MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Fred Rayworth, Nevada

With

Sue French, New York, Special Advisor

Thanks to Robert Lambert, Alabama, for his dedicated work as LVAS Webmaster 2009 – 2019
RIP – You will be missed!

APRIL 2019

Report #123

NGC 2964/2968 Galaxy Pair in Leo

"Sharing Observations and Bringing Amateur Astronomers Together"

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 2964/2968 Galaxy Pair in Leo

NGC 2964 is an intermediate spiral galaxy discovered by William Herschel on December 7, 1785. It lies about 60 million light-years away. It shines at an approximate mag. 11.2 – 12.0, depending on the source.

The galaxy has four spiral arms and evidence of a weak bar. It's the brightest galaxy in a group in Leo that includes NGCs 2968, 2970, 3003, 3011, and 3021.

There's another galaxy buried within the main galaxy called MKN 404. However, not much is known about this object, and it's extremely faint.

NGC 2968 is dimmer and of a different class. There's an extremely faint bridge connecting it to the much fainter companion NGC 2970.

Below is an approximate mag. chart compiled by Sue French for NGC 2970.

V (V_T) 13.62 ± 0.14

Keep in mind that the light is all crammed into a tiny area, so the surface brightness is mag. 12.3.

Observations/Drawings/Photos

Gary Addington: Observer from North Carolina

NOTE: We'd like to welcome new member Gary Addington. Welcome Gary!

I found galaxy NGC 2964 at 102× using my 10-inch Schmidt-Newtonian telescope, but could not see NGC 2968. NGC 2964 appeared mostly round, without any detail. It was difficult, due in-part to the almost zenith position and having to find myself in all types of contorted positions to look through the finder. The surface brightness of this galaxy is extremely low. The *Interstellarum Deep-Sky Atlas* was helpful in locating this faint galaxy. The dew and moon finally took over my night. I was unable to see the tiny and very faint galaxy, NGC 2970.

Gus Johnson: Observer from Maryland

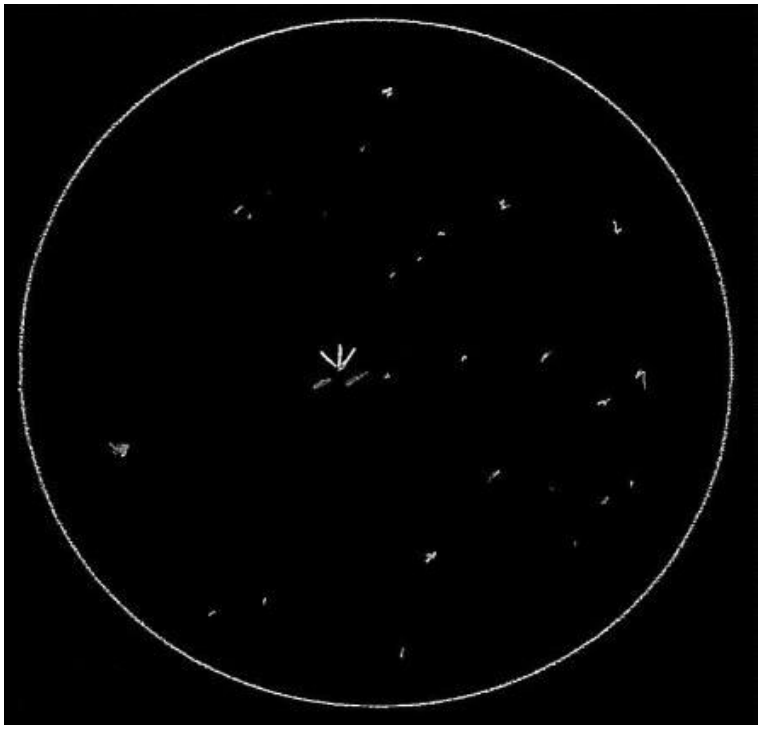
In May, 1990, I used an 8-inch Newtonian reflector @58× to observe the galaxy pair NGC 2964/68 in Leo. NGC 2964 was faint, but with a brighter middle, elongated E-W. NGC 2968 was very faint, and mostly round. Both were easily framed in the field of view.

Francisco Silva: Observer from Nevada

I observed NGC 2964 and 2968 on March 30, 2019 between 00:15 and 00:42 AM, using an 8-inch reflector at 80×. Transparency was 4 out of 5, seeing was 2 out of 5. There was no moon.

I was not able to find these galaxies myself, but thanks to Will Ribero, we found them. They look blurred and like two eyes. I wasn't able to see any details. For me, they seemed to be in Leo Minor instead of Leo, judging from the angle of my telescope.

EDITOR'S NOTE: This galaxy pair is pretty close to the Leo Minor border.



Corey Mooney: Observer from Massachusetts

I live stacked NGC 2964/2968 and 2970 during a YouTube live stream on the night of March 27, 2019 around 11:35pm.

I was using my monochrome IMX290 based camera in a 4.5 inch f/4 Newtonian on a small GOTO converted GEM mount. This small system was run in my driveway (Bortle ~5) and operated remotely from a computer indoors. The whole session was broadcast live using YouTube.

There's a link that cuts to the part where I live stacked the challenge object. The commentary is not very riveting, but it can be neat to see how the image gets refined as more stacked sub exposures are added on.

This is the resulting image. It's 90 stacked 8-second exposures at half gain, totaling 12 minutes of integration time. I flipped and removed a gradient in gimp for this report.

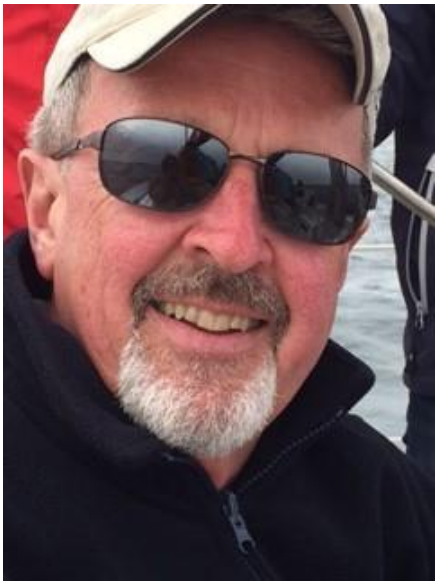
NGC 2964's beautiful spiral arms were well-defined, even in the single exposures. They were the first thing to draw my eye.

At first, I thought NGC 2968 was going to have spiral arms, like a stumpy propeller, but as more frames stacked, it became clear that the apparent shape was due to a dark dust lane cutting through the oblong galaxy. It also had a large extended faint glow, the extent of which was bigger than NGC 2964s apparent size. If I cranked the histogram stretch, this faint extension almost appeared to bridge to 2970, but at that point the background noise was so bad it was hard to tell.

NGC 2970, although smaller, fainter, and less detailed than the other two galaxies, became more interesting as the stack developed. A couple smaller (dwarf maybe?) galaxies appeared in close proximity (2 and 7 o'clock). I checked the chart, and they're all at similar distances as NGC 2970, so they should be interacting.

There are more than half a dozen small faint smudges in the background. One of them is just north of the bright mag. 10.4 star that is south of NGC 2964. The chart said it's PCG 2832069. N.E.D. said it's mag. 17.1, and 300 million light-years away. Wikipedia tells me that 300 million years ago marks the end of the carboniferous period (the swamps that gave us our coal) and the beginning of the Permian era. Pangea was still intact. Crazy to think about!

John Bishop: Observer from Massachusetts



On April 6, 2019 and April 27, 2019, I observed galaxies NGC 2964 and NGC 2968 from the ATMoB Clubhouse in Westford, MA. I observed with an 8.25-inch reflector (210/2,415, f/11.5) at 48×, 80×, 100×, 133×, and 196×. 100× and 133× gave the best views.

On April 6, conditions were favorable, until clouds rolled in and brought an early end to the observing session. Just before that happened, I located NGC 2464 and 2968. The objects were easy to locate, orienting by Telrad, and then sweeping, because they were (relatively) brighter than I expected, and easily framed together in the same FOV. I attributed the objects' brightness to good contrast and their location high in the sky at that time. As I invited a fellow observer to take a look, clouds rolled in. We watched as 2968, and then 2964, were occulted by the clouds. NGC 2964 remained visible for a time in the eyepiece, even as the sky was covered by clouds.

Total observing time was only a few minutes, but I noted a few things. NGC 2964 was larger and brighter than NGC 2968, and slightly elongated. The surface was evenly bright, without an obvious core or nucleus. NGC 2968 was smaller and more circular, which gave the impression of concentrated brightness in an object that is smaller and dimmer than NGC 2964.

On April 27, the weather reversed itself. The sky was mostly clouded over for the entire evening (as forecast), but rapidly cleared just before 11:00 P.M. (also as forecast, although we were beginning to have doubts). Once the clouds left, conditions were fair to good, except transparency varied unpredictably, noticeably affecting contrast.

NGC 2964 and 2968 were not as bright or easily viewed as they were on April 6. I had to use the finder to center the telescope on the little string of field stars in which the objects are located. At times, we couldn't see NGC 2968 with direct vision, and averted vision was required

to regain the object. I attributed this change from the previous attempt to degraded transparency, and the objects' position lower in the sky. Both objects were nebulous, with no visible structure or other detail. NGC 2964 looked noticeably elongated compared to NGC 2968.

Galaxy pairs like these that can be framed in the same FOV are interesting and attractive targets. This particular exercise, observing the same objects on two different nights, reminded me how transparency and object location can significantly affect deep-sky image quality.

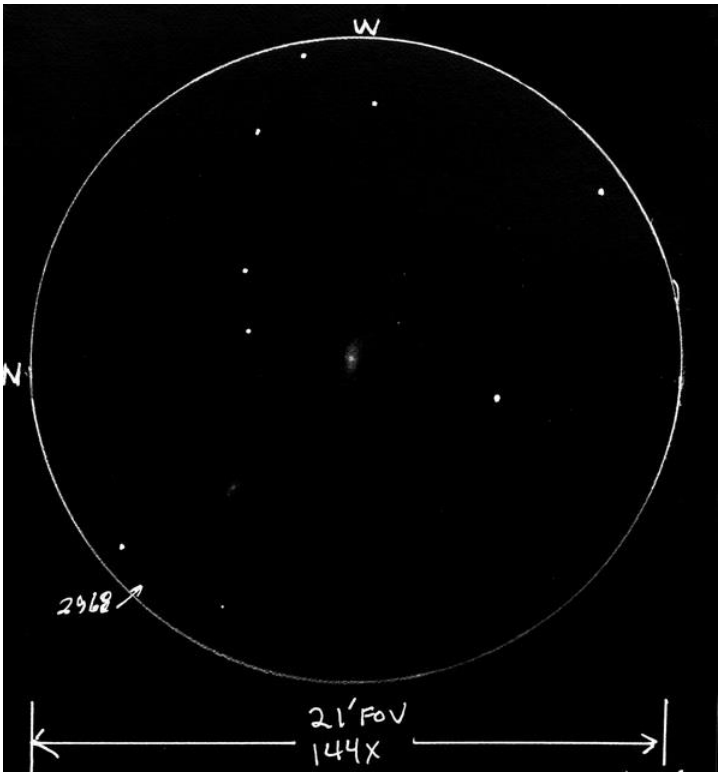
Ed: Observer from Texas

On the night of April 9-10 south Texas had clear low humidity skies with the strong inflow of air from the northwest. The sky conditions were reasonable with an SQM measured at 20.1 on an iPhone App. The first acquisition of the NGC 2964 field was at 115× in a 12-inch Dob. The field had two arcs of five to seven stars that joined on one end at NGC 2964. Three bright, evenly spaced stars formed an almost straight line in a north-south direction with NGC 2964 adjacent to them on the north end of the line. These three mag. 9-10 stars were part of a larger arc, and they dominated the field stars. Galaxy NGC 2964 was readily visible as a small nebulous patch. Slightly farther north was a dimmer NGC 2968. With averted vision and time, NGC 2970 appeared on occasion, briefly more northerly below a dim star a short distance to the north of NGC 2968. Next, we increased the power to 265× by going to a 13mm EP and centered the group of galaxies. TYC 02501-0169, the dim northern star, allowed us to locate precisely the position of NGC 2970 relative to the other two galaxies, and at the higher power, this galaxy could be seen frequently but not steadily. Both NGC 2964 and NGC 2968 were slightly eccentric, while NGC 2970 appeared round. In none of the three galaxies did we see an indication of structure, and only NGC 2964 seemed to have a more concentrated center indicating a core.

Backing off to a very wide view, it was not too much of a stretch to propose that the grouping of stars at a wider field could be designated as an asterism named “The Wave” or perhaps “Surfs Up.” The April target was a beautiful grouping of three galaxies that calls for frequent observation, as it is challenging to pull out all three, yet the field is easy to positively identify.

Kenneth Drake: Observer from Texas

I didn't have the best conditions on May 5, 2019, but I had no difficulty finding the star field. There appeared to be a small amount of cirrus. NGC 2964 was just visible at 35× in the 13-inch. After experimenting, I found 144× to work the best for this difficult galaxy from my driveway 55 miles north of Houston. It appeared as an oval about 1.3′×.5′ elongated E-W. It appeared evenly lit and best seen with averted vision while shaking the scope. Its little companion, just 6′ to the northeast, was very difficult, and I never saw it using direct vision. Only tricks allowed me to see the small 30" glow with a slightly brighter 15" middle.



Doug Paul: Observer from Massachusetts

This image was shot over two cold nights in January and February. I set up the control computer in the shed to hide from the wind both nights, but discovered that I had company on the second night. Two skunks were under the shed, but we reached an agreement that they would stay in the basement and use the back door, while I would stay on the first floor and use the front door.

I had originally cropped this image to show only NGC 2964 and NGC 2968, but following the forum discussion concerning NGC 2970, I re-cropped the image to include it.

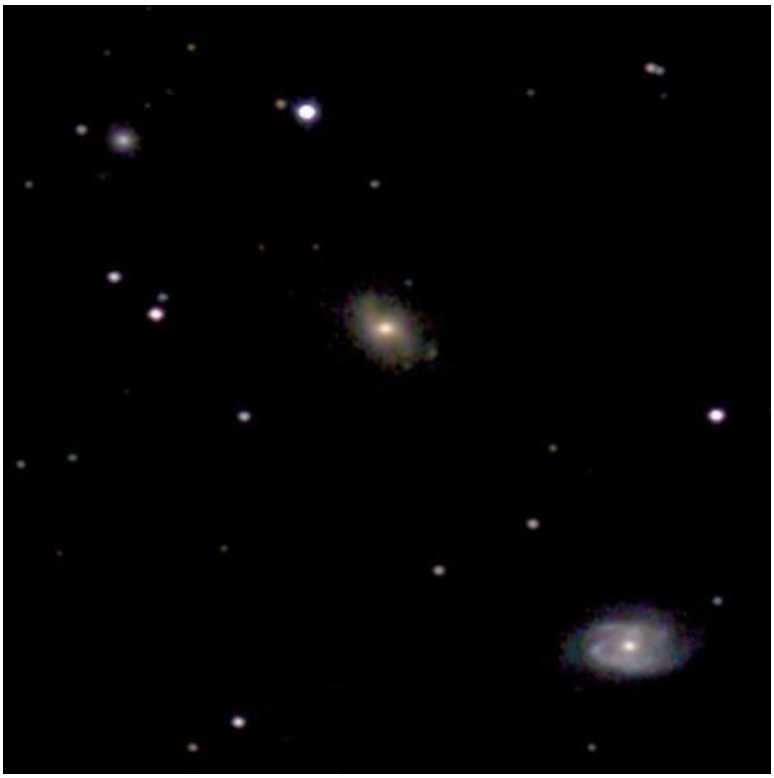
NGC 2964: bottom right

NGC 2968: center

NGC 2970: upper left

Technical details:

Canon 80D, 400mm f/2.8 (142mm aperture) lens, ISO 800, 107 subs × 30 sec = 53.5 minutes, 200% scale (1 arc-sec/pixel).



Sue French: Observer from New York

Through my trusty 10-inch f/5.8 reflector at 43×, NGC 2964 is a little oval smudge perched 38 arcminutes north-northeast of the markedly orange, mag. 5.9 star HD 83787. The galaxy dangerously floats just 4.9′ arcminutes above (north of) the point of a 19′-tall shark's fin outlined by eight stars spanning mags. 9.3 to 11.6. NGC 2964 makes a nice little trio with two other galaxies at 115×, as seen in the sketch. NGC 2964 grows gently brighter toward its center, while to its northeast, NGC 2968 displays a more distinct disparity in brightness. Farther northeast, NGC 2970 is just a little spot of fuzz. In the drawing, north is up and west is to the right.

Joseph Rothchild: Observer from Massachusetts

I observed the April challenge object at the ATMoB clubhouse on April 3, 2019. There was a 20 MPH wind in fair skies. I observed NGC 2964 with my 10-inch Dob. I located it with a double star (10 Leonis Minoris) pointing to an L-shaped asterism, which contained the galaxy. I initially saw the galaxy with averted vision in a 27mm eyepiece as a rounded oval, but it was more visible with a 14mm eyepiece. I couldn't see NGC 2968 with the 10-inch, but was able to observe that night with the club 25-inch Dob, and I easily saw NGC 2964 along with the fainter NGC 2968.

Chris Elledge: Observer from Massachusetts

On March 23, 2019, @9:30 P.M. EDT, I used a 10-inch f/5 reflector to observe NGC 2964 & 2968 from the ATMoB Clubhouse. Sky conditions were: Bortle Scale 6. NELM 5.0. Transparency: Good. Seeing: Poor.

I located NGC 2964 & 2968 by star hopping from Alpha Lyncis, to 7 Leonis Minoris, then HD 82637, and finally DR Leonis. The galaxies lie between DR Leonis and HD 84004.

At 36× (35mm 1.9˚ FOV), the two galaxies lie on an edge of a V of stars formed by HD 84004 in the north, acting as the base of the V, and two lines of mag. 9 & 10 stars heading to the SSE and SSW. DR Leonis is at the end of the SSW leg. The leg with the galaxies on it is the other leg with TYC 2501-0728-1 right nearby NGC 2964.

At 51× (25mm, 1.4˚ FOV), both galaxies were easily visible, with the larger NGC 2964 lying 5′ to the North of TYC 2501-0728-1. The slightly smaller NGC 2968 lies 6′ NE of NGC 2964. The faint mag. 11 star TYC 2501-0169-1 is another 3′ to the NE of NGC 2964. NGC 2970 wasn't visible.

At 115× (11mm, 0.71˚ FOV), I could see NGC 2964 as a large glowing area with averted vision. A small part of the glow from the core of the galaxy was visible with direct vision. The glow was circular. NGC 2968 was visible in the same field, but its glowing area wasn't quite as large or bright. It also appeared circular. I couldn't detect any hint of NGC 2970 with averted vision.

Richard Nugent: Observer from Massachusetts

Light pollution is making me feel claustrophobic. It's my observations of this month's Observer's Challenge objects, NGC 2964 and NGC 2968 that have driven this point home. These galaxies are about 70 million light-years out, and despite their makeup — hundreds of billions of stars — they appear exceedingly faint from my backyard, where the NELM is 4.8-5.0 mag. on the best of nights. Deeper objects blend into the gray background and are lost. Here in eastern Massachusetts — and we're not alone — light pollution is robbing us of all but the closest and brightest galaxies. The room is getting smaller!

I had several opportunities to observe these galaxies this month with equipment ranging from my 10-inch and 20-inch scopes to 18-inch and 22-inch instruments. Finding the location of these galaxies was relatively easy. I started at Alpha Lyncis, and moved due east until the stars 7- and 8- Leo Minoris were visible in my 3.5° finder. From 7 LMi, I moved the scope 3.3° SE until I reached 5.9 mag. HD 83787. This star marked the center of a large "Y" consisting of the stars HD 84004, HD 83069, and HD 84107. The galaxies lie 25′ due south of HD 84004.

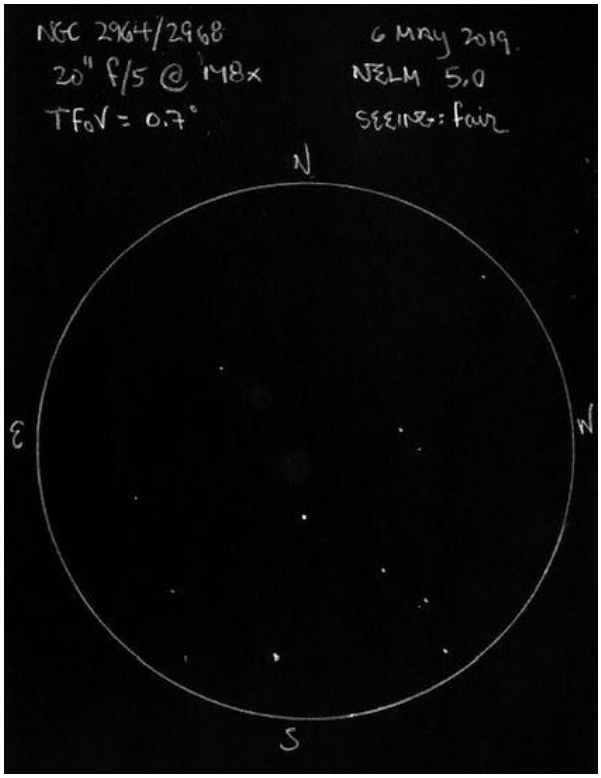
From the AMToB observing site in Westford, MA (NELM ~5.2), I could see the galaxies through my 10-inch, Steve Clougherty's 18-inch, and Slav Mich's 22-inch scope. The larger scopes showed the diffuse glows a bit more extended, but I couldn't see detail in either galaxy. I wasn't looking for nearby NGC 2970, but if it was visible, it was exceedingly faint because I didn't notice it. To me, the most pleasing view came through my scope using an 11mm eyepiece (2.2mm exit pupil). The galaxies appeared as delightfully soft glows, with a sprinkling of field stars.

Observing from my backyard, I couldn't see the galaxies through the 10-inch scope. Using my 20-inch gave better results, but the galaxies were exceedingly faint and difficult to

observe. NGC 2968 required averted vision. Later in the evening, the sky conditions improved and the galaxies were easier, but still faint. There was no hint of NGC 2970.

The included sketch is meant to portray the faintness of these galaxies. After inverting the image to white on black, the stars seemed too bright, but again, this serves to support the faintness of the galaxies. The image of my sketch is best observed in a dark room.

Considering the rapid and thorough spread of indiscriminate LED lighting, I fear the only option for observers of galaxies is to become mobile enough to reach dark skies at remote sites. Sigh.



Mario Motta: Observer from Massachusetts

I took advantage of a clear night last night and got NGC 2964-68. I went "deep" because I saw some faint distant fuzzies beyond the 2 galaxies in the foreground. NGC 2964 is 60 million light-years away, and a "small" galaxy of 60,000 light-years across.

So... I took 24 10-minute subs, for a 4 hour exposure, with my 32-inch f/6 scope, SBIG STL1001E camera. I processed it in PixInsight.

I got nice detail in the main galaxies, got a few more distant galaxies that are easily seen...from size and past experience, they're about 1/2 to 1 billion light-years, I think, but...look beyond even those, there's a smattering of very faint tiny fuzz spots. Those are galaxies, from the size well beyond the billion light year mark for sure. The distribution speaks against being

satellite galaxies of these foreground galaxies, I’m sure. I had to balance not burning out the foreground and still see the background stuff in processing, so, I hope you can see what I refer to. May not mean much, but...fun to get a deep field at times and see really deep. :).

Jay and Liz Thompson: Observers from Nevada

From our backyard at the edge of the Las Vegas Valley, and using a 16-inch SCT, NGC 2964 was a moderately sized smudge at 203×. At 270×, it was easy and we could see it with direct vision. NGC 2968 was a smaller glow that we could also see with direct vision.

Under the dark skies of Meadview, Arizona with the LVAS 24-inch, at 277×, NGC 2964 was a reasonably large, but fairly featureless blob, with a companion galaxy in the same field of view. The companion galaxy (NGC2968) was following NGC 2964, with a very faint star about halfway in between.

Roger Ivester: Observer from North Carolina

NGC 2964 was fairly bright, well concentrated, with a very subtle brightening in the central region, elongated E-W

NGC 2968 was faint, mostly round, but with a hint of elongation, oriented NNE-WSW, and stellar nucleus with averted vision.

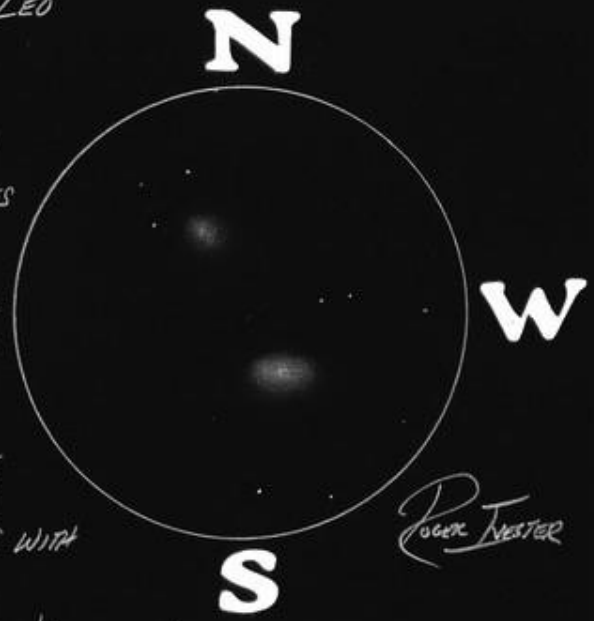
NGC 2970: Only five arc minutes to the NE of NGC 2968, lies galaxy NGC 2970. It was very faint, appearing only as a star. It was only after looking at my sketch the following morning, did I realize I'd sketched the galaxy unknowingly. It was a pleasant surprise. See it as the apex star, making a triangle with two faint stars on my sketch.

NGC 2964 - 2968 Galaxies - Leo
Date: March 27, 2019
Telescope: 10-Inch Reflector
Sketch Magnification: 114x
Eyepiece: 20 mm Er + 2x Barlow
Field of View: ½° - 30 Arcminutes

NGC 2964: Fairly Bright, Well Concentrated, Very Subtle Brightening In The Central Region, Elongated E-W

NGC 2968: Faint, Mostly Round, But With A Hint of Elongation, Oriented NNE - WSW, Faint Stellar Nucleus With Averted Vision.

NGC 2970: Bright Spot, Starlike, w/Averted Vision.



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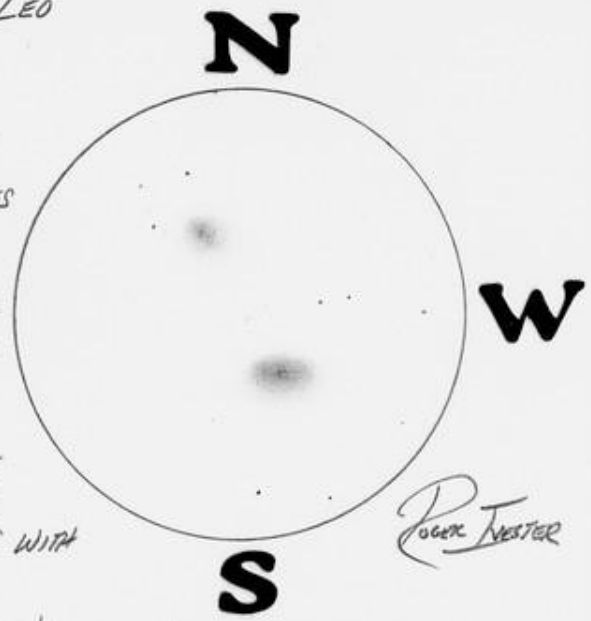
NGC 2970: Bright Spot, Starlike, w/Averted Vision.



Fred Rayworth: LVAS AL Coordinator and Observer from Nevada

I've observed this pair twice, but the third galaxy only recently.

The first time was on February 5, 2005 from Sunset Overview at Lake Mead, Nevada. At 1,375 feet, it was clear and cool. It was supposed to be good until 01:00 the next morning. There was a barely detectable breeze.

Using my home-built 16-inch f/6.4 at 82×, NGC 2964 was small, medium-bright, and round. It was a nice pair with NGC 2968.

NGC 2968 was a very faint oval next to NGC 2964. I noted no other details at the time.

The second time I observed all three objects was on March 30, 2019 from our "undisclosed location" at Lake Mead. At 2,100 feet, it was cool, with a slight breeze that died down before dark. There were high, thin clouds that seemed to disappear before dark and it looked like it would be a gorgeous night, and it at first appeared to be. However, the transparency wasn't all that great. In fact, it was in holes, where in one spot, I was able to go very deep, while in other spots, I could barely see bright stuff. It was very frustrating. Just as the sun went down, I put on a longjohn shirt, but never did end up with a coat. I really needed it by the time we quit at 11 P.M. By then, the winds picked up and started knocking stuff over. However, that was when we must've got a nice hole in the sky because things started to open up and I was finding stuff again. Go figure. It wasn't the worst night, but it could've been better. Oh, and the seeing was terrible. Everything scintillated really bad.

Using my commercial 16-inch f/4.5 at 102×, NGC 2964 was a soft, almost round glow with no distinct core. NGC 2968 was also an oval glow with a sharp core that only showed clear with averted vision. Both galaxies were kind of blotchy where 64 was a bit larger and with just a

hint of spiral shape, though it was an extremely faint hint. Whereas NGC 2970 was just a very faint oval. Soft, with no core, looking just like many of the Herschels I see.