SPACEWATCH

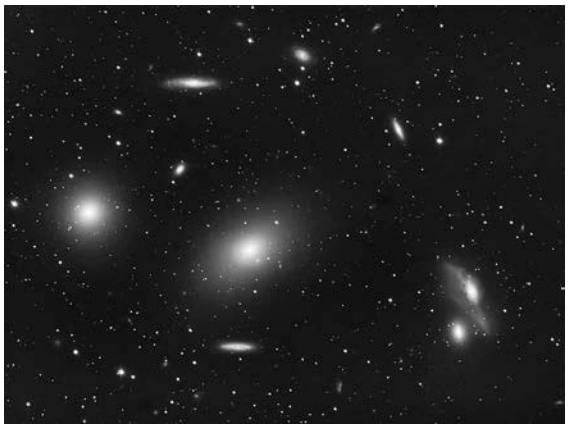
the newsletter of the Abingdon Astronomical Society

Next Talk
10th June 2019
Admiral Smyth and the Bedford Catalogue
Rob Peeling
AAS

EDITORIAL

As the 2018/19 session starts to wind down it is a good time to reflect on where we are. The weather has not been that kind this observing season, at least for me and I hope that others may have had better luck. I would like to have more images for Spacewatch as we currently really rely on Ian and Steve to send images in and I know there are a lot of other imagers out there. Unfortunately I can't just cycle through peoples accounts to try and find their latest images so if you have something new please let me know. At least we only have a month now to the summer solstice when nights start to get darker again. With the 50th anniversary of the Apollo 11 moon landing due in July we are looking to see if we can do some kind of public observing event for that. Of course it does not get dark (at all) that month but we have the moon and Jupiter around.

We are in the process of getting some new books for the library to see if we can reverse the trend of its lack of use and hopefully these will meet with peoples approval. It is always a difficult call whether to get advanced books or really low level ones. It would be interesting to know people's views on the library as to whether it is something that people find useful or something we can do away with.



Markarians Chain
– Tony Boer

THE NIGHT SKY THIS MONTH

by Steve Creasey

The shorter nights are now making astronomy even more difficult, as if our weather wasn't enough to contend with! But who doesn't enjoy a challenge 😉
May is a quiet month for meteor showers, and the planets are either very low to the horizon or rising just before dawn.
There is however lots to look for when it comes to Deep Sky Objects, and the May full moon, known as the Full Flower Moon, always shines in or near the stars of Libra.

The Planets

Mercury - During the opening days of May, Mercury will complete a so-so morning apparition for Northern Hemisphere observers (and a very good one for southerners), remaining in view low over the eastern pre-dawn sky until mid-month while it swings sunward and dips into the morning twilight. At the same time, the planet will brighten as its illuminated phase increases from waxing gibbous to full. Superior conjunction with the sun will occur on May 21.

Venus - will spend the entirety of May positioned low in the eastern pre-dawn sky among the stars of first Pisces and then Aries. Venus will remain embedded within the morning twilight while it slowly decreases its angular separation from the sun. During this period, the extremely bright planet will shine at magnitude -3.8 and exhibit a nearly fully illuminated phase. Its disk will slightly decrease in apparent diameter from 11.5 to 10.5 arc-seconds as it recedes from Earth. On May 2, the old crescent moon will land 4 degrees to the lower right (south) of Venus. On May 18, Venus will pass one degree south of Uranus – but that distant, dim planet will be very hard to observe.

Mars - Reddish Mars will spend May in the western early evening sky, decreasing its angular separation from the sun from 40 degrees to 30 degrees and

reducing its viability as an observing target. Mars' easterly prograde motion will carry it from the stars of Taurus and into Gemini on May 16. During the course of May, Earth's orbital motion will continue to increase our distance from the Red Planet. As a result, Mars will diminish in brightness (from visual magnitude 1.64 to 1.76) and its apparent disk diameter will decrease from 4.2 to 3.9 arc-seconds. On the evening of May 7, the waxing crescent moon will land 3.5 degrees to the lower left (south) of Mars. On May 18, Mars will pass less than 0.5 degrees to the right (north) of the prominent open star cluster known as Messier 35 (NGC 2168). The following night, Mars will move to sit 0.3 degrees above that cluster. Both objects will appear together in the field of view of a medium power telescope.

Jupiter - which began to rise just before midnight in late April, will gradually move into a convenient position for evening observing in the south-eastern sky during May. By the end of the month, the bright magnitude -2.5 planet will be rising at about 9:30 p.m. local time. Throughout May, Jupiter will be moving retrograde westward through the stars of southern Ophiuchus. In the post-midnight sky on May 19, the waning gibbous moon will be positioned only 7 degrees to the upper right (west) of bright Jupiter. As the pair crosses the night sky together, the moon's orbital motion will carry it noticeably closer to Jupiter. On the following night, the moon will jump to a position to Jupiter's lower left (east). Watch for occasional transits of the round, black shadows cast upon Jupiter by its four large Galilean moons.

Saturn - will spend May as a medium bright, yellowish object moving retrograde through the north-eastern part of Sagittarius. In early May, the ringed planet will rise in the east after 1:30 a.m. local time and remain visible until dawn, when it will be culminating 24 degrees above the southern horizon. During the closing days of the month, Saturn will begin to rise just before midnight local time. Meanwhile, the planet will slightly brighten and grow larger in apparent size as Earth moves closer to it ahead of opposition in July. When the waning gibbous moon rises from the south-eastern horizon after 11 p.m. local time on May 21, it will be positioned 9 degrees to the upper right (west) of Saturn. As the pair crosses the night sky, the moon's orbital motion will carry it noticeably closer to Saturn.

Uranus - During May, blue-green Uranus (magnitude 5.89) will be in the pre-dawn sky among the stars of southwestern Aries, but it will not be readily observable until late in the month when it will begin to rise in a dark sky before 4:30 a.m. local time. On May 18, Venus' rapid orbital motion toward the sun will carry it one degree to the lower right (south) of Uranus. The two planets will sit low over the east-northeastern horizon before just dawn, making dim Uranus difficult to see.

Neptune - Blue-tinted Neptune (magnitude 7.9) will spend May in the eastern pre-dawn sky among the stars of Aquarius. As the month wears on, the planet will rise earlier, increasing the window of time for observing it in telescopes before the onset of morning twilight.

Meteor Showers

The annual Eta-Aquariid Meteor Shower, produced by material from Halley's Comet, runs from April 19 to May 26 and peaks before dawn on Sunday, May 5.

Deep Sky Objects

NGC869 is an open cluster in the constellation of Perseus (mag 4.3) is visible all night because it is circumpolar. It will be highest in the sky shortly before dawn, when it will be lost to twilight at around 03:31, 26° above your north-eastern horizon. At dusk, it will become visible at around 22:16 (BST), 21° above your northern horizon.

NGC2403 an intermediate spiral galaxy in the constellation of Camelopardalis (mag 8.9) is very well placed – it is close enough to the north celestial pole that it is high above the horizon all night.

M10 a Globular Cluster in the constellation of Ophiuchus (mag 6.6) is visible in the morning sky, becoming accessible at around 23:39, when it rises 21° above your south-eastern horizon. It will then reach its highest point in the sky at 02:47, 34° above your southern horizon. It will be lost to dawn twilight at around 03:31, 33° above your southern horizon.

M92 a Globular Cluster in the constellation of Hercules (mag 6.5) is visible all night. It will become visible at around 22:16 (BST) as the dusk sky fades, 42° above your eastern horizon. It will be lost to dawn twilight at around 03:31, 80° above your south-western horizon.

M12 a Globular Cluster in the constellation of Ophiuchus (mag 6.1) is visible in the morning sky, becoming accessible at around 23:14, when it rises 21° above your south-eastern horizon. It will then reach its highest point in the sky at 02:37, 36° above

your southern horizon. It will be lost to dawn twilight at around 03:31, 35° above your southern horizon

M87 The now world famous M87, the galaxy containing the first ever photographed super massive Black Hole. It is a supergiant elliptical galaxy in the constellation of Virgo and is around 53 million light years away.
It is possible to image one of the intense energy jets, which extend some 5 thousand lightyears out from the galaxy, coming from the famous black hole.

NGC6741 Phantom Streak Nebula is a Planetary Nebula, located about 7 thousand lightyears away in the constellation of Aquila. Note that visually this is a very difficult target and will require an OIII filter at least to see

Comets

Not much happening in 2019 Comet wise unfortunately, but there is always the possibility of something coming along to surprise us.

Moon

New moon 4th May
First quarter 12th May
Full moon 18th May
Last quarter 26th May

Please share with us any images you get throughout May, maybe they will make it into the next SpaceWatch.

LAST MONTHS TALK

by Gwyneth Hueter

April's talk

'Astrophysics at the highest energies' was a talk not for the faint hearted, and given by Prof Tony Bell of the OU.

He admitted to being a theoretical astrophysicist and not an observer, and also admitted to doing his studies at that other place before working in London and at RAL before joining the OU.

As always, these talks are introduced with snippets of historical interest. Here we have one scientist who went up in a balloon found that ionising radiation got stronger as he went up and another scientist who found that it went down when he went three metres underwater. Two ways of skinning a cat? (Victor Hess and Domenico Pacino, if you want to look them up. Hess got a Nobel Prize; Pacino died two years before the first Nobel Prize was issued) Thus, cosmic rays were confirmed as coming from space, and since then they have been detected to incredibly high energy levels (electron volts, eV).
The weaker ones at GeV (giga, one billion eV) are ten a penny, but the scales of energy go through giga (one trillion), tera, peta, exa and zetta. The energy levels of protons ionised to the last two levels equate to the power needed to power a light bulb for one second and to hit a golf ball to almost the speed of light, respectively. A proton (yes, a proton) with zetta eV of energy would be able to keep up with a photon pretty well even up to 100 million years.
How do these protons attain such high energy levels before they reach us and disintegrate when they hit our atmosphere? Spoiler alert - the highest energy ones have yet to be detected, as they are so rare as there may only be one per square kilometre per century reaching us. Prof Bell referred to the main equipment constructed to detect them are the Arizona telescope array (VERITAS? On Mount Hopkins), and the Pierre Auger detectors in Argentina (Malargüe). (Note, I checked the telescope array reference but that is based in Utah. Have a google!)
Because of the rarity of the higher energy impacts, the area of these detectors is huge; the latter one is 30x the size of Paris. More on the Arizona one below.
It was soon discovered that the higher energy rays were coming from radio sources which are active galactic nuclei with black holes that have relativistic jets (of particles at near speed of light). The radio sources have been well mapped with VLBI (=very long baseline interferometry). It is still not clear why these jets occur, but it seems that even in the almost total vacuum of space there is just enough stuff that the high energy emissions from accretion discs get blocked and back up and the jets build up. Our galaxy's black hole is too small and immature for this to happen.

You've already seen the disc around the black hole in M87 (= radio designation Virgo A. Fact buffs will like this: VLBI at wavelength 2cm shows the edge of the stuff round the black hole, to a resolution of 0.01", equivalent to 0.8 parsec.)

Hercules A is another one with jets.
Fornax A has been imaged in the optical and radio and the suggestion is that the jets stopped forming but there are clouds remaining and there is a small gap between them and the central galaxy. The galaxy still has small jets.

Centaurus A (whose jet is so big we could see it if we could see in radio wavelengths. Some of the cosmic rays coming from that are supercharged so are travelling at near speed of light.)

Prof Bell showed us a nice radio image of the sky at 408 MHz and these radio sources pop up.

The black hole in Cygnus A is of one million solar masses. It is 180 megaparsecs away, a huge distance that means that its cosmic rays never reach us because they keep backing up against other particles en route. The space observatory Chandra does show the jets well in x-rays though. M87, Centaurus A and Fornax A are less than 20 mpc away so their rays are not hitting enough stuff to get backed up. However they do hit stuff, and he calls it back flow shock, which produces streamers. These are caused when two high energy photons bang together and it is the gamma rays which come from these shocks that produce air showers when they hit our atmosphere.
Smaller black holes with accretion discs can also give off particles in jets.
The HESS gamma ray detector in Namibia is able to detect intermediate energy cosmic rays which are caused by high energy photons coming from supernova explosions in our galaxy, such as those from the year 1006, 1054, 1572, 1604. It is a detector so has no resolution, but tying in results with radio and visual observations has enabled us to locate the sources.
The aforementioned supernova remnants all have a thin blue line round them in the optical, and this is a shock wave caused by energetic electrons hit the interstellar medium in front of them. Prof Bell did his doctoral thesis on Cassiopeia A (SNR from 1680 AD). Using data from the 1006 SNR he was able to show how particles trapped in the magnetic field bounce around and gain energy as the SNR expands and hits the stuff around it. So, these particles have been detected from happenings in our galaxy. It is not so clear how often the higher energy stuff has been detected. We are still waiting for one of those once-in-a-century but I don't fancy being zapped by something travelling almost at the speed of light and with the energy of a golf ball. Luckily our atmosphere gets in the way.

DATES FOR YOUR DIARY

20th May 8pm Beginners' Meeting in the Main Hall., talks to include Nebulae, Saturn and building an Observatory although subject to change

Observing evening: There will be no further regular Observing sessions until September. There maybe the odd special and look for information on the newsgroup and FB pages.

BAA Summer meeting at RAL June 22nd 2019. Details and how to book at https://www.britastro.org/RAL2019

FURTHER DISCUSSION

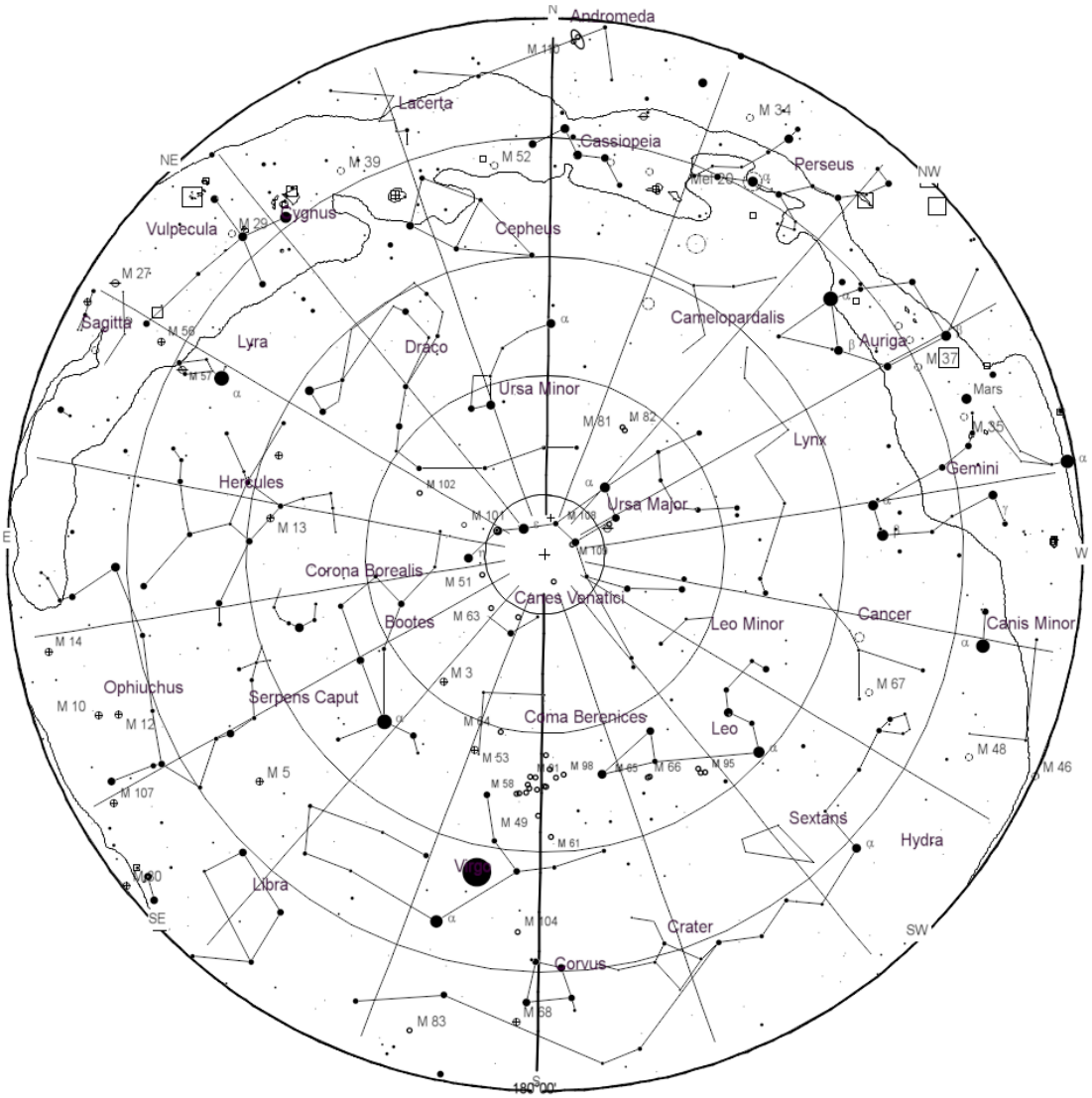
If you are not already on our internet mailing list, then why not log on to YahooGroups. The list is called
'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous

messages click on:
http://groups.yahoo.com/group/abingdonas/ .
To join the abingdonas list, please go to http://www.yahoogroups.com . You can also unsubscribe from the list here.

More information on society activities can also be found on the Facebook page - https://www.facebook.com/AbingdonAstroSoc/
Although confusingly we seem to have two groups on Facebook.

STAR CHART

The night sky at 22:00 (BST) Wednesday 15th May 2019



MOON PHASES: 2019