

The Spring Sky

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Fixed Stars

One of the brightest galaxies in the spring sky is the relatively unknown NGC4258. Although considerably brighter than many objects on Messier's original list, this object was apparently added only later, with the number M106. It also lacks a descriptive name. It is located, along with several other bright galaxies, in the constellation Canes Venatici. It is in a rather empty region close to Ursa Major, about eight degrees southeast of the bright star Phecda, one of the stars in the big dipper.

In addition to being bright, NGC4258 is also quite large, at least in angular size, so that, while it is a very attractive object for smaller telescopes, it appears rather diffuse with larger apertures. It is a moderately late type spiral, so that it has rather open and well separated arms, but these have an irregular and ragged appearance. To further complicate matters, it is generally classified as a barred spiral, although the barred structure is not immediately obvious.

When the Westerbork Synthesis Radio Telescope in The Netherlands was brought into operation in the early 1970s it became possible to make detailed radio observations of nearby galaxies. NGC4258 was one of the first objects chosen for observations because of its size, which just filled the field of observation, and the good separation of the spiral arms. Imagine the consternation of the astronomers when they saw the first results, which showed the spiral arms rotated 90 degrees from their expected position! The computer programmers were immediately called upon the carpet and told to correct the error so as to get the orientation right. Only after they were unable

to find any error did it occur to the astronomers that they might be seeing the real thing.

It was already known that some galaxies showed radio jets, pointing out in two opposite directions from their centers. When found in disk galaxies, these directions are generally perpendicular to the disks, suggesting that the jets pointed along a rotation axis, possibly of a compact object in the center of the galaxy. The jets

became visible only after they had encountered enough of the very diffuse intergalactic material that it could influence their motion. Supposing that, through some dynamical accident, such as a collision with another galaxy, this compact object should be turned around so that its rotation axis lay in the plane of the disk. Then the very high velocity particles, which make up the jet, would encounter the gas and magnetic fields in the disk. This would make the jets visible in the disk itself, and just in the form of radiation (we call it synchrotron radiation because it is also observed in particle accelerators right here on Earth) that was being observed

with the Westerbork telescope. The jets, which are initially straight, will be bent into a spiral form by the rotation of the galaxy, so that they will closely imitate the normal spiral arms, but they can be located in an entirely different place.

Shortly before the discovery of the radio arms, concentrations of ionized hydrogen had been found outlining the same regions. With the help of the radio data, these could be interpreted as due to heating of the interstellar medium by the action of the jets. Observations of neutral hydrogen were made, also with the Westerbork telescope, shortly after the discovery of the



NGC4258 (M106)
(N.A.Sharp, REU program/NOAO/AURA/NSF)

radio arms. Rather to our surprise (your correspondent played some part in this), these observations showed very little that could be attributed to the jets or the radio arms. The normal spiral arms showed up very clearly and had the normal sort of motion, although the situation was complicated by the fact the NGC4258 is a barred spiral. The gas density in the regions between the arms is too low to give reliable results, and the fact that much of it is ionized only makes matters worse.

Recently the presence of a massive object in the center of NGC4258 has been confirmed by observations of a rapidly rotating disk of gas. Such disks are not uncommon in galaxies, and they are interpreted as indicating the presence of a compact object. Such an object is probably present in the center of the Milky Way, although it is not currently active. The unusual thing about NGC4258 is not the presence of the compact object itself, but its remarkable orientation, which allows the jet to interact with the disk. There are only a few other cases in which such an interaction is suspected, but in none of them is the effect so clearly illustrated as here. Unfortunately the visual observer will see none of this, but hopefully knowing what is going on will increase his pleasure in observing this exciting object.

Planets

Mercury can be glimpsed briefly at the beginning of April in the western evening sky, and again, under unfavorable circumstances, in the eastern morning sky around the middle of May.

During April, Venus will still be high in the evening sky, but it will be dropping lower into the northwest. It will reach maximum brightness at the beginning of May before disappearing into the evening twilight. It will be occulted by the Moon on May 21, but this will be visible mainly from the eastern hemisphere. A very rare event, a transit of Venus, in which it passes in front of the solar disk, will occur on June 8. The last time this happened was in 1882. There will be another transit in 2012 and then not again for more than 100 years. The transit will be seen from most of the eastern hemisphere. The last phase will be visible from eastern North America, but in our part of the world it will be finished before sunrise. Transits of Venus (and of Mercury) used to be of great importance in determining the dimensions of the Solar System. With the advent of new techniques, this is no longer the case, but they remain events of great interest.

Mars will still be well observable in the evening during April, but it will disappear into the evening twilight before the end of June.

Jupiter will be visible in the evening sky during the whole quarter, but by June it will be rather low in the west. It is stationary on May 5.

Saturn remains visible in the evening sky during most of the quarter, but it will be lost in the evening twilight early in June.

Pluto, which is around the border of Ophiuchus and Serpens Cauda, will be in opposition on June 10, with a magnitude of 13.8. Good luck!

Meteor Showers

The strongest meteor shower of the spring quarter, the eta Aquarids, peaking on May 4, will be lost in the full moon this year. It could be best observed, if at all, in the morning hours.

The best chance to observe meteors comes on the night of April 21-22 when the Lyrids are expected to peak. The Moon will interfere only in the early evening. The shower is very brief, but both the time of maximum and the intensity are variable, making this a worthwhile observing opportunity.

The pi Puppids belong to a new stream, associated with Comet 26P/Grigg-Skjellerup. The maximum rate is as yet quite variable, depending on the position of the comet in its orbit. Recent observations have given very low rates, but it will be interesting to see how the meteors spread out along the orbit as the stream ages. This stream is better observed from the southern hemisphere.

After a long absence, the June Bootids reappeared strongly in 1998. This year a maximum is predicted for the early evening of June 26-27. Unfortunately the Moon will interfere with evening observations, but both the time and the intensity of the peak are quite uncertain, so observations during any part of the night might be rewarding.

Comets

There will be two bright comets visible during the quarter, but both are quite far south for observation from our area. Comet LINEAR (2002 T7) should be visible in the morning twilight during part of April and early May and again in the evening twilight early in June,

when it appears that it will be well past maximum. Comet NEAT (2001 Q4) can be observed during early May, when it will be near maximum, but it will be very far south. Both comets are expected to reach second or third magnitude, but with luck, they might become even brighter. We are indebted to MIRA friend Tom Loughheed for alerting us to these comets.

Eclipses

There will be two eclipses during the quarter, but neither one will be visible from anywhere in North America. A partial solar eclipse on April 29 will be visible only from the southern Atlantic Ocean and the southern part of Africa. A total lunar eclipse two weeks later, on May 4, will be visible from most of Africa and southern Asia and partly visible from most of the eastern hemisphere and South America. None of it will be visible from North America. We will have to wait until October for any eclipse activity.