MONTHLY OBSERVER’S CHALLENGE

Las Vegas Astronomical Society

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IC 342 (Caldwell 5) - Hidden Galaxy in Camelopardalis

Introduction

The purpose of the observer’s challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, we will be happy to include them in our monthly summary. Observing is not only a pleasure, but an art. With the main focus of amateur astronomy on astrophotography, many times people tend to forget how it was in the days before cameras, clock drives, and GOTO. Astronomy depended on what was seen through the eyepiece. Not only did it satisfy an innate curiosity, but it allowed the first astronomers 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 is the tradition we are stressing in the observers challenge. By combining our visual observations with our drawings, and sometimes, astrophotography (from those with the equipment and talent to do so), we get a unique understanding of what it is like to look through an eyepiece, and to see what is really there. The hope is that you will read through these notes and become inspired to take more time at the eyepiece studying each object, and looking for those subtle details that you might never have noticed before. Each new discovery increases one’s appreciation of the skies above us. It is our firm belief that careful observing can improve your visual acuity to a much higher level that just might allow you to add inches to your telescope. Please consider this at your next observing session, as you can learn to make details jump out. It is also a thrill to point out details a new observer wouldn’t even know to look for in that very faint galaxy, star cluster, nebula, or planet.
IC-342

IC-342 is an intermediate spiral galaxy in the constellation Camelopardalis. It is located near the galactic equator. Dust obscuration makes it a difficult object for amateurs to observe, thus the name “Hidden Galaxy.” It was discovered by W.F. Denning in 1895 and has an H II nucleus (see below). Once thought to be a member of our local group of galaxies, measurements have shown it is quite distant at between six and ten million light-years. If not for being obscured by our galactic cloud, it would be one of the brightest galaxies in the sky, maybe even rivaling the Andromeda Galaxy.

The listed mag. 9.1 brightness is a misnomer because the only part of the galaxy easily seen visually is the central core. The spiral arms, though not impossible to see in smaller scopes, are quite difficult to spot, even in larger apertures.

(NOTE: This is a direct quote from Wikipedia.com) An H II region is a large cloud of gas and ionized gas of glowing low density in which star formation has recently taken place. Young, hot, blue stars, which have formed from the gas, emit copious amounts of ultraviolet light, ionizing and heating the gas surrounding them. H II regions, sometimes several hundred light-years across, are often associated with giant molecular clouds in which star formation takes place, and from which the stars that produce the H II region were born. The first known H II region is the Orion Nebula, discovered in 1610 by Nicolas-Claude Fabri de Peiresc.
The November Observers Challenge object, IC-342, a faint galaxy in Camelopardalis, can be a very difficult target. The low surface brightness and large size requires a very dark sky and excellent transparency. I made all observations with a 10-inch reflector from my moderately light-polluted backyard in Boiling Springs, North Carolina. On a night with a mag. 5.0 sky, I found and observed the galaxy rather easily.

A chain of six stars, with an orientation of NW-SE, lies a few minutes SW of the faint core. This galaxy is best observed with low to medium magnification. I used 114X for the accompanying sketch. The 10-inch presented IC-342 as little more than a large faint glow without structure. A faint and small core could be seen with averted vision, with the absence of visible detail being attributed to the lack of a dark site, which reduced the contrast significantly. On a night of lesser seeing and transparency, I was unable to see this galaxy with my 4-inch refractor.
IC 342 Galaxy - Camelopardalis
10" inch Reflector - 07 Nov 10
20 mm + 2x Barlow = 114x
FOV 0.50° -

Little Concentration,
Faint Brightening.
Averted Vision can see
Small Faint Core.

Conditions: Good
Limiting Naked Eye Magnitude
5.0

Location: Nearest Light
Private Backyard
Bowling Springs, North Carolina
The first time I observed IC-342 was at Furnace Creek in Death Valley. Rob Lambert was trying to see it in his Mallincam but wasn’t sure he was on it so I tried and verified it was really what Rob was seeing. Sky conditions were not good for transparency. I saw a bright elliptical-like core with a line of five stars next to it. There were other nearby stars that almost gave me the impression of a very loose open cluster. I saw no hint of the arms as indicated in this 70X drawing.

The second occasion was at Redstone Picnic Area at Lake Mead, Nevada. The transparency and darkness were much better, though I had to look between bands of clouds before it finally became completely overcast. This time, I saw the same elliptical and almost stellar core with the odd line of five stars. However, with a slightly higher power this time, I could just detect a faint haze going out well beyond the line of stars. It took a bit of imagination to see a hint of spiral structure, but after seeing Jim Gianoulakis’ excellent image, maybe I actually saw just a bit of that structure. After seeing it under those conditions and with my 16” reflector, I had to wonder at people seeing those arms in much smaller scopes. It could be that it is best seen at very low power. This drawing at 86X shows how it looked that night.
At 32X in my ST120, IC-342 was obviously a face-on spiral with a very bright core and a less bright, but still significant halo. This magnification didn’t do much to pull out any detail of the spiral structure. As I flipped through the 40 images I captured on two different nights, I could just detect a hint of the galaxy's spiral structure. My inexperience at stacking images did nothing to bring out the detail seen in long-exposure photographs of this object.

IC-342 appeared to sit in a fairly rich star field and, in fact, had several foreground stars superimposed upon it. The four most significant foreground stars formed an elongated almost diamond shaped border around the galaxy. Attempts to use my LX200 were disappointing. At the greater magnification of the LX200, the galaxy practically disappeared. I thought the sky conditions were such that the upper atmospheric haze obscured the galaxy's detail and even caused the core to appear as no more than one of the foreground stars. During my December dark-sky outing, I plan to re-visit IC-342 under, hopefully, better skies. Until next month... take care.
This observation was made Thursday, November 11, 2010 from the Mt. Airy Granite overlook on the Blue Ridge Parkway near mile post 203. I was using a 4-inch refractor with a 13mm eyepiece for a magnification of 67X. It was a cool 40°F with a 4-5 mph wind. The sky was beautiful although very bright with the moon up, having a naked-eye limiting magnitude of 5.5. The Milky Way was only a faint glow compared to a moonless sky. The seeing was as about as good as it gets around here with pinpoint stars at high magnification.

IC-342 is not a very bright galaxy for observing. Although it has an integrated mag. of 8.4 listed, it is a large almost face-on spiral with a surface brightness of mag. 15.2. Such a low surface brightness makes it a difficult target in less than the darkest skies. This was definitely the case in the 4-inch refractor. I tried to find IC-342 using a 24mm eyepiece at 37X and could only see faint clumps of patchy fog in the area of the galaxy. I switched to a 13mm eyepiece for a magnification of 67X, and at this magnification, the galaxy was a little more apparent. Still, it required moving the telescope and a lot of tube tapping to see these nebulous patches form the shape of this galaxy. Probably more than half of it is only seen with averted vision. In this case I wondered if it wasn't averted imagination. It appeared to be about 15 arc minutes by 30 arc minutes in size. There also appeared to be two spiral arms visible with a hint at a third at times.

I really needed more aperture for viewing this galaxy. It would’ve probably been much easier to see it had the humidity been lower and without a six day old moon low in the western sky. It requires good dark skies to view with a small telescope.
DEEP SKY OBSERVATION FORM

CONSTELLATION: Camelopardalis

OBJECT: IC 342

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Day & Date: Thursday, Nov 11, 2010
Time (local): 9:15 PM - 9:45 PM EDT
Time (UT): _____________________________
Observer: BLB
Location: Mt. Aire Granite Overlook mile post 203 Blue Ridge Parkway

INSTRUMENT
Telescope: TV 102
Aperture: 4" refractor
Focal Length/Ratio: _____________________________
Eyepiece: 13 mm
Magnification: 6.7x
Field of view: 01° 13'
Filter: None

Seeing (1-5): Excellent 4.5
Transparency (1-7): Very Good 5.7
Limiting Magnitude: 9.7
Temp: 40°F  Wind: 4-5 mph
Humidity: 67%

OBJECT
RA: 03 hr. 46.8 min.
Dec: +68° 06' min.
Type: Galaxy
Listed Magnitude: 8.4
Listed Size: 21.8' x 70.9'
Altitude of Object: 75°

NOTES
This is a very dim froggy spot in the 4" refractor best seen withverted vision. This galaxy looks splotchy with areas that are brighter than other areas. Only by moving the telescope and a lot of tube topping could I see any shape at all. I thought it looks a little larger than its listed size. It appeared to be approximately 12' x 30' in size.
I’ve tried sketching and have had little success. This particular object was a tough one. I got very little visually except the star pattern that let me know I was on the right object. I tried to "reverse engineer" the attached photo to match Roger Ivester’s sketch. I only minimally stretched the data to mimic what might be seen through an eyepiece.
W.S. Houston reported having seen it in his 4-inch Clark refractor. On a mag. 5 night, I failed to see any trace of it with my 5-inch f/4.7 at 30X, 39X and 86X. Finally, on April 16, 2009, I found it "on the edge of imagination," very dim. I saw a dim star chain crossing it. A brighter chain is nearby, when using a 6-inch at 59X. (See S&T 2-91, page 223; 11-91 page 559. Also see Deep-Sky Wonders 2-94, page 108 and June 2007 page 17).
Tom English: Observer from North Carolina

Using a 16” RCOS, I observed this object from Jamestown. There was very good transparency, but it was hampered by fairly bright moonlight. I could see the central core, but nothing else. I really likes the line of stars that cuts through the foreground to give a good reference frame for this galaxy.
IC-342 is one of the most unique galaxies in the heavens due to its orientation, size and brightness. It’s a face-on spiral galaxy approximately 20 arc-minutes in diameter and glows at mag 9.67. Because of its size, brightness and orientation, it’s very hard to see visually. It spans only 1/3 the distance across as the face-on spiral M-33 in the constellation Triangulum, which is 35 times brighter. So M-33 is easier to see in a telescope. IC-342 has about the same total luminosity as M-100, a face-on spiral galaxy residing in Coma Berenices, however, since it spans three times the diameter as M-100, M-100 is much easier to see visually.

The only face-on spiral galaxy with the same angular size that comes to mind is M-101 in Ursa Major. However, M-101 is 5 times brighter, so big light buckets reveal M-101’s spiral arms with much greater ease.

IC-342 lies in the northerly constellation Camelopardalis. It is slightly southwest of the midpoint between two mag. 4.5 stars, Gamma Camelopardalis and BE Camelopardalis. The two stars are 5.75° apart.

To see IC-342 in its splendor requires a long exposure with an astronomical camera. The galaxy is classified as a weakly barred and loosely wound spiral galaxy. The Hubble classification SABc. (S means spiral, AB means weekly barred, and c means loosely wound spiral arms). In barred spiral galaxies, the spiral arms usually originate at the ends of the bar. On IC-342, there appear to be two spiral arms originating from each end of the galactic bar. The arms tend to fan out as one traces them away from the bar.

My image of IC-342 was taken January 6, 2010 at the Wildwood Pines Observatory in Earl, NC. I used an SBIG ST-2000XCM CCD camera, operating at -20°C, attached to a 190mm (7.5-inch) f/5.3 Maksutov-Newtonian telescope. The exposure was 60 minutes.