Hoag's Object

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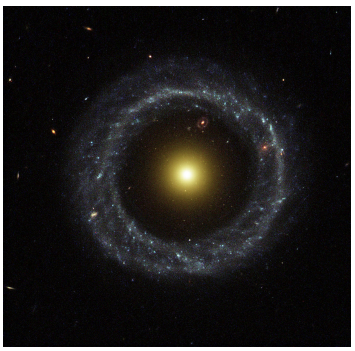 Hoag's Object taken by the Hubble Space Telescope. Courtesy of NASA/ESA	
Observation data (J2000 epoch)	
Constellation	Serpens Caput
Right ascension	$15^h\ 17^m\ 14.4^s$[]
Declination	+21° 35′ 08″[]
Redshift	12,740±50 km/s[][1]
Distance	600±30 Mly (183±8 Mpc)[1][a]
Type	SA0(r)[*citation needed*]
Apparent dimensions (V)	0′.28 × 0′.28[]
Apparent magnitude (V)	16.0[]
Notable features	Ring galaxy
Other designations	
PGC 54559,[] PRC D-51[]	
See also: Galaxy, List of galaxies	

Hoag's Object is a non-typical galaxy of the type known as a ring galaxy. The appearance of this object has interested amateur astronomers as much as its uncommon structure has fascinated professionals. The galaxy is named after Arthur Allen Hoag who discovered it in 1950 and identified it as either a planetary nebula or a peculiar galaxy[2] with eight billion stars.

Characteristics

A nearly perfect ring of young hot blue stars circles the older yellow nucleus of this ring galaxy ~600 million light-years away in the constellation Serpens. The diameter of the 6″ (seconds of arc) inner core of the galaxy is about 17±0.7 kly (5.3±0.2 kpc) while the surrounding ring has an inner 28″ diameter of 75±3 kly (24.8±1.1 kpc) and an outer 45″ diameter of 121±4 kly (39.9±1.7 kpc), which is slightly larger than the Milky Way Galaxy.[1][a] The gap separating the two stellar populations may contain some star clusters that are almost too faint to see. As rare as this type of galaxy is, another more distant currently unnamed ring galaxy can be seen through Hoag's Object, between the nucleus and the outer ring of the galaxy, at roughly the one o'clock position in the picture to the right.

History and formation

Even though Hoag's Object was clearly shown on the Palomar *Star Survey*, it was not included in either the *Morphological Catalogue of Galaxies*, the *Catalogue of Galaxies and Clusters of Galaxies*, or the *catalogue of galactic planetary nebulae*.[1]

In the initial announcement of his discovery, Art Hoag proposed the hypothesis that the visible ring was a product of gravitational lensing. This idea was later discarded because the nucleus and the ring have the same redshift, and because more advanced telescopes revealed the knotty structure of the ring, something that would not be visible if the ring were the product of gravitational lensing.[]

Many of the details of the galaxy remain a mystery, foremost of which is how it formed. So-called "classic" ring galaxies are generally formed by the collision of a small galaxy with a larger disk-shaped galaxy. This collision produces a density wave in the disk which leads to a characteristic ring-like appearance. Such an event would have happened at least 2–3 billion years in the past,[*citation needed*] and may have resembled the processes that form polar-ring galaxies. However, there is no sign of any second galaxy that would have acted as the "bullet", and the core of Hoag's Object has a very low velocity relative to the ring, making the typical formation hypothesis quite unlikely.[*citation needed*]

Noah Brosch suggested that Hoag's Object might be a product of an extreme "bar instability" which occurred a few billion years ago in a barred spiral galaxy.[3] Schweizer *et al*[] claim that this is an unlikely hypothesis because the nucleus of the object is spheroidal, whereas the nucleus of a barred spiral galaxy is disc-shaped, among other reasons. However, they admit evidence is somewhat thin for this particular dispute to be settled satisfactorily. Interestingly, a few galaxies share the primary characteristics of Hoag's Object, including a bright detached ring of stars, but their centers are elongated or barred, and they may exhibit some spiral structure. While none match Hoag's Object in symmetry, this handful of galaxies are known to some as Hoag-type galaxies.

Notes

a. ^ 1974 O'Connell paper[1] assumes a Hubble constant of 75 this figure adjusts for 2006's $70^{+2.4}_{-3.2}$ (km/s)/Mpc.

References

External links

- Hubble Space Telescope image of Hoag's Object. (http://heritage.stsci.edu/2002/21/big.html)
- Accretion Rings (http://nedwww.ipac.caltech.edu/level5/Rings/Rings17_2.html) Galactic Rings – Fund. Cosmic Physics, 1996. Vol. 17, pp. 95–281
- A Wheel within a Wheel (09/05/2002) (http://oposite.stsci.edu/pubinfo/PR/2002/21/index.html) News Release Number: STScI-2002-21 – HubbleSite
- ESA/Hubble image of Hoag's Object (http://www.spacetelescope.org/images/html/opo0221a.html)

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