MONTHLY OBSERVER'S CHALLENGE

Compiled by:

Roger Ivester, North Carolina

&

Sue French, New York

March 2021

Report #146

NGC 2685, The Helix Galaxy, in Ursa Major

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 who's interested, and if you're able to contribute notes and/or drawings, we'll be happy to include them in our monthly summary. 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 astronomers 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 Observer's Challenge. And for folks with an interest in astrophotography, your digital 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.

This month's target

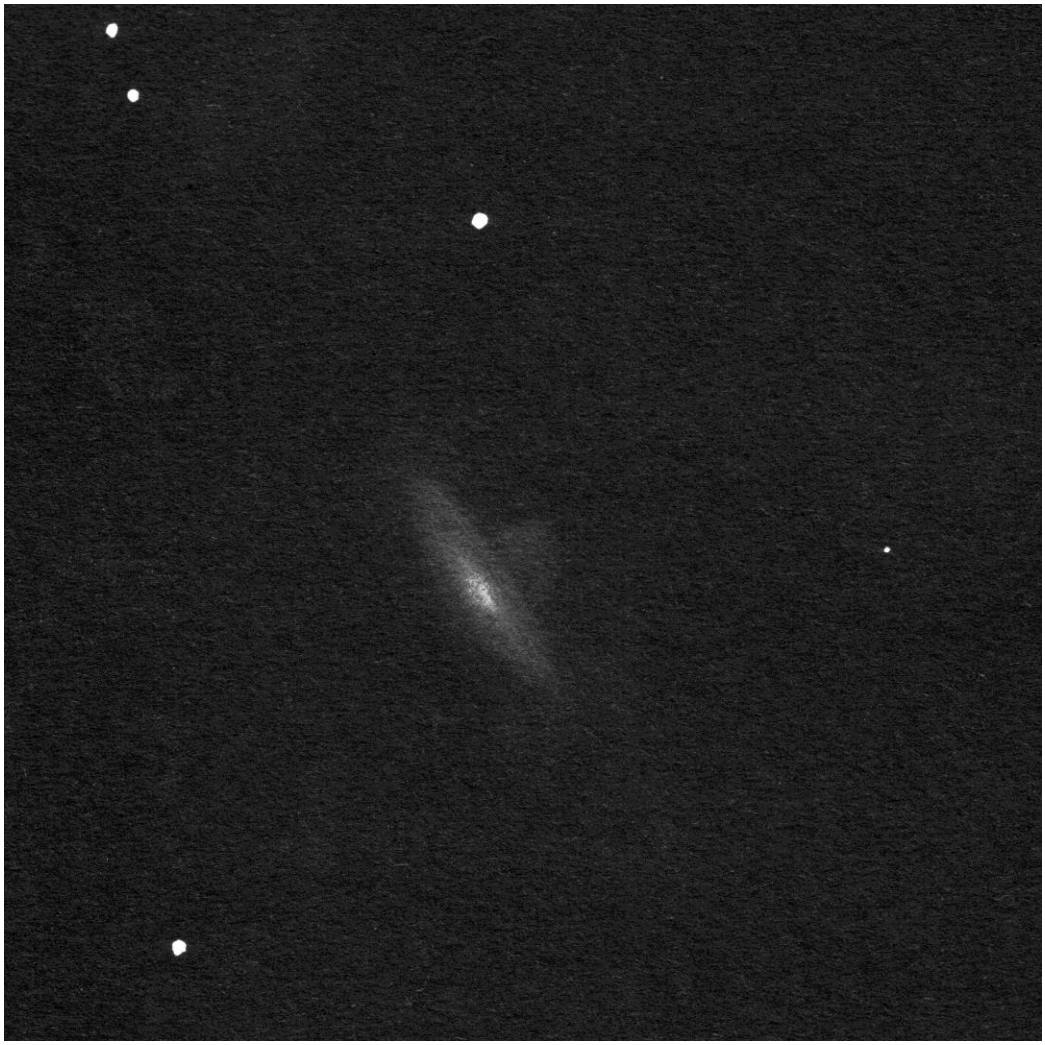
German astronomer Wilhelm Tempel discovered NGC 2685 in 1882 with an 11-inch refractor. Loosely translated, his discovery description reads: Good II-III; round; with a small star in the middle; stands 4′ south of a 10th-magnitude star.

In the *Hubble Atlas of the Galaxies*, Allan Sandage states, "NGC 2685 is perhaps the most unusual galaxy in the Shapley-Ames catalogue." While most astronomers would agree with this, there remain various opinions as to why. NGC 2685 is generally regarded as a polar ring galaxy wrapped in exterior hoops of gas and dust aligned nearly perpendicular to the plane of the galaxy's lenticular disk. The rings may have been birthed by a merger and/or accretion event. A less touted viewpoint is that this galaxy is strongly warped, and the semblance of rings is merely the result of projection effects.

This perplexing galaxy lies roughly 50 million light-years away from us. As seen photographically, the unusual array of gas, dust, and resultant stars entwining the Helix gives rise to its name. The galaxy may also house a supermassive black hole.

Uwe Glahn: Observer from Germany

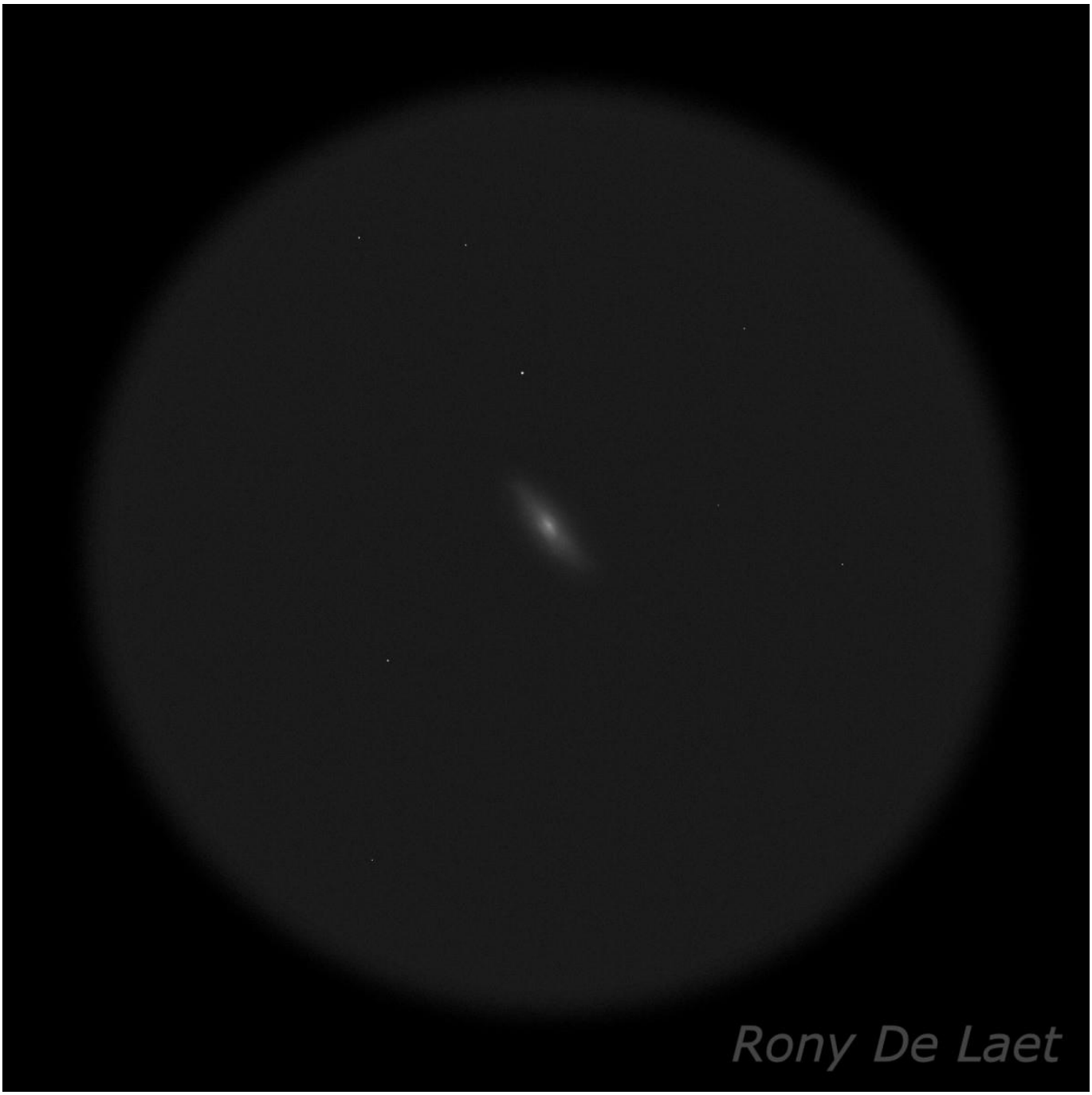
Object: NGC 2685 - "Helix Galaxy"
Telescope: 24″ f/4.5 Newtonian
Magnification: 390×
NELM: 6.7



Rony De Laet: Observer from Belgium

NGC 2685 lies so far away from any bright stars that my Telrad did not show any stars to aim at. I aimed at Muscida (omicron UMa) and started starhopping with my 32mm eyepiece and the guidance of the Stellarium+ app. At 60× NGC 2685 is a weak spot S of a mag 11 star. With each increasing magnification, the galaxy reveals more details. I got the best views at 280× with a CLS-filter and 400× without filter. At first sight, the galaxy is an elongated streak of light, brightening to the center. With time, more details become apparent. The nucleus appears stellar with averted vision. The core is quite compact and clearly elongated in the same position angle as the halo. It is my impression that just SE of the core, the spindle shaped halo appears suddenly brighter. A brighter arc of light appears next to the SE border of the core. A weird impression because the galaxy does not have any spiral arms? This might be an optical illusion caused by the sharp border of the SE core. The same phenomenon appears on the N edge of the core, but it is less prominent. The tips of the spindle-shaped halo both seem to bend a bit counterclockwise before they fade away.

Site : Bekkevoort, Belgium (51° N)
Date : March 31, 2021
Time : around 20.30UT
Telescope : Taurus 16″
FOV: 11.4′
Filter : with and without CLS
Seeing : 3/5
Transp. : 4/5
Sky brightness : 19.7 magnitudes per square arc second near zenith (SQM reading).
Sketch Orientation: N up, W right.
Digital sketch made with Corel Paint Shop Pro X2, based on a raw pencil sketch.


Rony De Laet

Mike McCabe: Observer from Massachusetts

Having been presented with a crystal-clear night in early March, it seemed like a good idea to take a shot at observing the March Observer's Challenge object. Yes, it was cold, and yes, it was breezy, but nights with transparency like that seen on the 6th only come around here a handful of times a year. And am I glad I did! This target needed that transparency to be seen well.

The area where NGC 2685 resides is an easy star hop from Muscida, the tip of the Great Bear's nose. What's not so easy is knowing that you're in the right place at first glance. That field is DIM, and the galaxy is even dimmer. At low power there is just the vaguest hint of something aside an 11th-magnitude star, but what it is not immediately apparent.

Pushing the power up to 140× clarifies things quite a bit. It then became clear that I was definitely looking at a galaxy, which was obviously elongated and situated north-south along the long axis. Averted vision kept revealing a bright spot, but I couldn't be sure if it was actual brightening towards the center of the galaxy or a star superimposed in front of it.

Doubling the power to 280× actually enhanced the nebulosity a little, but didn't do much to resolve the question of core, or star? It wasn't until I was warm and snug inside the house and on a computer that I was able to ascertain that what I was seeing was indeed brightening at the center of the galaxy. In the eyepiece of a scope with just 10-inches of aperture, the brighter core does indeed have what I'd call a "sharp edge" to it.

Aside from the observation of the target, the good transparency led to me being able to discern stars down to nearly 15th magnitude in the field of view, so that was fun. I even almost considered going for April's target in Leo on this very clear night…almost, but then my scope and all my gear got up and went into the garage. It seems that they have more sense than me, when it comes to getting in out of the cold.

OBSERVATION LOG - OBJECT: NGC 2685

DATE 3/6/21 /Z TIME 20:00 /Z EST LOCAL OBSERVING LOCATION 42N 71W

SCOPE/APERTURE 10" F/5 NEWTONIAN

EYEPIECE 9mm, 4.5mm MAGNIFICATION 140x/280x

FILTER — SEEING 3/5 TRANSPARENCY 3/5

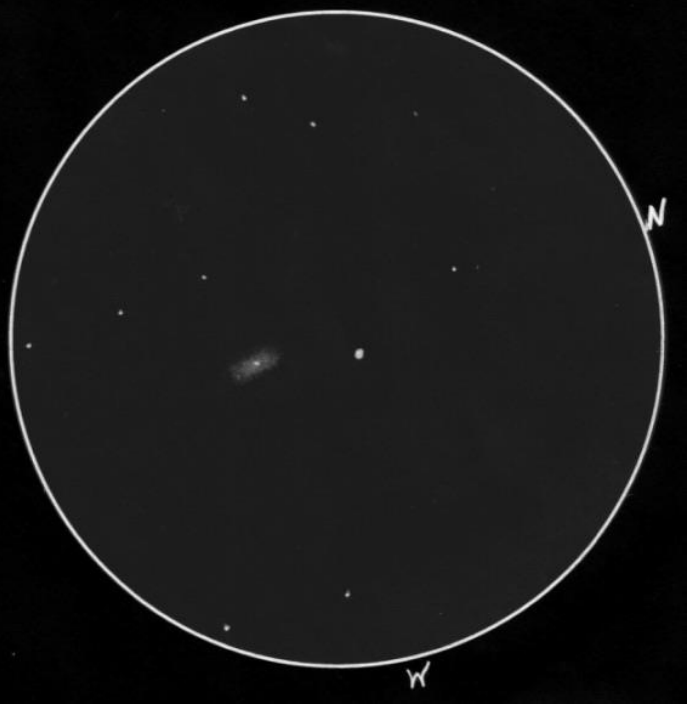
TEMP 27° BARO PRES. — WIND NW 7

COMMENTS:

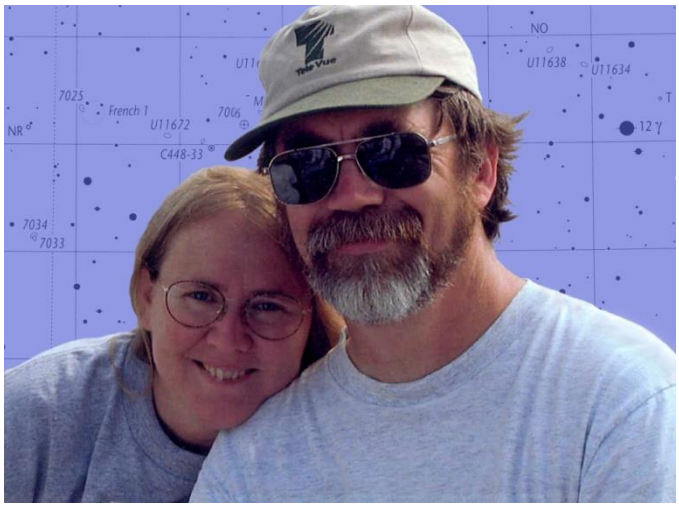
WOW! BRIGHTEST THING IN THE FOV IS AN 11th MAG. STAR.

BRIGHT SPOT IN GALAXY MAY BE CORE OR COULD BE SUPERIMPOSED STAR.

ORIENTATION AND/OR ROTATION



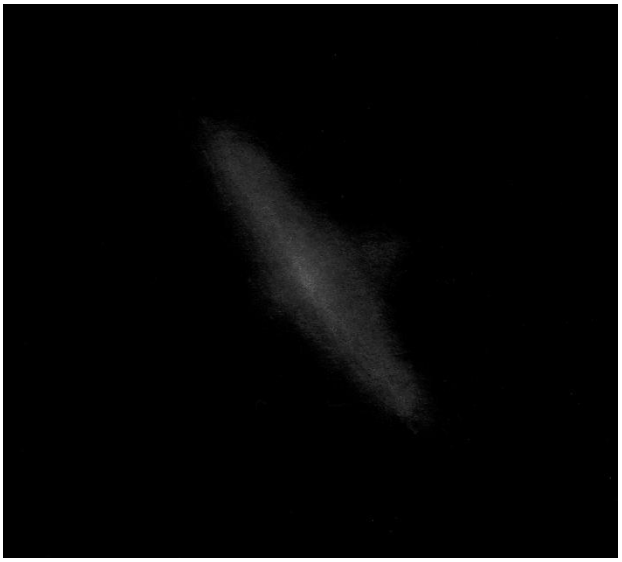
Sue French: Observer from New York



NGC 2685 is invisible through my 4.1-inch refractor at 28×, but at a mere 28× it begins to emerge as a very faint northeast-southwest oval with an 11th-magnitude star hovering north of the northeastern tip. At 87× it spans 1½′ long and grows slightly brighter toward its center.

Through my 10-inch reflector at 68×, the galaxy appears to stretch about 1.8′ in a position angle of about 35º. At 213× the only trace of polar-ring structure that I detect is the galaxy seems overly wide in the middle.

My 14.5-inch reflector at 170× faintly shows stubby protrusions that are cocked with respect to the galaxy's long axis and more apparent on its northwestern side. Sketch and scope below.



Glenn Chaple: Observer from Massachusetts

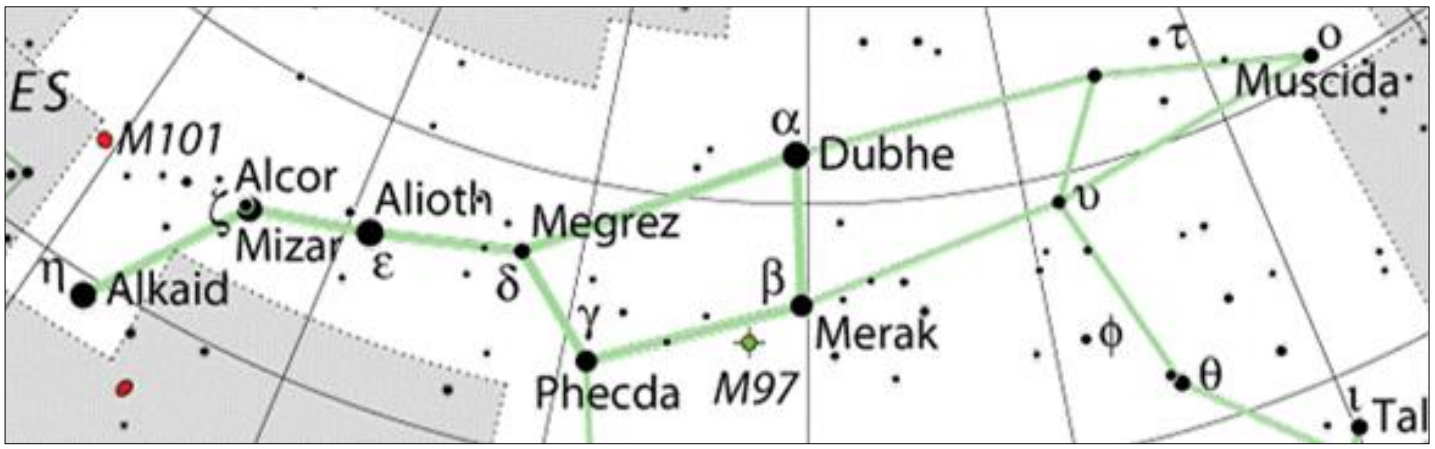
NGC 2685 – Lenticular Galaxy in Ursa Major (Mag: 11.3, Size: 4.6′ × 2.5′)

This month's Observer's Challenge, NGC 2685, is a lenticular galaxy with a twist. It has a ring of stars, gas, and dust that runs perpendicular to the plane of the main galactic disk. Such rarities are known as polar ring galaxies. These cosmic oddities are likely a result as a collision or gravitational interaction between two galaxies, one of which is lenticular. The appearance of the whorls surrounding NGC 2685 give it the nick-name the "Helix Galaxy,"

Those with computer-controlled scopes will find NGC 2685 at coordinates RA 8h 55m 34.8s, Dec +58° 44′ 03.9″. If you locate deep sky objects via the star-hop method, begin your search at the 3rd-magnitude star Muscida (omicron [o] Ursae Majoris), shown in upper right of **Chart A**. Aim your telescope midway between Muscida and 5th-magnitude 17 Ursae Majoris (**Chart B**), and you should come across a pair of stars of magnitude 6 and 7 that are about a degree apart. **Chart C** shows the location of NGC 2685 between these two stars.

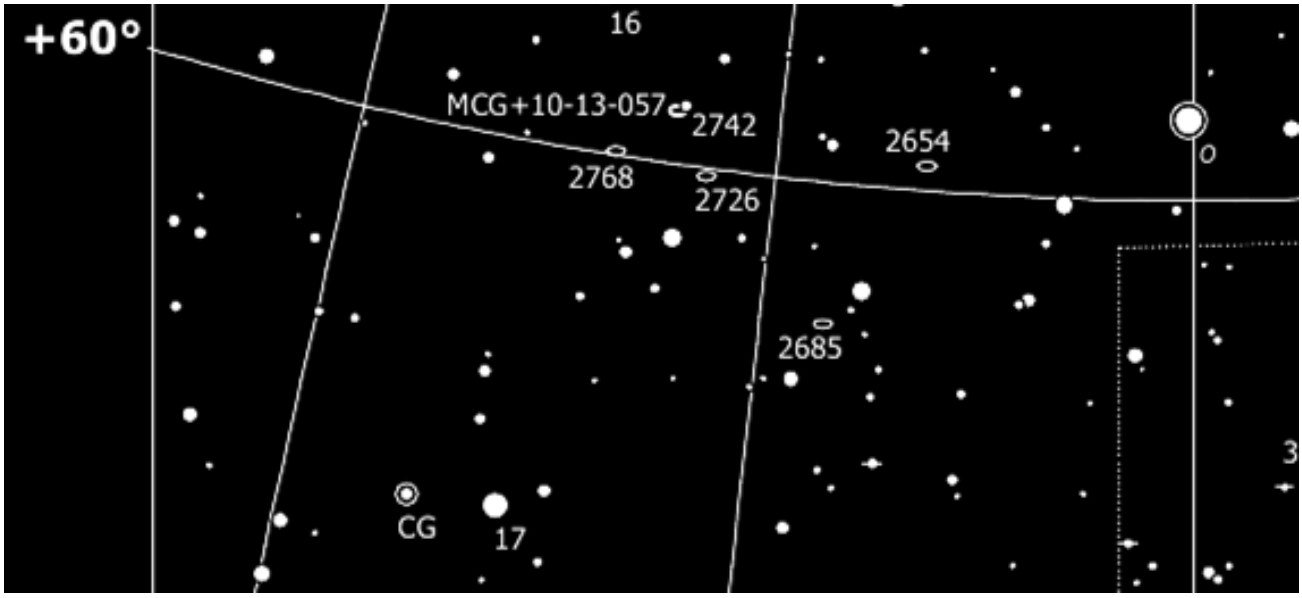
NGC 2685 was discovered by the German astronomer Wilhelm Tempel on August 18, 1882. Studies indicate a distance of around 40 million light-years and a visual diameter of some 50,000 light-years, about half that of the Milky Way.

Chart A



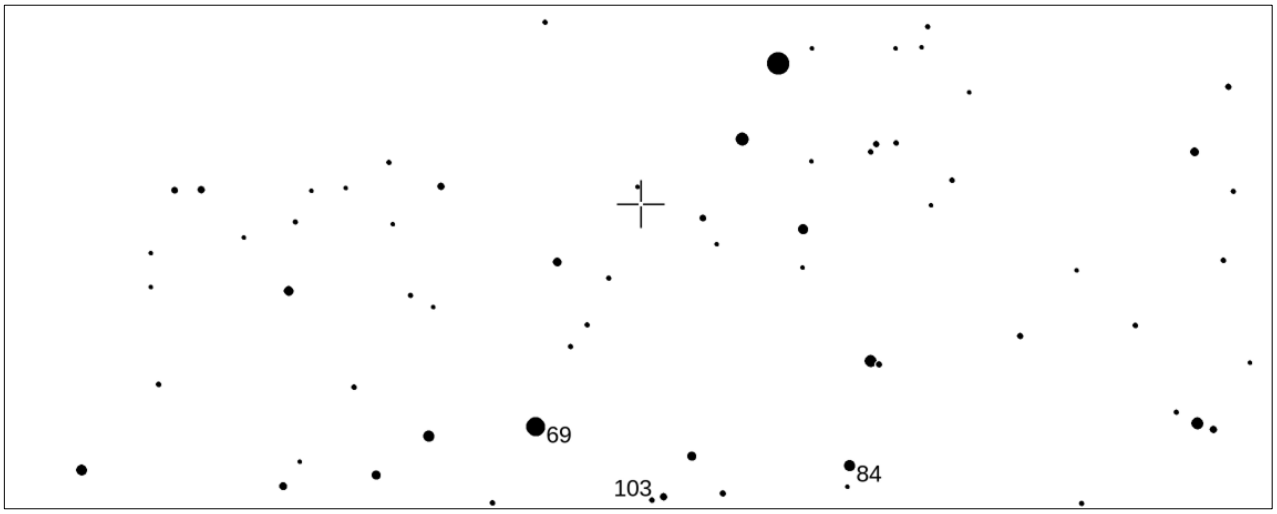
www.constellation-guide.com (from IAU and *Sky and Telescope*)

Chart B



Taki's magnitude 8.5 Star Atlas (takitoshimi.starfree.jp)

Chart C



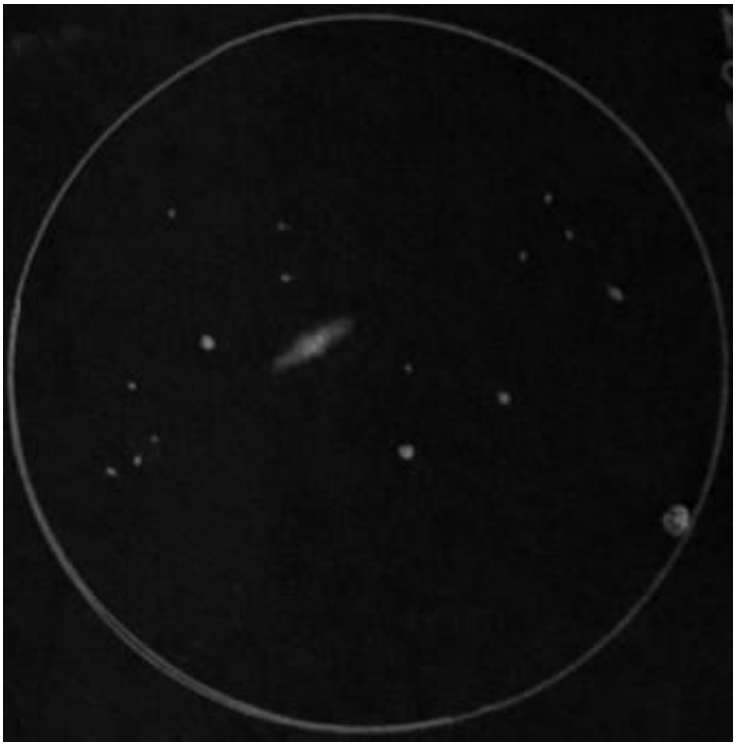
Glenn Chaple (from AAVSO Variable Star Plotter) Field is 3° by 1° with north up. Stars shown to 11th magnitude

Larry McHenry: Observer from Pittsburg, Pennsylvania

NGC 2685 is a small 11.3-mag lenticular galaxy located in the spring constellation of Ursa Major – "The Great Bear. "

It is about 42 million light-years distant, and about 50,000 light-years in size. Being only 31º from Polaris, the galaxy is circumpolar and above the horizon year-round for most observers. Deep images of NGC 2685 show that it is a polar ring Seyfert galaxy showing an outer ring of stars, gas, & dust that may have been perturbed by another unidentified passing galaxy or possibly from the breakup and merging of a satellite companion pulled into the main galaxy. NGC 2685 is listed as Arp 336 in Halton Arp's *Atlas of Peculiar Galaxies*.

Visual Screen Sketch: 03/02/2021 from Big Woodchuck Observatory backyard in Pittsburgh, PA. Using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with a CMOS/USB color camera and LP filter @ 30-second guided exposure live-stacked for 20 minutes.



Visually, the galaxy is a small elongated spindle with a brighter bulge at its core and a star-like nucleus.

Video-Capture:
06/01/2016 from Cherry Springs State Park at the Cherry Springs Star Party, using an 8-inch SCT optical tube @ f/6.3 on a GEM mount, with an analog deep-sky video camera & IR filter @ 35 seconds, unguided single exposure.

Richard Nugent: Observer from Massachusetts

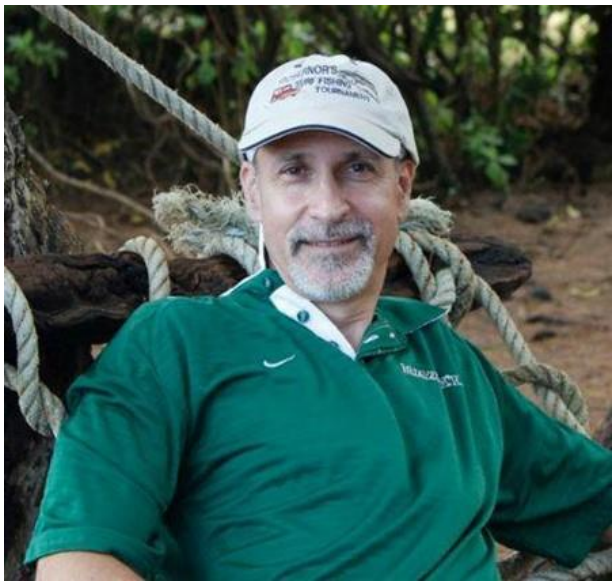
This month's object, NGC 2685, also known as the Helix Galaxy, glows at 11th magnitude and can be found in the constellation of Ursa Major. The galaxy has a reported surface brightness of 13.8, and with this type of object, a dark sky is preferred while using a telescope/eyepiece combination which yields an exit pupil of around 2mm. This object lies only 3.8 degrees away from Omicron Ursa Majoris, Muscida, the tip of the Great Bear's nose. I enjoy star hopping to objects and from Muscida, I located magnitude 6.5, HD 73029. From there, I hop 2 degrees to magnitude 6.3, HD 75487. NGC 2685 lies midway between this star and slightly fainter HD 76216. The galaxy is adjacent to an 11th-magnitude star.

During this era of the COVID pandemic, my observing has been restricted to my home in Framingham, (MA) where light pollution has reduced the NELM to about magnitude 4.8 under Bortle Class 7 skies. I was able to view the galaxy with 10- and 20-inch telescopes on nights of good transparency.

Michael Covington is quoted as saying ***"All galaxies deserve to be stared at for a full 15 minutes."*** and this wise advice should be kept in mind when observing this month's object! Using the 10-inch, at first, I could see nothing at the galaxy's location. But in time its ghostly light started to become visible. The longer I observed the brighter the glow became. Tweaking the magnification to darken the background helps as does jiggling the telescope a bit. After about 20 minutes, the galaxy appeared as a small, faint, diffuse, oval-shaped glow which could be detected with direct vision and better with averted vision. The view through the 20-inch yielded a better view with the galaxy nicely apparent with direct vision. No hint of detail could be seen nor could the helix structure.

Will I ever return to this faint fuzzy? Only if I can view it under darker sky conditions. Why should *you* observe this object? To gain an appreciation for your telescope's capabilities and to become a better observer.

James Dire: Observer from Illinois

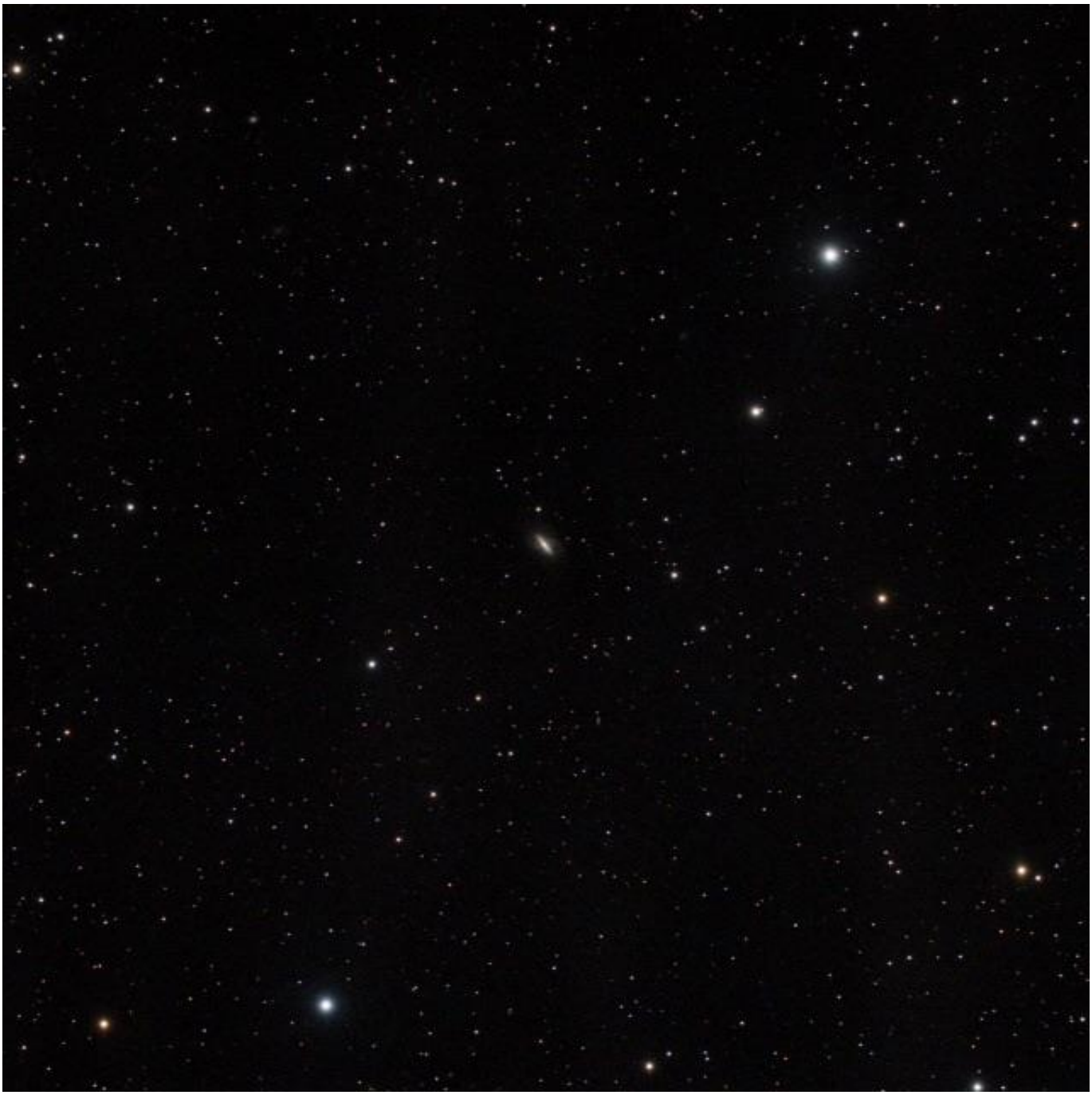


NGC 2685, a.k.a the Helix Galaxy, is a small, faint galaxy in Ursa Major. The galaxy is located 11 degrees north of the wide, naked-eye double star Talitha (Kappa and Iota Ursae Majoris, magnitudes 3.57 and 3.14. respectively). The galaxy is roughly 4.4 × 2.3 arc minutes in size and shines at magnitude 11.3. The galaxy is 52 million light-years away and is classified as an S0 (Lenticular spiral galaxy).

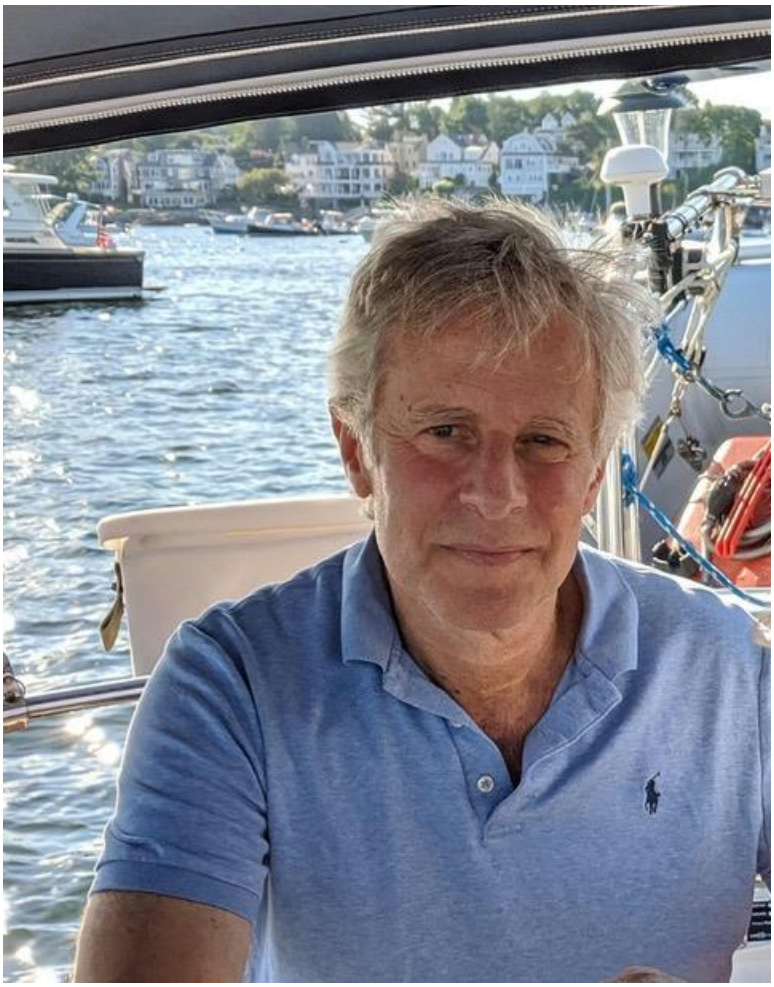
The Helix Galaxy is dim and small. It doesn't look like much in any telescope I have seen it. It appears as an elongated smudge with a brighter star-like core. The galaxy is famous because it has a polar ring of material encircling it. This is a ring of material perpendicular to the disk of the galaxy. Most likely this ring was formed by a collision with another smaller galaxy, where the gravity of NGC 2685 ripped the smaller galaxy apart as it was captured in a polar orbit.

I shot NGC 2685 this month with a William Optics 132mm f/7 apo using a Tele Vue 0.8× focal reducer/field flattener. My camera was an SBIG ST-4000XCM and the exposure was 60 minutes. Despite the small telescope and short exposure, I was able to capture and resolve some of the polar ring.

The brightest stars in the image are SAO 27026, magnitude 6.3, and SAO 27056, magnitude 6.92. The faintest stars in the image are below magnitude 18. There are about a half dozen other galaxies captured in the image that are very small and between 16^{th} and 18^{th} magnitude.



Barry Yomtov: Observer from Massachusetts



For the first two months that I've participated in the Observer's Challenge I've used a RASA 11 (which is an 11-inch Schmidt-Cassegrain) with great super-fast f/2.2 optics. A notched light pollution filter and an IR cut filter for imaging galaxies.

Unfortunately three weeks ago, my mount decided to get a mind of its own, so it's now out for repair. Fortunately I still have my previous fast optics system: A 9.25-inch Schmidt-Cassegrain with a HyperStar lens providing f/2.3.

The field of view between the two optics is roughly 15% larger for the 9.25/HyperStar, which has only 71% of the light gathering as compared to the 11-inch RASA. The 9.25-inch does not have the custom notched frequency light pollution filter as that of the RASA.

This was also my first imaging experience with this combination of optics and the ZWO CMOS camera.

What's most or more important…imaging could still continue!

The following is my NGC 2685 image which was taken on March 9th, 2021, which is a composite of 107 images at 30 second exposures, taken with a ZWO ASI183 pro-cooled color for a total exposure of 54 minutes.

My processed image was able to distinguish the helical bands which are perpendicular to the main galactic disk; as given the name Helix Galaxy.

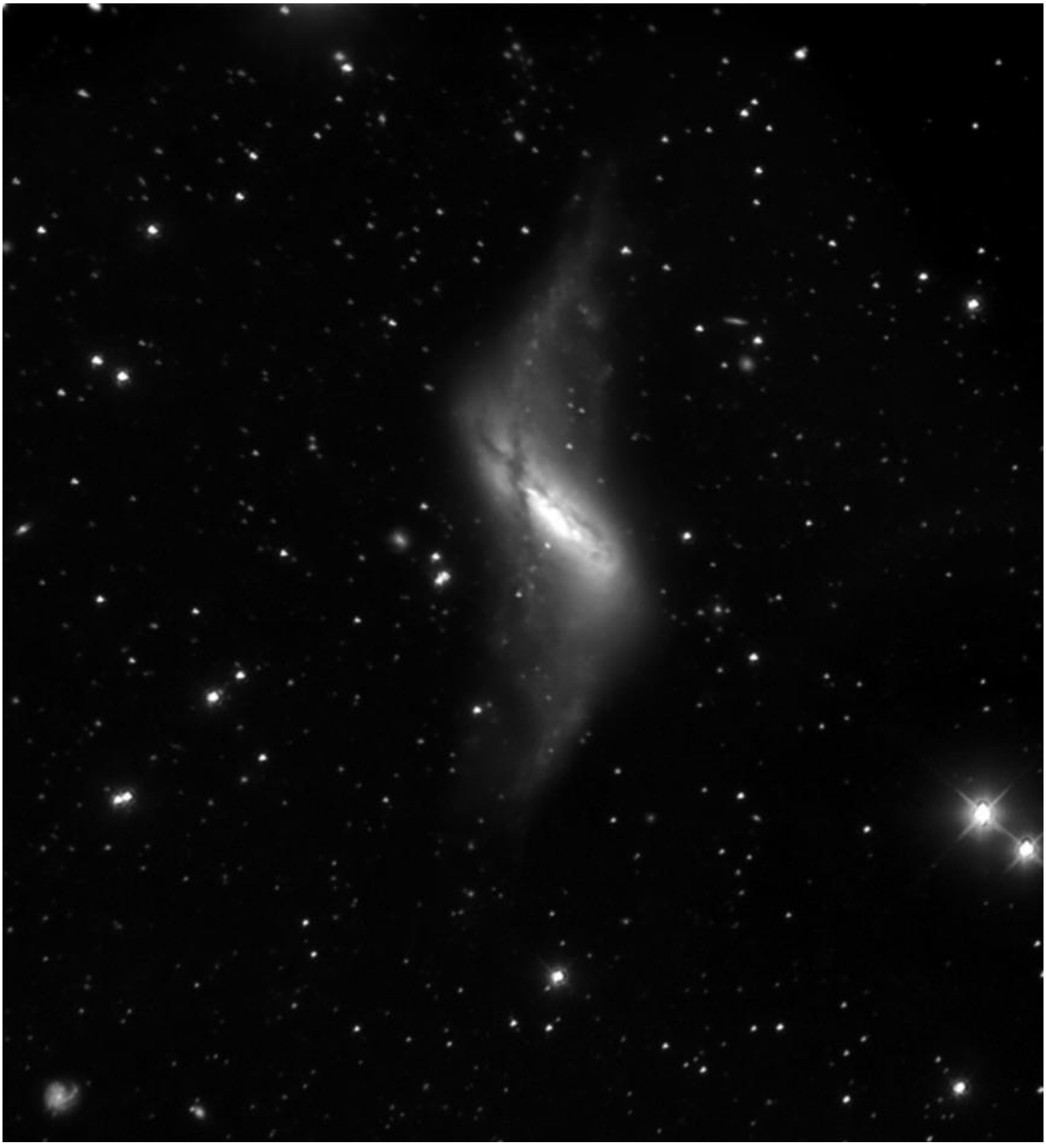
This image is about 40% cropped from the original, but the field of view still shows two smaller very faint edge-on galaxies to the SW of NGC 2685, which is about the four o'clock position in the image.

That’s part of the fun of wide-field imaging during galaxy season…you never know how many other galaxies will show up.

Mario Motta: Observer from Massachusetts

NGC 2685, taken with my 32-inch home-built f/6.5 telescope with ZWO ASI6200 camera, 3 hours imaging, using RGB and Lum filters. Processed in PixInsight. This is a very Interesting galaxy in that it is a “polar ring Seyfert” galaxy, with one galaxy “spearing” directly into another spiral galaxy at right angles, causing intense new star formation, why the intense blue hue from new star bursting activity. It is 42 million light-years away in Ursa Major.

I've also included NGC 660 for comparison, another polar ring galaxy that I have imaged, which shows the polar ring structure more distinctly for illustrative purposes.



Venu Venugopal: Observer from Massachusetts

I took this image of the Helix galaxy from my backyard on March 20th 2021.

Scope: 72mm ED refractor with 45 minutes exposure, 10 second sub-exposures. SharpCap live stacked.


HD 76146
NGC 2685 / Helix Galaxy
HD 75615
HD 75418

Joseph Rothchild: Observer from Massachusetts

I observed galaxy NGC 2685 in Ursa Major on March 9th under dark skies in Cape Cod. I observed with my 10-inch Dob. I had not previously viewed this spiral galaxy. It was easily found, appearing in a flattened triangle with a nearby star and double star.

The double star points to the galaxy, which is small, compact, and spindle shaped, without any appreciable features. It was best seen with a 14mm eyepiece at 111×.

Roger Ivester: Observer from North Carolina

Date: February 3, 2021

Telescope: 10-inch reflector

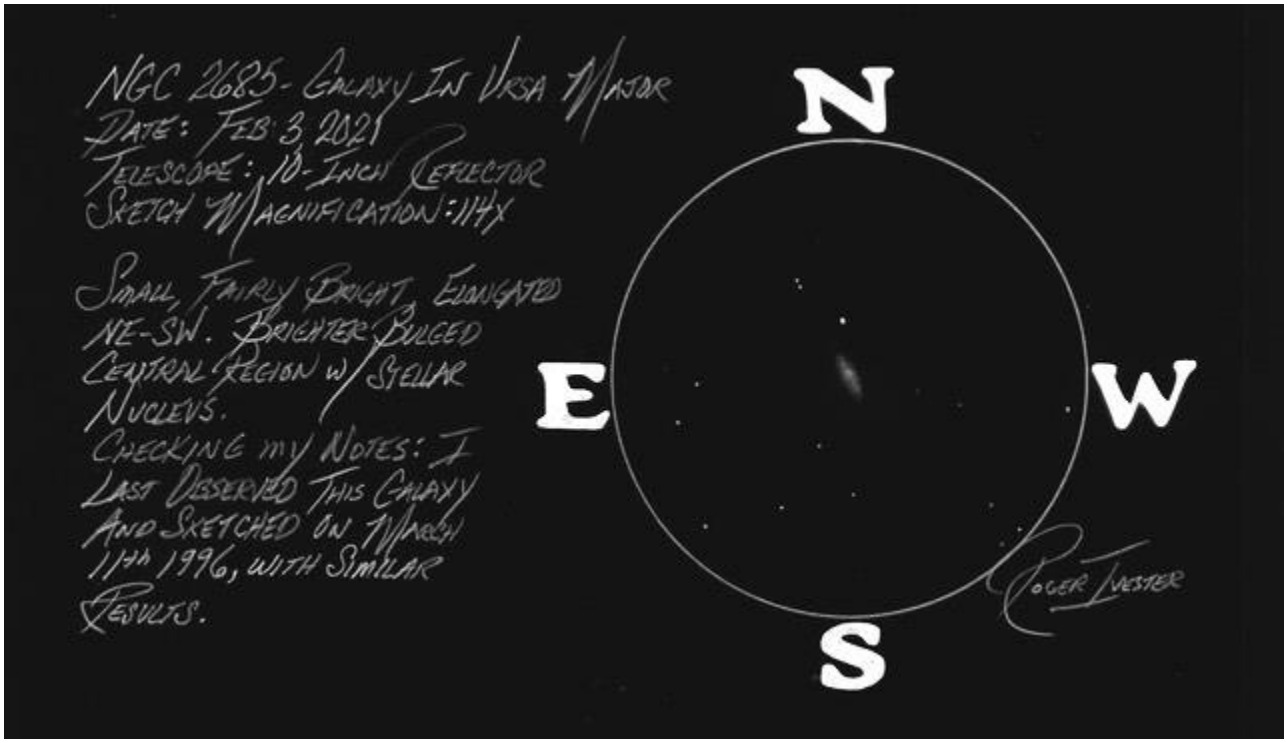
Sketch Magnification: 114×

Field of View: 1/2º

Description: Small, fairly bright, elongated NE-SW, brighter bulged center with a stellar nucleus. I last observed this galaxy on March 11, 1996, from the same location and telescope with almost identical results.

From my 5.0 NELM suburban location, it is very easy to locate and see with the 10-inch, but with very little fine detail. The stellar nucleus required a magnification of 183×, and averted vision. It was my plan to observe this galaxy with my 6-inch reflector for a comparison. Hopefully, I can make this comparison next year.

Sketch follows.



The following is the complete listing of all Observer's Challenge reports to-date.
https://rogerivester.com/category/observers-challenge-reports-complete/