

M49 and Nearby Galaxies

The Virgo B SubCluster

The Virgo B SubCluster

The Virgo B SubCluster is a group of galaxies that form a subgroup of the larger Virgo Cluster, which has its gravitational centre 4.5 degrees away around the massive elliptical galaxy M87

M49, another large elliptical galaxy, forms the centre of the Virgo B SubCluster.

Other members include:

NGC4417, NGC4434, NGC4442, NGC4483, NGC4526, NGC4535

NGC4570, and many other smaller and fainter galaxies

M49 (M 49 - NGC 4472)

Type: **Galaxy**
Magnitude: **8.40** (extincted to: **8.56**)
Surface brightness: **12.98** (extincted to: **13.15**)
RA/Dec (J2000.0): 12h29m48.01s/+8°00'00.0"
RA/Dec (J2021.4): 12h30m53.22s/+7°52'56.3"
Hour angle/DE: 0h47m51.77s/+7°53'41.1" (apparent)
Az/Alt: +199°41'47.3"/+52°27'36.6" (apparent)
Ecliptic longitude/latitude (J2000.0): +183°38'19.7"/+10°17'51.8"
Ecliptic longitude/latitude (J2021.4): +183°56'16.2"/+10°17'51.2"
Galactic longitude/latitude: -73°03'47.7"/+70°11'48.8"
Size: +0°08'54"



p Vir - 30 Vir - HIP 61960

Type: **pulsating variable star** (DSCTC)
Magnitude: **4.85** (extincted to: **5.01**)
Absolute Magnitude: 2.05
Color Index (B-V): **0.07**
Magnitude range: **4.88+4.90** (Photometric system: V)
RA/Dec (J2000.0): 12h41m53.18s/+10°14'06.2"
RA/Dec (J2021.4): 12h42m57.97s/+10°07'06.1"
Hour angle/DE: 0h35m47.23s/+10°07'46.9" (apparent)
Az/Alt: +195°36'00.2"/+55°17'58.7" (apparent)
Ecliptic longitude/latitude (J2000.0): +185°30'50.3"/+13°32'33.5"
Ecliptic longitude/latitude (J2021.4): +185°48'47.3"/+13°32'32.6"
Galactic longitude/latitude: -65°06'36.5"/+72°57'27.0"
Distance: 118.30 ly
Spectral Type: A0V
Parallax: 0.02757"



Vindemiatrix

20 Vir - HIP 61246

Type: star

Magnitude: 6.25 (extincted to: 6.41)

Absolute Magnitude: 0.44

Color Index (B-V): 0.95

RA/Dec (J2000.0): 12h33m2.81s/+10°17'44.5"

RA/Dec (J2021.4): 12h34m7.79s/+10°10'41.6"

Hour angle/DE: 0h44m37.27s/+10°11'22.6" (apparent)

Az/Alt: +199°19'46.0"/+54°52'51.1" (apparent)

Ecliptic longitude/latitude (J2000.0): +183°26'43.1"/+12°43'18.6"

Ecliptic longitude/latitude (J2021.4): +183°44'40.0"/+12°43'18.0"

Galactic longitude/latitude: -72°22'35.6"/+72°37'06.8"

Distance: 472.69 ly

Spectral Type: G8III

Parallax: 0.00690"

Vindemiatrix



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Vindemiatrix



R Vir - HIP 61667

Type: **pulsating variable star** (M)
Magnitude: **7.75** (extincted to: **7.91**)
Absolute Magnitude: -1.16
Color Index (B-V): **1.26**
Magnitude range: **6.10+12.10** (Photometric system: V)
RA/Dec (J2000.0): 12h38m29.89s/+6°59'19.1"
RA/Dec (J2021.4): 12h39m35.04s/+6°52'17.9"
Hour angle/DE: 0h39m10.09s/+6°53'04.0" (apparent)
Az/Alt: +195°54'01.2"/+51°57'11.5" (apparent)
Ecliptic longitude/latitude (J2000.0): +186°03'28.7"/+10°13'57.0"
Ecliptic longitude/latitude (J2021.4): +186°21'25.2"/+10°13'56.0"
Galactic longitude/latitude: -66°19'37.0"/+69°37'38.8"
Distance: 1976.71 ly
Spectral Type: M3.5-8.5IIIe
Parallax: 0.00165"
Period: 145.63 days
Next maximum light: 2024-07-20 02:09:36 UTC
Rising time: 50%



M49



Photo: Rick J on
Cloudy Nights forum

M49

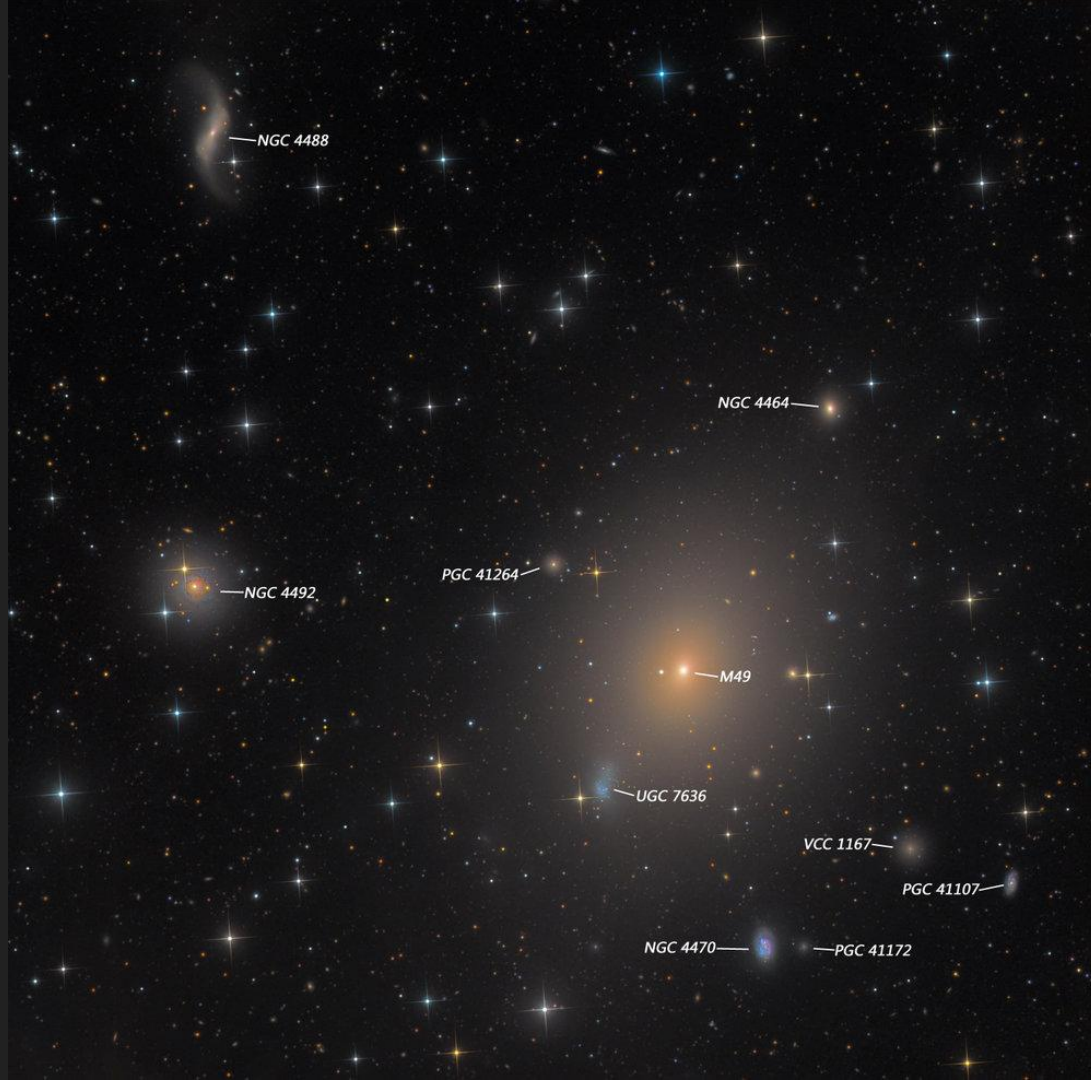


Photo: Mark Hanson

M49

Elliptical galaxy (E2), the first member of the Virgo Cluster to be discovered by Charles Messier in 1777, shining fairly bright at magnitude 8.4 with surface brightness of 12.8

M49 is the most luminous galaxy in the Virgo Cluster, despite being smaller in size than the massive M87. It is about 52.5 million light years away, with a diameter of 124,000 light years and is receding from us at 630 miles/sec.

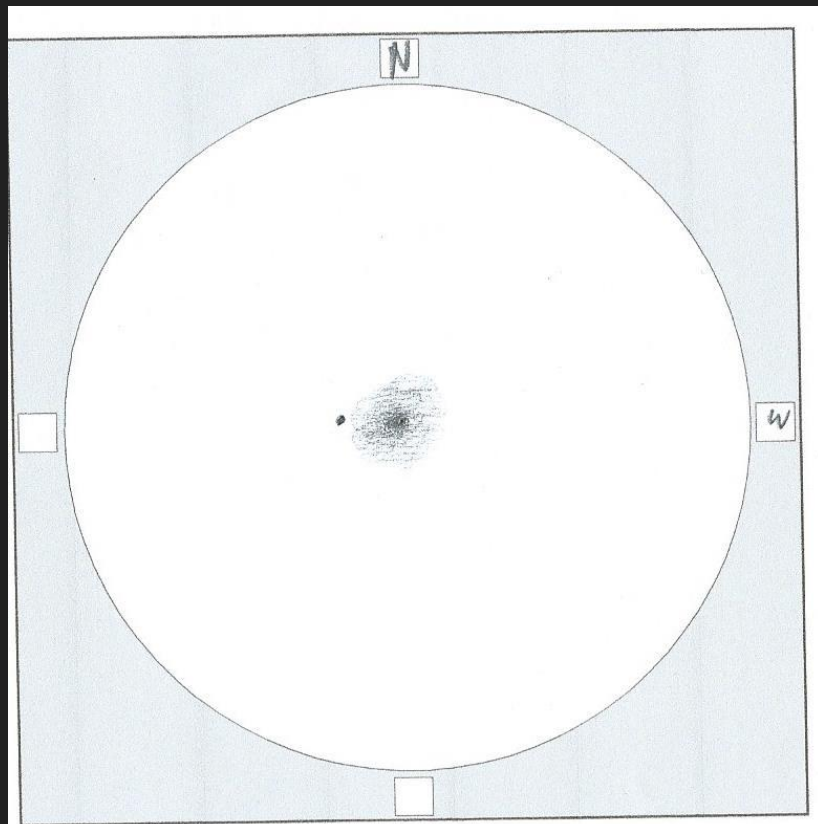
As a giant elliptical, M49 has an estimated collection of some 6,300 globular clusters, with an average age of 10 billion years.

M49's core is a low-ionization nuclear emission region (LINER) with a weak, two-sided radio jet. Despite looking like a typical radio galaxy, it has emissions that are very much weaker than normal.

X-ray emissions from the nucleus hint at a supermassive blackhole of about 565 million solar masses

M49 is gravitationally interacting with dwarf irregular galaxy UGC7636, with a debris trail extending from the dwarf over 1x5 arcminutes, corresponding to about 6x30 kpc in size. This interaction is catalogued as Arp 134.

Pencil Sketch of M49 - 4.5 inch Newtonian @ 120x



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NGC 4532

NGC4365

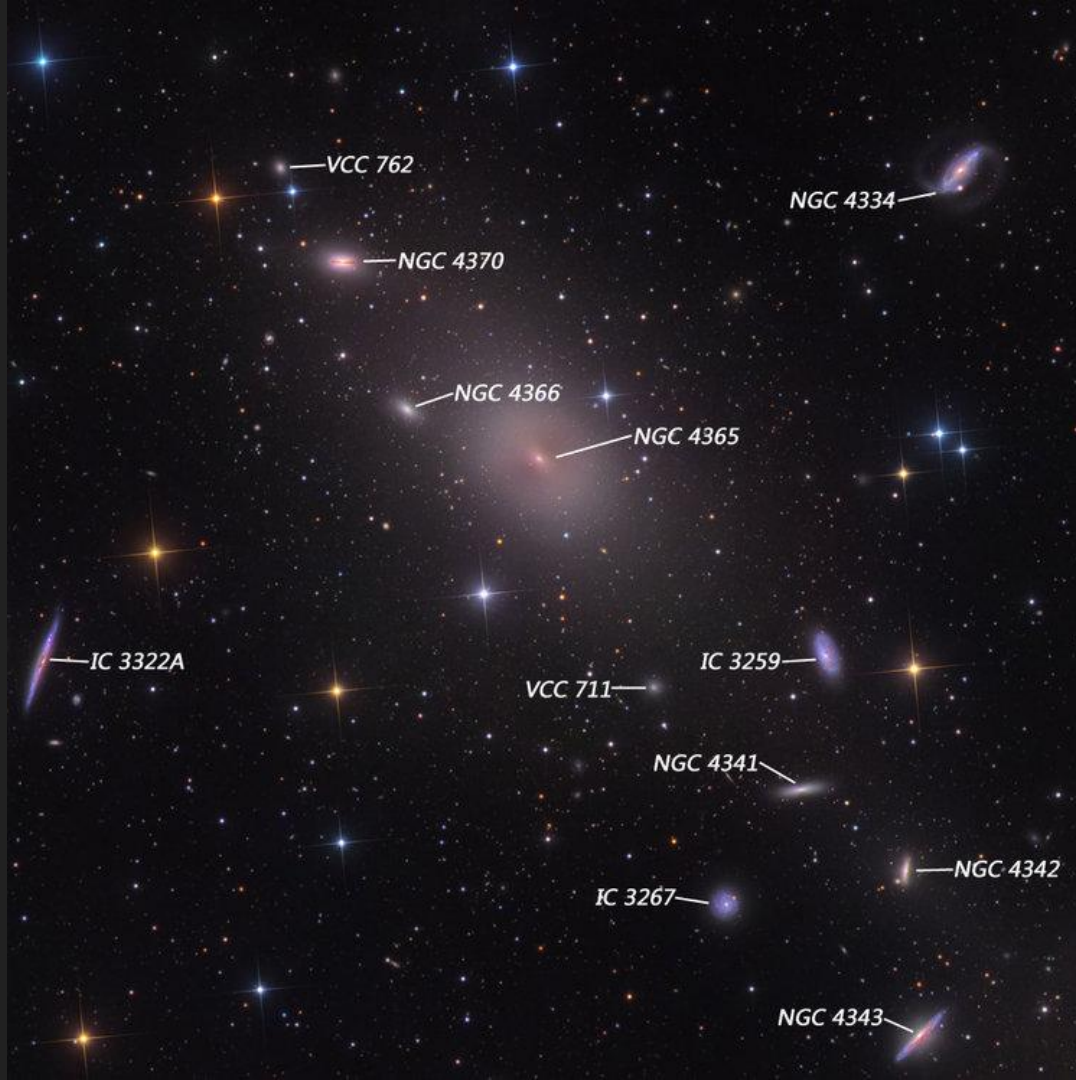


Photo: Mark Hanson

NGC4365

Another giant elliptical, this galaxy is nearby M49 to its southwest, but in reality it is 20 million light years more distant at 75 million light years away from us - not actually part of the Virgo B subcluster gravitationally

NGC4365 is fairly faint at magnitude 11, surface brightness 14.8

NGC4365 anchors another group of smaller galaxies, and is currently tidally stripping stars and globular clusters from NGC4342

One of its most interesting features is that it has a counter-rotating core, turning in the opposite direction of most of the stars in the galaxy. This provides strong evidence for the theory that ellipticals are late-stage galaxies that have grown by accreting other galaxies onto themselves

The mean age of its stellar population is greater than 12 billion years

Its central supermassive black hole is thought to be no larger than 300 million solar masses

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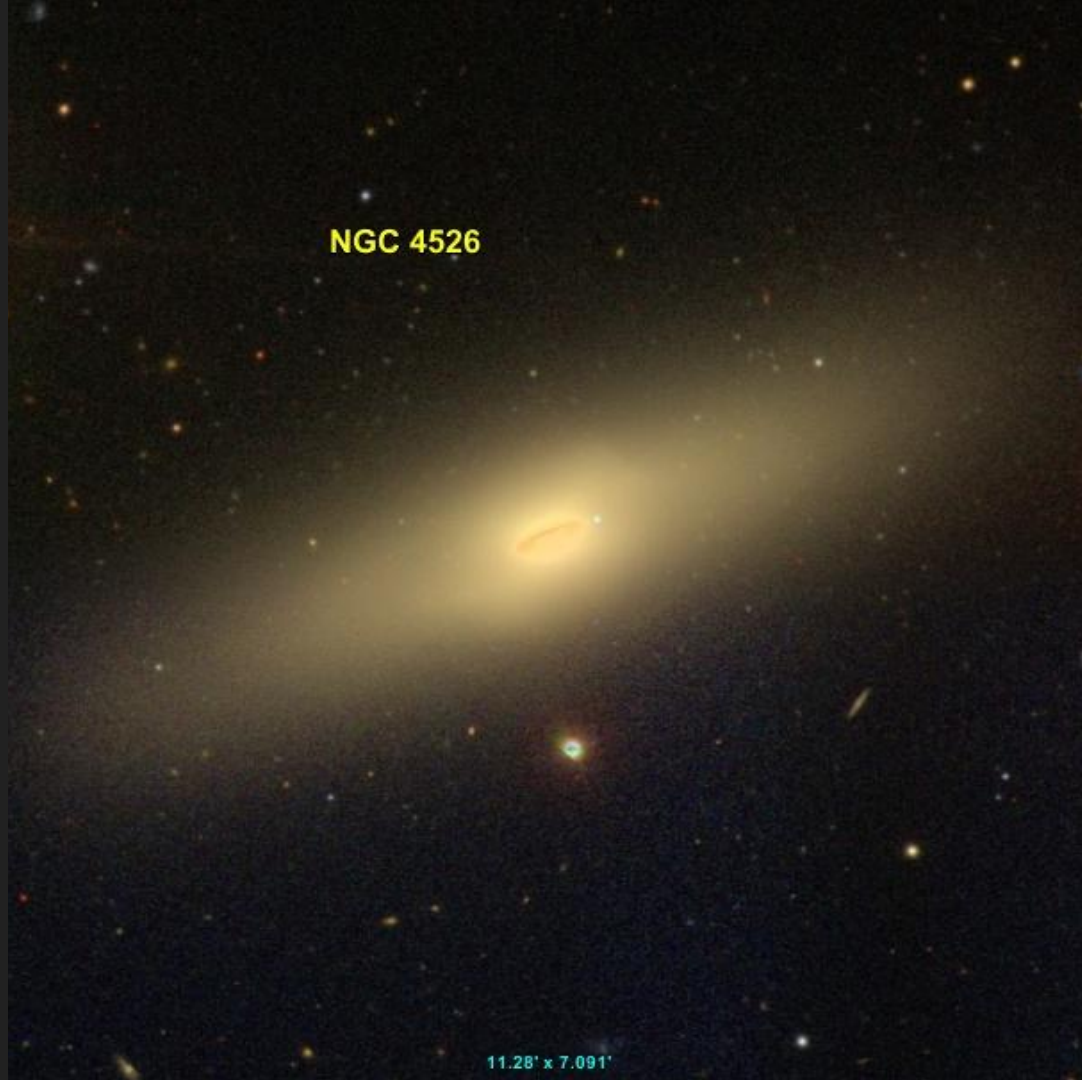


NGC4526

NGC 4526

11.28' x 7.091'

Photo: Sloan Digital
Sky Survey



NGC4526

SN1994D



Photo: Hubble ST

NGC4526 - RASC Finest NGC #80

A mixed lenticular galaxy (SAB(s)0) about 55 million light years distant, discovered by William Herschel on April 13, 1784, glowing at mag 9.7 with a surface brightness of 12.8

The galaxy is near edge on, with a weak bar across the centre

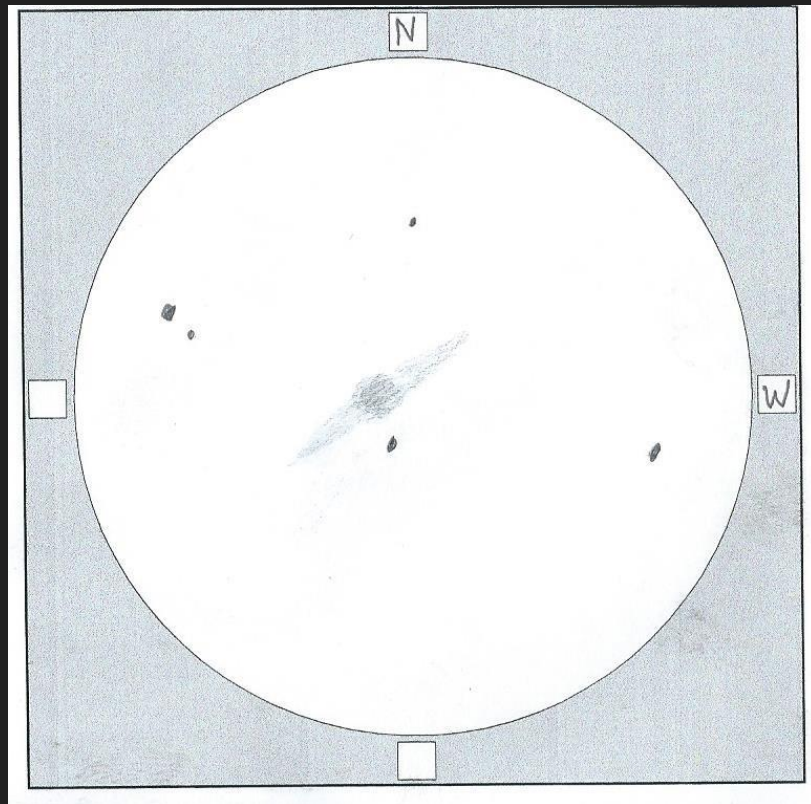
In the galaxy's outer halo, globular cluster orbital velocities indicate an abnormal paucity of dark matter

The inner nucleus contains a supermassive black hole of about 450 million solar masses, the first to be estimated by measuring the rotation of gas molecules around the centre of the nucleus.

Stephen J. O'Meara calls this galaxy the Hairy Eyebrow Galaxy due to the prominent dust lanes in the nucleus

Stellarium and Interstellarum Deep Sky Atlas mistakenly label this galaxy as the Lost Galaxy

Pencil Sketch of NGC4526 - 4.5 inch Newtonian @ 120x



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NGC4535



Photo: Very Large
Telescope, Paranal
Observatory, Chile

NGC4535



Photo: Hubble ST

NGC4535 - RASC Finest NGC #81

A loosely wound barred spiral (SAB(s)c) located 54 million light years from Earth, discovered in 1785 by William Herschel, glowing at mag 9.8 with surface brightness 13.8

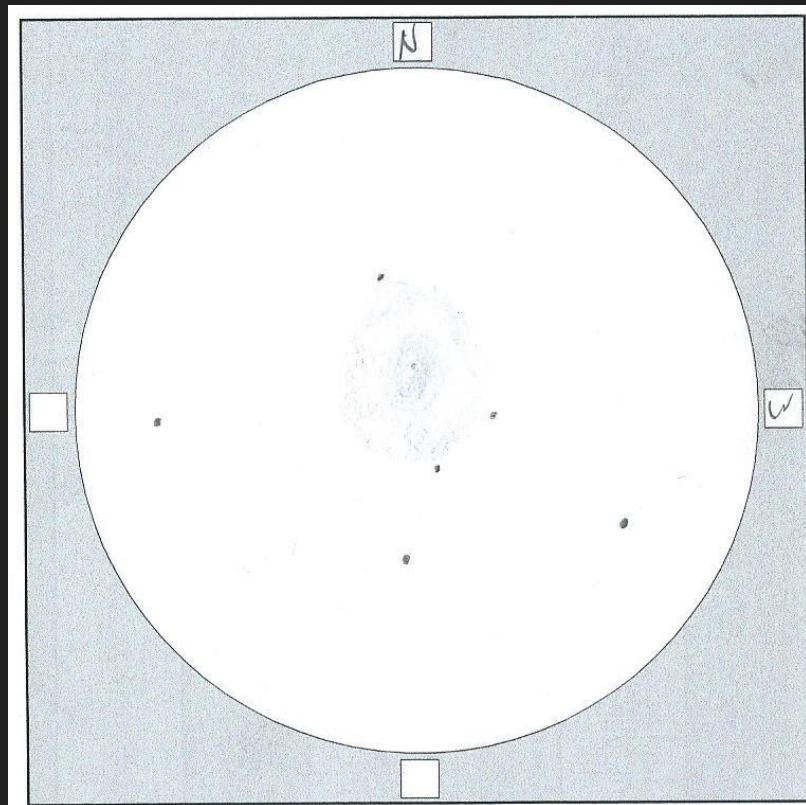
The galaxy has two spiral arms near the core which begin to branch many times further out

The population of the arms is typical, with many hot, young blue stars while the core bulge and inner parts of the arms contains an older population indicated by its yellowish tinge

The nucleus is small and has a spectrum resembling that of an HII region

In the 1950s, Leland Copeland called this galaxy the Lost Galaxy due to its ghostly, hazy presence at the eyepiece. More recently it has been called McLeish's Object in honour of astronomer David McLeish who made a number of discoveries at the Cordoba Observatory in Argentina

Pencil Sketch of NGC4535 - 4.5 inch Newtonian @ 120x



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NGC4570

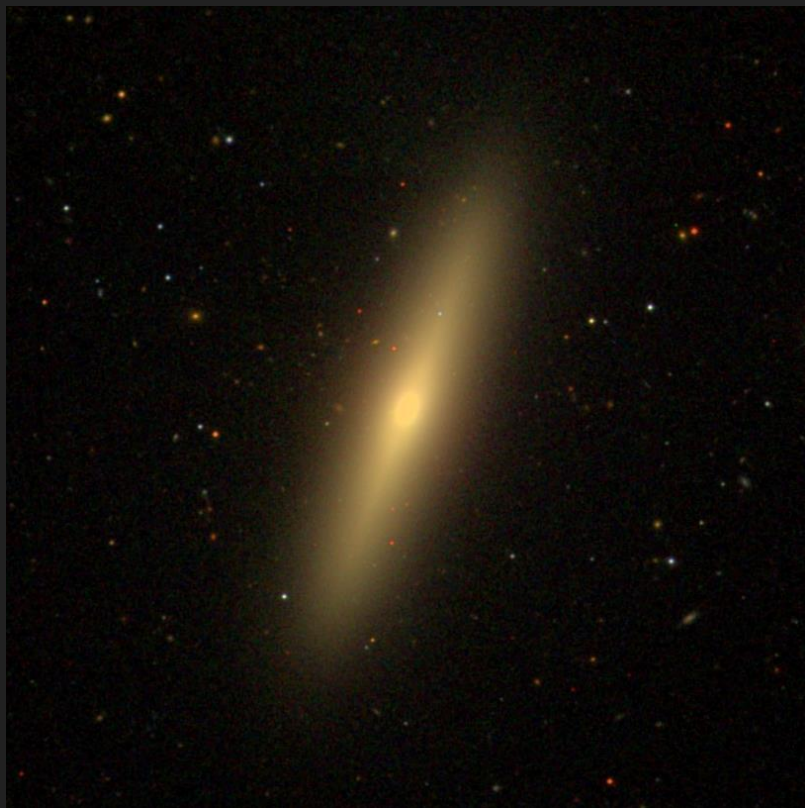


Photo: Sloan Digital Sky Survey

NGC4570

This edge-on lenticular galaxy (S0) is located about 57 million light years away. NGC4570 was discovered by William Herschel on April 13 1784, glowing faintly at magnitude 10.9, surface brightness of 13.8

NGC4570 has a very interesting structure, with a nuclear disc that extends to a radius of 330 light years. There is then a gap before the outer disk, also about 330 light years wide. This multi-disc structure may have resulted from evolution induced by a small nuclear bar. However observations of globular clusters surrounding the galaxy found a significant subpopulation with ages from 1-3 billion years, in good agreement with the stellar population of the nuclear disc, suggesting that both these populations formed after a merger/accretion event that introduced significant amounts of gas and triggered a starburst.

Pencil Composite based on Observations & SDSS Images



References

Blom C. et al. 2014. "The SLUGGS Survey: new evidence for a tidal interaction between the early-type galaxies NGC4365 and NGC4342." *Monthly Notices of the Royal Astronomical Society* 439(3) 2420-2653

Cohen J. et al. 2003. "The Ages and Abundances of a Sample of Globular Clusters in M49 (NGC4472)." *The Astrophysical Journal* 592(2) 866-883.

Davis T. et al. 2013. "A black-hole mass measurement from molecular gas kinematics in NGC4526." *Nature* 494(7437) 328-330.

Ekers, R and Kotanyi C. 1978. "NGC4472 - A very weak radio galaxy." *Astronomy and Astrophysics* 67(1) 47-50.

Kotulla R. et al. 2008. "Young globular clusters in an old S0: clues to the formation history of NGC4570." *Monthly Notices of the Royal Astronomical Society* 387(3) 1149-1156

Loewenstein M. et al. 2001. "Chandra Limits on X-Ray Emission Associated with the Supermassive Black Holes in Three Giant Elliptical Galaxies." *The Astrophysical Journal* 555(1) L21-L24

McNamara B. et al. 1994. "A violent interaction between the dwarf galaxy UGC7636 and the giant elliptical galaxy NGC4472." *The Astronomical Journal* 108(3) 844-850.

Statler T. et al. "Long-lived triaxiality in the dynamically old elliptical galaxy NGC4365: a limit on chaos and black hole mass." *Monthly Notices of the Royal Astronomical Society* 353 (1) 1-14.

Stephen James O'Meara. 1998. *Deep Sky Companions: The Messier Objects*. 2nd ed. Cambridge University Press.

Stephen James O'Meara. 2007. *Deep Sky Companions: Hidden Treasures*. Cambridge University Press.

<https://esahubble.org/images/potw2103a/>

<http://skyserver.sdss.org/dr16/en/tools/chart/navi.aspx>

<http://stellarium.org/en/>