The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER AUGUST 2022

NEXT MEETING

Internet meeting. *
Date and time: Wednesday 24 August 2022 at 19h00.
Programme: “Madala dark matter in the Coma and Virgo galaxy clusters”
by Tessa Collins. **
Chairman: Johan Smit.

* You will receive an e-mail invite from Johan Smit around 18:30 to join the meeting. Please join as quickly as possible.

** This talk provides an overview of Tessa's study of a dark matter candidate - the South African proposed Madala boson. Tessa is an MSc candidate at the school of physics at the University of the Witwatersrand.

Virtual observing evening chat

Date: Friday 19 August. Time: 18h30. Johan Smit will open the meeting at around 18h15 and anyone who wishes to join the chat is welcome to join in the fun. Be seated in front of your computer at 18h15 with a glass of wine/beer/coffee.

TABLE OF CONTENTS

Astronomy related articles on the Internet

Two black holes merged despite being born far apart in space | Science News

To the Moon! South Korea's first lunar mission is on its way (nature.com)
South Korea's orbiter named Danuri will Psychology of alien contact: Could we even handle it? - Big Think orbit the moon for a year.

EarthSky | Mars Curiosity rover's '7 minutes of terror'
Ten years ago, on 5 August 2012, Curiosity Rover landed on Mars. Its landing lasted 7 minutes - 7 minutes of sheer terror.

EarthSky | UFOs – Ultra-red Flattened Objects – revealed by Webb
These are massive, deep red, disk shaped galaxies. Scientists are calling them **U**ltra red **F**lattened **O**bjects, or UFOs. They were found by the JWST. And they do have the classic SF look of flying saucers.

Webb space telescope has just imaged another most-distant galaxy, breaking its record after a week | Live Science

Ask Ethan: Why bother exploring the Universe at all? - Big Think
There are so many problems, all across planet Earth, that harm and threaten humanity. Why invest in researching the Universe?

How balloons could one day detect quakes on Venus | Science News

The 7 most terrifying things in space | Live Science

We Were Here - Nautilus | Science Connected
How intelligent aliens, who have created a technological civilization, could leave us a message of their presence.

Io, Jupiter's Exploding Moon: Unique in the Milky Way? - The Daily Galaxy

The Epoch of 'Black Dwarfs' - The Daily Galaxy
A discussion of the ultimate death of the Universe.

Astronomy related images, video clips and documentaries on the Internet

James Webb telescope captured the aftermath of a galactic collision | Science News

JWST First Full-Color Images Explained – YouTube

Seeing The Universe Like We've Never Seen It Before - YouTube

Are the Laws of the Universe Eternal? | Laura Mersini Haughton – YouTube

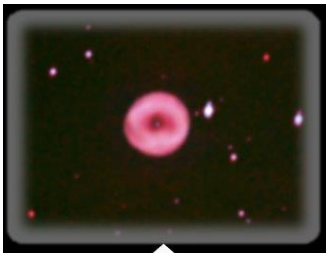
Physicist Michio Kaku on the Shift in the UFO Phenomenon - YouTube

Astronomy basics: The EM spectrum

The study of spectra of celestial bodies forms a large part of astronomical research. Here is an article on the electromagnetic (EM) spectrum.

The EM Spectrum And Its Importance In Astrophysics | BoA 2 (secretsofuniverse.in)

Johan Moolman missed the Karoo Star Party this year. On this and the following page are photographs with annotations made by him at his Urban Star Party. It was attended, as he says, by "me, myself and I".



"URBAN" star party Pretoria 2022 (2)

Imaging set-up #1

Telescope: PlaneWave 12.5" (318 mm), f/8.0, fl 2541 mm Corrected Dall-Kirkham telescope.
Camera: Astro-modified Canon R6 mirrorless. Control with *BackYardEOS*.
Filter: Radian quad-band narrow-band light pollution suppression (LPS) filter.
Mount: Losmandy Gemini G11 GT. Control in *Cartes du Ciel*
Guiding: Canon 400mm f/5.4 lens with ZWO AZI cam. Control in *PHD*.
Post-production: Stacking in *DSS**; processing in *PixInsight*, *Paint.net*, *Photos*, *Power Point*.

The Spare Tyre planetary nebula. IC 5148
Located in the constellation of Grus
Around 3000 light-years distant, it is expanding at a rate of 50 kilometres a second, one of the fastest of all planetary nebulae. Apparent mag + 16.5. Dimensions: 2' x 2'.
[When a star with a mass similar to or a few times more than that of our Sun approaches the end of its life, its outer layers are thrown off into space. The expanding gas is illuminated by the hot remaining core of the star at the centre, forming the *planetary nebula*, which often takes on a beautiful, glowing shape.]
(Wikipedia, hyperphysics.phy-astr.gsu.edu/)

The Crescent emission nebula. NGC 6888
Located in the constellation Cygnus, about 5000 light-years away from Earth.
It is formed by the fast stellar wind from the Wolf-Rayet star WR 136 (HD 192163) colliding with and energizing the slower moving wind ejected by the star when it became a red giant around 250,000 to 400,000 years ago.
Apparent mag + 7.4. Dimensions: 18' x 12'. *(Wikipedia)*

NGC 1535, planetary neb, in Eridanus.
(Single exposure)

It is very similar to the Eskimo nebula in both colour and structure, but the central star can be quite difficult to observe visually. Apparent mag + 10.5 Dimensions: 0.650' x 0.611'.

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"URBAN" star party Pretoria 2022 (3)

Imaging set-up #2

Telescope: Takahashi TOA 150, 5" (150 mm), f/7.3, fl 1100mm apo-chromatic refractor.
Camera: Astro-modified Canon R5 mirrorless. Control with *BackYardEOS*.
Filter: Hutech V4 mid-band light pollution suppression (LPS) filter.
Mount: Celestron CGX. Control in *Cartes du Ciel*
Guiding: Takahashi FS-60CB refractor with ZWO AZI cam. Control in *PHD*.
Post-production: Stacking in *DSS**; processing in *PixInsight*, *Paint.net*, *Photos*, *Power Point*. (Note*: All images consist of *multiple stacks*: +/- 120 – 180 x 1 min subs).

The Sculptor Galaxy aka **the Silver Coin, Silver Dollar Galaxy, NGC 253** – it is an intermediate spiral galaxy in the constellation Sculptor.
This is a starburst galaxy, which means that it is currently undergoing a period of intense star formation. Apparent mag + 8.0.
Dimensions: 27.5' x 6.8'. *(Wikipedia)*

The Dumbbell Nebula aka the **Apple Core Nebula, Messier 27, NGC 6853.**
It is a planetary nebula (nebulosity surrounding a white dwarf) in the constellation Vulpecula, at a distance of about 1360 light-years.
It was the first such nebula to be discovered, by Charles Messier in 1764.
Apparent mag + 7.4. Dimensions: 8.0' x 5.6'.
(Wikipedia)

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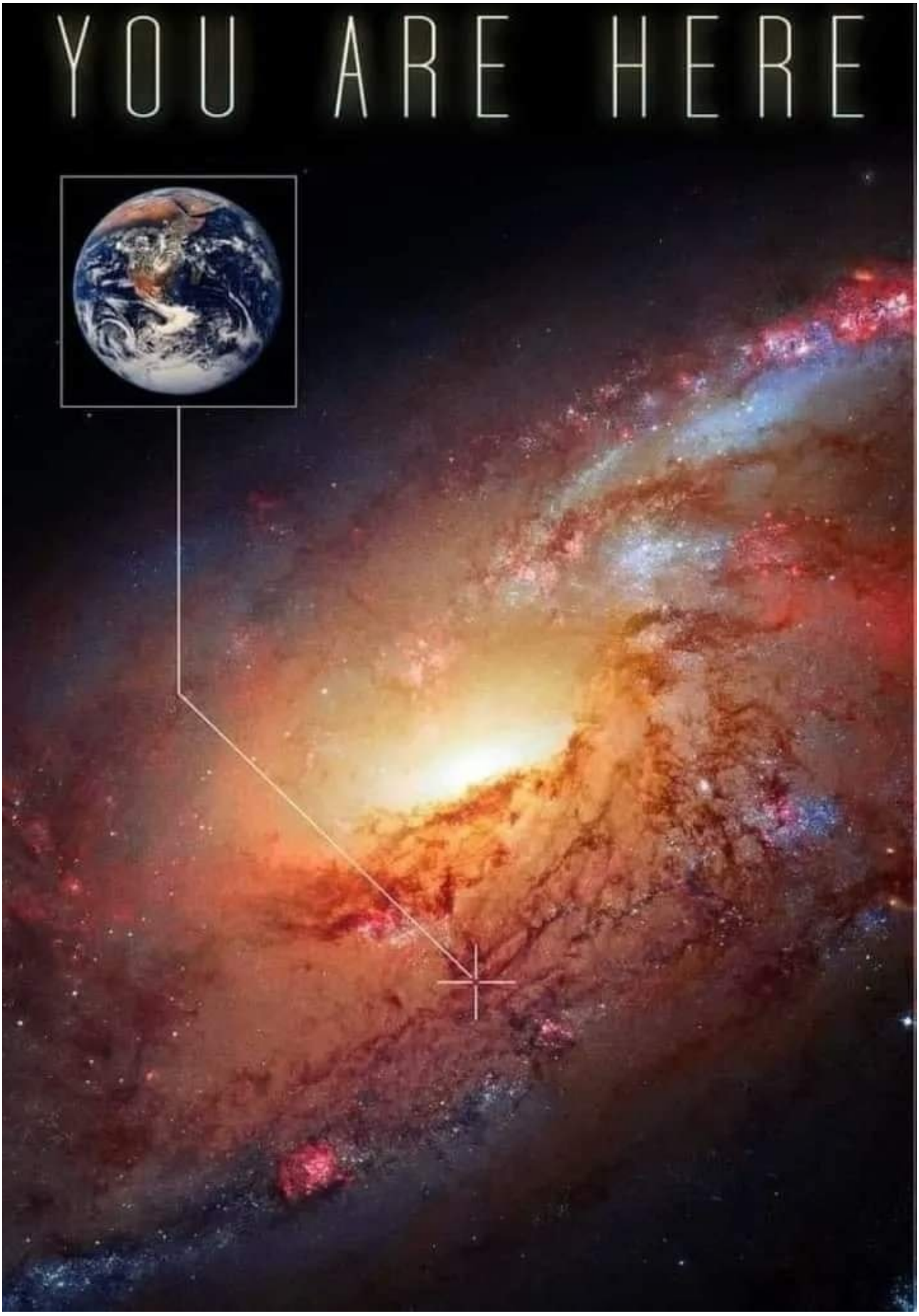

YOU ARE HERE

What's up in late August and in September 2022 - by Michael Poll

Mercury has been visible in the west after sunset for most of August and will still be visible from the end of August and for the first couple of weeks of September. Its greatest angular distance from the Sun is on August 27th, when the two are 27º apart, and Mercury sets nearly two hours after the Sun The best time to look for Mercury is after the sky becomes dark and before it gets too low down – say from 18h30 onwards. It can be located with reference to the crescent Moon which will be just to the north (right) of it on August 29th.

Saturn is low in the east after sunset at the end of August and beginning of September but will be well up after sunset by the end of September. During August and September the planet is in the sky for most of the night. Saturn is in Capricornus, which has no bright stars with which to confuse it. It can be located next to the Moon on September 8th. It is near opposition at these times.

EarthSky | Saturn's rings: Top tips for seeing
EarthSky | Saturn's 2022 opposition: 4 fun things to see

Jupiter rises in the east late in the evening at the beginning of September but is high up at in the east after sunset by the end of the month. During September it will be in the sky all night and can be seen low down in the west before sunrise. Jupiter is a bright white object and is brighter than any star. It is at opposition to the Sun on September 26th. The Moon will be close to Jupiter on September 11th, and in fact they will be close together for the whole night of September 11th-12th.

Mars rises around midnight during the month, and so can be seen in high in the north east / north before morning twilight starts. It is travelling through the constellation of Taurus. From the end of August for the about the first 10 days of September, watch it pass between the Pleaides star cluster and the bright star Aldebaran (the brightest star in Taurus). Mars will be closest to the star on September 7th, and the Moon will be near the group on the mornings of September 16th and 7th.

Venus is not easily visible during this period. For the whole of September it rises in the morning twilight. As viewed from Earth, it passes behind the Sun on October 22nd, and thereafter moves into the evening sky – it will be setting in the evening twilight until January next year.

Moon near bright stars

As it orbits the Earth during the month, the Moon passes bright objects near its path, thus:

Evening sky: On August 31st the Moon will be near Spica, the brightest star in Virgo. Spica is distinctly bluish. On September 3rd , and again on September 30th, it will be near Antares, the brightest star in Scorpius, which is distinctly reddish (in fact it is a Red Giant star).

In the morning sky before sunrise, on September 20th the Moon can be seen next to Pollux, one of the Gemini twin stars, and on September 23rd it will be next to Regulus, the brightest star in Leo.

Selected constellations for September:

In the north look for Lyra, Aquila, Cygnus.

Lyra (the Lyre), **Aquila** (the Eagle), and **Cygnus** (the Swan) form a distinct group. (See image). Note that the three stars of the "Altair Trio" point to Vega, and that the stars Vega, Altair and Deneb form an equilateral triangle, known in the northern hemisphere as the "Summer Triangle" . The main outlines of Cygnus form what is known as the "Northern Cross", which is upside down in this view. It sets in an upright position when viewed from northern latitudes. (Continued on next page.)

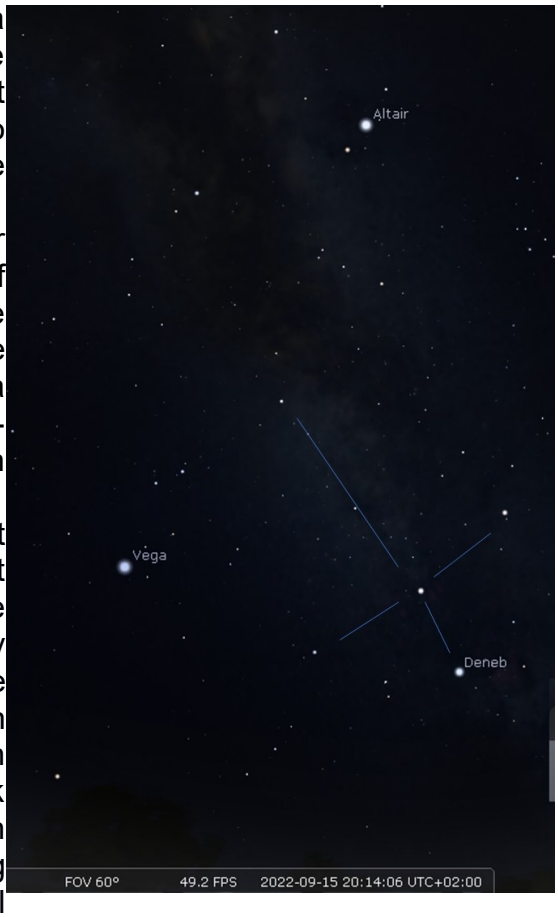
(Continued from previous page.)

The Equinox **https://www.timeanddate.com/**

The September 2022 equinox occurs on September 23rd at 03 h 03 South African Standard time. The actual time of the equinox is the same for any point on earth, but the actual *local* date can vary with time zone. For some places further west than South Africa (e.g the Americas), the equinox this year will be on September 22nd.

The equinox does not always fall on the same date. Usually the September equinox occurs on September 22nd or 23rd, although very rarely it can occur on the 21st or 24th - a September 21st equinox has not happened for several millennia, but this century, it will happen twice – in 2092 and 2096. The last time the equinox occurred on September 24th was in 1931, the next time will be in 2303.

In a normal calendar year we count 365 days, but the Earth takes about 6 hours longer than this to travel around the Sun, which means that the equinox occurs 6 hours later each year. After four years this would add up to the equinox occurring a whole day later, but a leap year is added which brings the date back by one day. If there were no leap years, the equinox would continue to get a day later every four years, and in 100 years' time it would be occurring 25 days later than at present (mid-October). The effect would be to put the seasons out of synchronisation with the calendar.



It was Julius Caesar and the philosopher Sosigenes of Alexandria who had the idea of inserting a leap day every fourth year to keep the seasons and the calendar synchronised. Before this various cultures had arbitrarily inserted extra months into the calendar when necessary, to re-align the calendar with the seasons. The Julian Calendar was introduced in 46 BC.

However, the Julian Calendar did not altogether solve the problem of the seasons not synchronising with the calendar, because Caesar's year was 11 minutes too long, which by the 1500s made a difference of 10 days. The Gregorian Calendar, which is the one now in use, was introduced by Pope Gregory XIII in 1582, principally to bring the date of Easter back into its correct relationship with the Jewish Passover. The date of Easter was being calculated with respect to an ecclesiastical equinox that had, in 325 AD, been fixed permanently as March 21st. Because Caesar's calendar gave a year that was too long, the astronomical March equinox was getting earlier than the fixed (ecclesiastical) equinox and in 1582 was occurring on March 11th. Although Easter was related to the Jewish Passover, the date of the Passover was calculated according to the astronomical equinox, and with the dat of Easter was being calculated according to the ecclesiastical equinox it was being celebrated 10 days after the Passover. The difference between the Julian Calendar and the Gregorian calendar is that in any period of 400 years three leap days are removed – a century year has to be divisible by 400 for it to be counted as a leap year. **Ω**

Feature of the month: Dark matter

Dark matter is a hypothetical form of matter thought to account for approximately 85% of the matter in the Universe. One of the lines of evidence for its existence is the velocity curve of the stars in galaxies. These curves can only be explained by the presence of unseen matter inside these galaxies.

Another line of evidence is the movement of galaxies in clusters of galaxies. These can only be explained by the presence of unseen matter inside these clusters.

There are many hypotheses about the nature of the dark matter, among them neutrinos, WIMPS (Weakly Interacting Massive Particles) and brown dwarfs. **Ω**

Is dark matter real? Astronomy's multi-decade mystery - Big Think

Dark matter - Wikipedia

NOTICE BOARD

UFOs and an "alien artefact". A maverick astronomer named Avi Loeb plans to make a scientific study of UFOs. He also came up with the far fetched theory that Oumuamua* is an alien artefact. He even risked his reputation by writing a book about his theory.

Dr. Avi Loeb and the Scientific Study of UFOs - The Daily Grail

Book review of Extraterrestrial: The First Sign of Intelligent Life Beyond Earth by Avi Loeb - The Washington Post

Old newsletters: All old newsletters from January 2004 onward are on our website. They contain a record of our Centre's activities as well as astronomical information.

Data base: Members are reminded that a data base of the books in our library is to be found on our website.

* Oumuamua is an object from interstellar space that zipped through the solar system along a hyperbolic orbit and passed close to the Sun in 2017.

IN MEMORIAM

It is with sadness that I hereby inform members of the recent passing away of two of our Centre's elderly members. Some members may not be aware of this. They were:

Fred Oosthuizen

George Dehlen

Observing: Three in one - by Magda Streicher

If we think about the the well known constelation Carina in the southern hemisphere, the great Eta Carinae nebula comes first to mind. This rich constellation houses many wonderful deep sky objects, lovely clusters and nebulae to keep one busy for at least a large part of the night. But, the constellation also has some hidden objects in its borders. These objects barely get attention, such as unexpected galaxies. IC 2554A is an edge-on galaxy, elongated in a north to south direction and in the proses of merging with two fainter companions. Barely touching the north-eastern tip of IC 2554A is the faint companion listed as IC 2554B with an even fainter companion PGC 0020511 superimposed and part and parcel of this merging process. The galaxies are a staggering 50 million light years away. Large parts of HI gas are displaced from the merging galaxies which indicates either a galactic merger or tidal interaction with the elliptical neighbour galaxy NGC3136B. The constellation Carina is definitely not close to boring. **(**Magda Streicher's e-mail address: magdalena@mweb.co.za) **Ω**

OBJECT	TYPE	RA	DEC	MAG	SIZE
IC 2554A	Galaxy	10 h 08.8 m	+67° 01.8'	12.5	3' x 1.2'

Web links for the astronomy enthusiast

- **The website for all information about the ASSA and the ASSA Centres:**
  https://assa.saao.ac.za/
- **ASSA Specialist Sections:**
  ASSA has various areas of interest. Join and participate!
  https://assa.saao.ac.za/sections/
- **ASSA Publications to download and enjoy:**
  MNASSA: https://www.mnassa.org.za/
  Nightfall: http://assa.saao.ac.za/sections/deep-sky/nightfall/
  To receive as part of ASSA membership benefits - *Sky Guide,* the astronomical handbook for Southern Africa: http://assa.saao.ac.za/about/publications/sky-guide/
- **Mail Groups to join:**
  For general ASSA related information: https://groups.io/g/ASSA-announce
  For posting general items and discussion: https://groups.io/g/ASSA-discussion
- **Social Media to join and share:**
  Facebook: https://www.facebook.com/Astrosocsa/?_rdc=1&_rdr
  Youtube: https://www.youtube.com/channel/UCJ4b1fhmPvYTOsy15YP-_JA
  Twitter: https://twitter.com/AstroSocSA
- **More web links can be found on page 118 of "2022 Sky Guide Africa South". Ω**

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