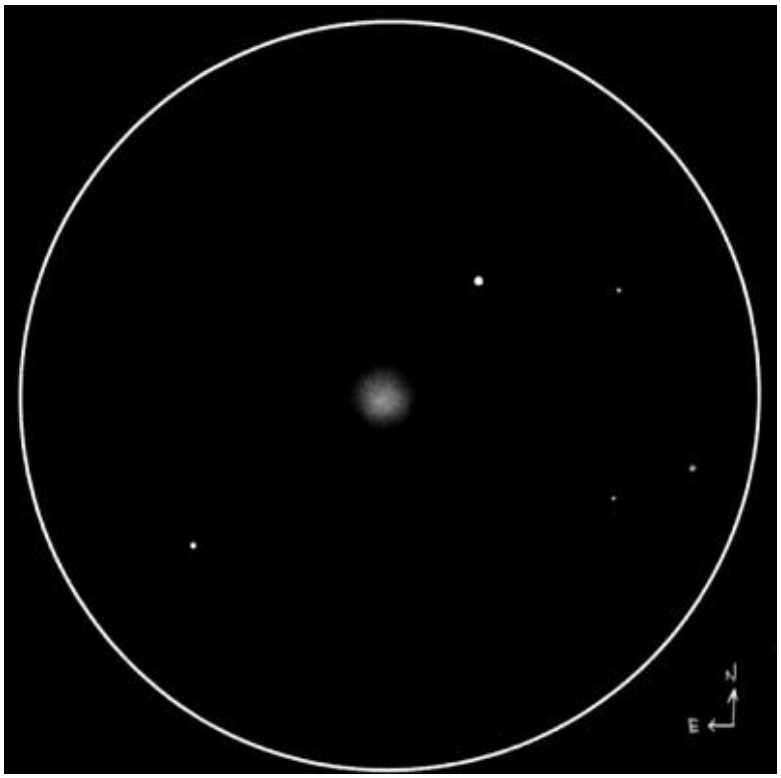
Gary Bruno: Observer from Nevada

As I pointed my 14-inch SCT toward NGC-3077, I was using low power: a 55mm eyepiece. By using low power, I get an overall and steadier view.

Four objects came into view: M81, NGC-3077, M82 and NGC-2976. M 81 is the most obvious, with its long extending arms followed by M82, which appeared as a flat disk on a slight angle. NGC-3077, our Challenge object and NGC-2976 followed. As you keep a close eye on it, NGC-3077 does a nice little dance as its light stretches and contracts. Always fun to watch.

Jaakko Saloranta: LVAS Friend and Observer from Finland

On May 6, 2016, I observed and sketched NGC-3077 using a 4.5-inch reflector. At astronomical twilight, it was +10°C, humidity ~71%, 10:23 hPa, no wind and clear skies. The altitude of the object was ~55°. It was fairly faint and fairly small, less than 2' in size, close to M81. Round, with a hint of being elliptical in NE-SW direction. It had a marginally brighter center @ 152X (16'). A bright mag. 8 star was at the NW.



Gus Johnson: Observer from Maryland

In April, 1975, I observed NGC-3077 with an 8-inch Newtonian reflector at 58X. I saw a mostly round shape, however a bit irregular. It was fairly dim, with a brighter central region.

Jay and Liz Thompson: LVAS Observers from Nevada

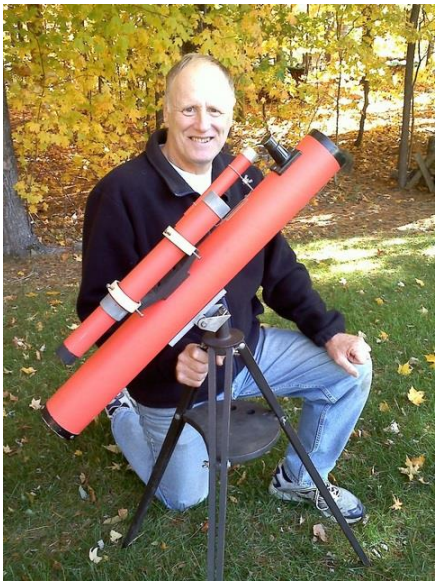
We observed NGC-3077 with 17-inch and 24-inch Newtonian reflectors from a dark-sky location (Meadview, AZ) and from the edge of the Las Vegas valley (Henderson, NV) with the 24-inch Newtonian.

Using the 17-inch under the dark skies of Meadview, AZ, the galaxy was reasonably bright, but just looked like an oblong, featureless smudge at 227X.

From Henderson with the 24-inch at 156X and 283X, it showed up as a smudge...reminiscent of the view through the 17-inch under darker skies.

In the 24-incher from Meadview, it showed a little more detail. It was about equidistant between a bright star and a fainter star. At 119X, we saw a fuzzy glow around a small, almost star-like nucleus, but it was still mostly featureless. Boosting magnification to 283X, it showed the faint star-like nucleus surrounded by a brighter coma, and then a diffuse outer region that faded out gradually to the background sky.

Glenn Chaple: Observer from Massachusetts



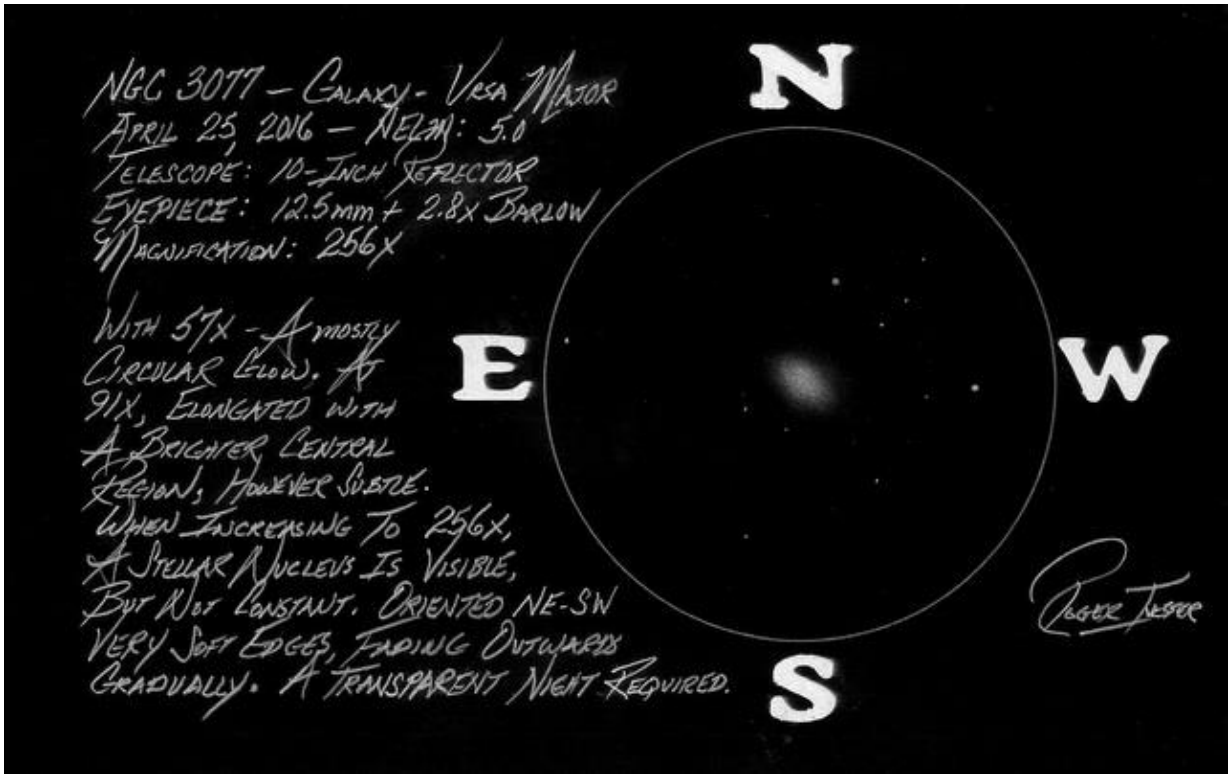
I observed NGC-3077 with a 10-inch f/5 reflector at 208X and a field of 0.3°. It seemed slightly elongated with a bright, stellar nucleus. I also saw it in a 4.5-inch f/8 reflector at 150X.

Roger Ivester: LVAS Observer from North Carolina

I observed NGC-3077 on April 25, 2016 with a 10-inch Newtonian reflector at magnifications between 57X and 256X by using primarily a 12.5mm EP and a 2.8X Barlow. The NELM that night was 5.0.

At 57X, it was fairly easy to see, appearing mostly as a circular glow. At 91X, the galaxy became elongated with a NE-SW orientation, and a brighter central region, however, it was subtle. When I increased the magnification to 256X, I saw a stellar nucleus, but could not hold it constant. The surface brightness of this galaxy is fairly low, making it difficult from my moderately light polluted backyard.

After viewing close neighboring galaxies, M81 and M82, which are much brighter and larger, NGC-3077 can be difficult, and maybe a bit disappointing.


NGC 3077 – Galaxy - Ursa Major
April 25, 2016 – NELM: 5.0
Telescope: 10-Inch Reflector
Eyepiece: 12.5mm + 2.8x Barlow
Magnification: 256x
With 57x - Atmosphy Circular Glow. At 91x, Elongated with A Brighter Central Region, However Subtle. When Increasing To 256x, A Stellar Nucleus Is Visible, But Not Constant. Oriented NE-SW Very Soft Edges, Fading Outwards Gradually. A Transparent Night Required.
N
E
W
S
Roger Ivester

Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

I've observed this object multiple times through both of my 16-inch scopes. However, for the Challenge, I'm relying on two observations, one in February of 2014 and the other in February of 2016.

On February 1, 2014, I observed NGC-3077 from the Furnace Creek airport in Death Valley at an elevation of -190 feet. It was super clear, getting cold, with slight air movement. Thought it was going to be windy after the earlier forecast of high winds in the afternoon, it never happened. Instead, the breeze ended up being slight and variable right until midnight when I gave up. The sky was pristine until sometime after 10:30 when I noticed some stars in Eridanus were starting to get halos around them on the far Western horizon. I had a feeling something was up and that was confirmed the next morning when I woke up to overcast skies again, just like the Friday previous. That one-night break was worth it though.

The galaxy was a nice, small bright oval with distinct hint of structure of some kind and a noticeable but soft core. Nice! This galaxy made an excellent trio with M81 and M82 in my big honkin' 38mm Q-70 at 48X. In fact, I based my drawing on this observation.

On February 5, 2016, I once again observed it from Furnace Creek, but this time from the golf course driving range. It was clear and calm, but getting cold fast. There was no wind or breeze at all, though a very slight one came around midnight that was just enough to move the air and make us colder. The issue was the high, thin clouds to the west and northwest that slowly crept over us during the evening. Though it appeared super dark and was gorgeous for the brighter objects, when it came to the faint fuzzies, the transparency was terrible. Halos and nebulae formed around the brighter stars for most of the sky. However, around midnight, I found a few holes in Ursa Major and Leo, which was due north and southeast. Still a great night.

This time, NGC-3077 appeared as an elongated oval with a star at the edge. I could almost see mottling at 390X. There was no distinct core at any X. It was pretty bland, but that was partially due to a white light in my eye from a nearby bathroom. That's one reason I based my drawing on that 2014 observation. Also, I wanted to show the other two major galaxies in the field of view, something even my 82° eyepieces couldn't do at those magnifications.