ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA

Durban ’nDaba

Monthly Newsletter of the Durban Centre - February 2023

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Chairman’s Chatter

Greetings ASSA Durban members

So, we are already turning over the first page on the desk pad and it is February; not quite sure where January went to. Exciting things lie ahead in the next week or two with Comet C/2022 E3 traversing our neck of the celestial woods. Most of the info out there is for the northern hemisphere where they are already enjoying the once in many, many lifetimes' (about 625 of them at 3 score years and 10) viewing. See page 20 for some of the images taken already in the Northern hemisphere.

Down south, it seems it should be coming into view by about the 8th Feb with optimum viewing closer to 11th or 12th. Although the Moon is almost three quarters on the 11th, it only wakes up at 10pm giving us a few hours of relative darkness to search the northern skies for that dim green trace. Weather permitting, we'll ask Alan to open the dome. Keep an eye on the WhatsApp group and emails - I'm sure people will be posting the moment they see anything.

Our planned in-person meeting for January sadly did not materialize due to stage 6 load shedding. February was planned for on-line anyway as we will be joining Johannesburg. That gives our esteemed power supplier 6 weeks to sort out their issues before we meet in person again in March. Perhaps we need to consider meeting earlier to finish by 8pm lights out on a Wednesday or change the weekday for the foreseeable future to better fit the area power schedule. Please give it some thought and give us feedback by email or WhatsApp - how can we make the most of the hand we are dealt?

February is still firmly planted in summer so no one is holding their breath for the weather for the next month or more (except on 11/12th when we totally expect clear skies), but hopefully we turn the corner soon and get to see some clear skies for more than an hour. Happy viewing all and we'll 'see' you on line at the general meeting on 8th Feb.

Regards

Debbie

Astronomy Delights - Telescopium
A Spy Glass Telescope

By Magda Streicher

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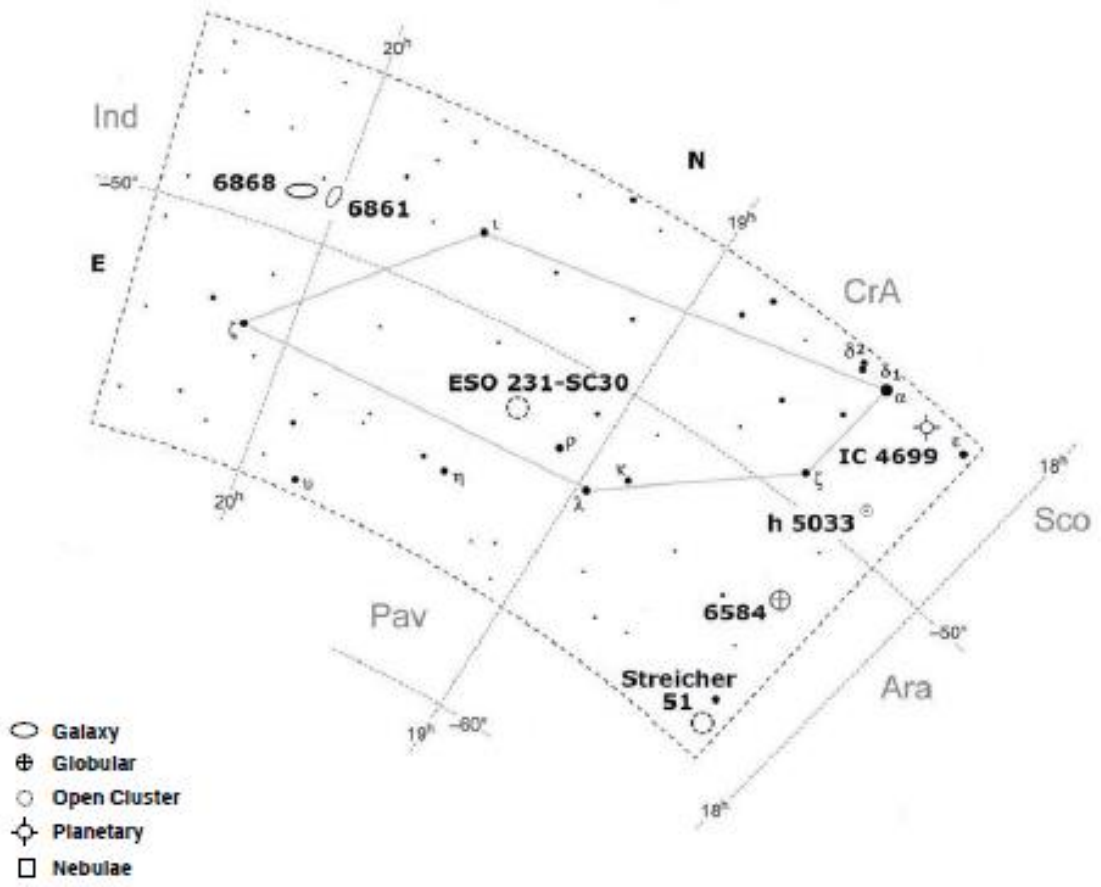


The constellation of Telescopium

ABOVE: An antique Schiefspiegler Telescope belonging to Mary FitzGerald. During the mid-1960s Miss Dolly Robinson started the construction of these telescope.

...Telescopium

Robert Frost once wrote a poem to say that he would burn his house down for the fire insurance and spend the proceeds on a telescope to satisfy a lifelong curiosity about our place among the infinities. (Credit to an article written by Charles Laird Calia).

Would we ever – even in our wildest dreams – have been able to imagine the universe as we know it today if we had not had any telescopes? We owe the telescope the most honorary position in relation to the stars, because without doubt it is this faithful instrument that reveals so much of the truth to us.

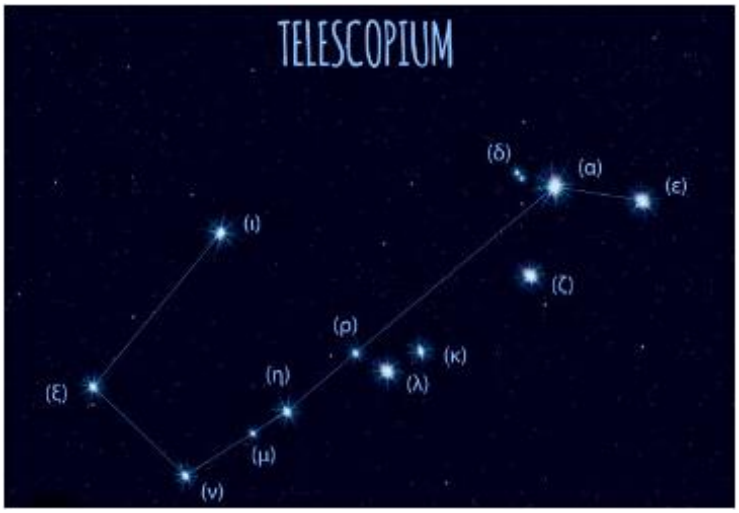
It was with great joy that we celebrated 2009, the International Year of Astronomy and the 400th anniversary of Galileo Galilei's earliest telescopic light rays into the starry night sky. Galileo may have been the first person to realize that the light had travelled for thousands of years to reach our eyes. Try and put his thoughts into perspective, the amazement, the fear and the wonder of it all. Galileo found that Venus goes through a cycle of phases, like the moon, which can happen only if Venus is circling the sun and not the earth. This discovery changed the perception of earth's being the center of the universe forever.

The German scientist Hermann Oberth (photo) first proposed a space observatory in 1923, followed by American physicist Lyman Spitzer (1914–1997), who suggested such a telescope in 1946. Today we are blessed to have telescopes of different kinds in space, opening the universe to us and providing astronomers with valuable information. The space shuttle Discovery finally carried the Hubble Space Telescope into space on 24 April 1990. This unique telescope, named after Edwin Powell Hubble, has shown that spiral nebulae lie much further away than previously thought, revealing them to be galaxies like our own Milky Way. But you do not need a space telescope to explore the beauty of the night skies; just an ordinary pair of binoculars or a small telescope will bring to your eyes a wealth of deep sky objects that lie on your path.

RIGHT: Hermann Oberth

...Telescopium

The constellation Telescopium was named by de Lacaille during his stay at the Cape of Good Hope. It was much larger as stars of neighbouring constellations were included, but is now a mere shadow of its former self. The constellation is situated between Indus to the east, Ara to the west and Pavo to the south. The telescope outline points to the north-west with the lovely reddish glow of magnitude 4.1 zeta Telescopii as the base of the starry telescope.



ABOVE: Telscopium – Photograph: Wikipedia

Discover a medium-sized galaxy group about 120 million light-years distant in the far north-eastern part of the constellation by drawing an imaginary triangle with iota and xi Telescopii. The group consists of no fewer than twelve NGC numbered galaxies, spanning a 3-degree field of view. The brightest member in this grouping is the giant **NGC 6868**, situated close to the eastern edge of the group. John Herschel discovered this globe of light in 1834. NGC 6868 is a relatively bright oval, growing gradually brighter towards its nucleus.

ABOVE: NGC 6868 – Photograph: Wikipedia

About 25’ towards the west, the elliptical galaxy **NGC 6861** occupies the middle spot of this galaxy group. It displays a northwest to south-east oval haze with a bright, prominent small nucleus, which seems slightly off-centered. This impression is given because it could be that the galaxy is slightly brighter towards the eastern part.

ABOVE: NGC 6861 – Photograph: Wikipedia

The Chandra X-ray observations of the hot gas in and around NGC 6868 and NGC 6861 probe the interaction history between these two galaxies. Mean surface brightness suggests that they are each the dominant galaxy in a galaxy subgroup that is about to merge. Surface brightness and temperature maps of the brightest group galaxy NGC 6868 show a cold front edge to the north, and a spiral-shaped tail to the south.

...Telescopium

Towards the middle area of the constellation, north-east of the yellow magnitude 5.1 rho Telescopii, the open cluster **ESO 231-SC30** displays a faint, definite triangular-shaped grouping pointing sharply south. Although faint, it consists of a handful of stars, relatively prominent against the star field. The brightest member, HD 180021, a reddish coloured magnitude 7.9 star, is situated on the eastern side of the grouping with several members spraying out into the northern extremity.

It is not unusual, when in the bush at night, to share the space around your telescope with the ever-present night creatures. Searching for asterisms, I could hardly believe my eyes when I stumbled across a small miracle in the far south-western corner of the constellation. **STREICHER 51** consists of fifteen stars resembling a praying mantis looking back at me with a pair of white stars situated on the north-eastern side of the asterism. The brightest star HD 165987, the northern "eye", so to speak. The group is situated 10' south of the galaxy IC 4679.

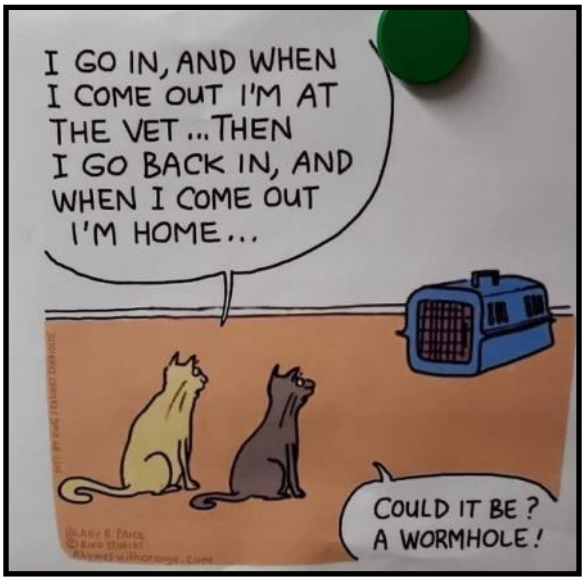
The globular cluster **NGC 6584**, also known as Bennett 107, is situated in the far western part of the constellation. This object could be thought of as an eyepiece lying to the side, if an imaginative mind like mine were to put it into perspective. NGC 6584 shows up as a lovely round bright haze, which stands out quite well against the star field. Higher magnification reveals faint stars becoming hazier towards the unresolved core, which seems to be somewhat out of shape. Three magnitude 10 stars can be seen enhancing the soft outer western part of NGC 6584. Careful observation reveals the southern star as double. The north-eastern side of the globular brings to the fore faint pinpoint stars spraying out into the field of view, whereas the southern part contains fewer stars. The globular is about 45 000 light-years distant.

ABOVE: GNC 6584 – Photograph: Wikimedia

About 3.5 degrees further north, the multiple star h 5033 shows off its pack of four members. The deep yellow primary star occupies the south-western corner of the square formation with a slightly darker yellow companion in position angle (PA) of 115°. The much fainter C companion, appearing grey in colour is in a position angle (PA) of 10°. To complete this multiple system, the D companion is in a position angle (PA) of 46°.

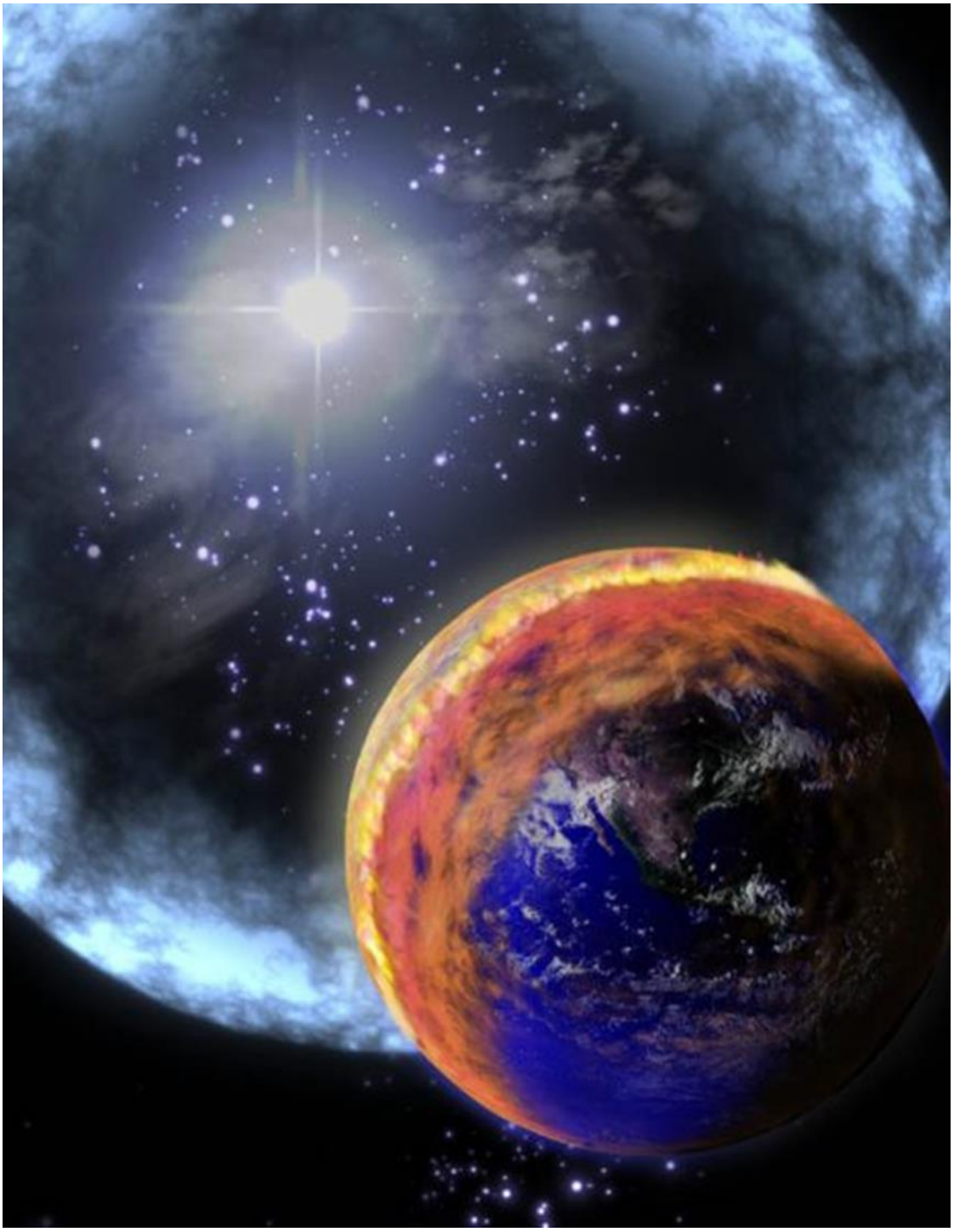
...Telescopium

The planetary nebula **IC 4699** is situated between alpha and epsilon Telescopii, barely 30' from the Corona Australis border. Discovered by Williamina Fleming in 1901 on an objective prism plate, the planetary nebula shows up as a tiny grey disc which responds well to an oxygen (O -III) filter. The outstanding delta Telescopii, situated 50' east of alpha, proudly keeps our telescope viewfinder focused on the stars and the universe beyond.



Is the Universe Too Dangerous for Life?

by Brian Ventrudo



Above: Artist's impression of a gamma ray burst hitting the Earth. The gamma rays would trigger changes in the Earth's atmosphere that might make life as we know it impossible. Credit: NASA

It's a question that inevitably arises in conversations about the cosmos: does life exist elsewhere in the universe?

For those who hope the answer is "yes", the harvest of exoplanets by NASA's Kepler Space Telescope and other telescopes over the past decade has been hugely encouraging. As of mid 2019, in the small slice of sky under its exacting gaze, analysis of Kepler's measurements found more than two thousand extrasolar planets, and all telescopes have confirmed some 3,700 exoplanets. exoplanets – (*recent count is 5297 in January 2023*).

...Is the Universe Too Dangerous for Life

Extrapolating these results, astronomers estimate our Milky Way galaxy alone might hold some 10 billion planets that may have the temperature and composition to harbor habitable life. With that much real estate, many believe that complex or even intelligent life must have formed on at least some of these?

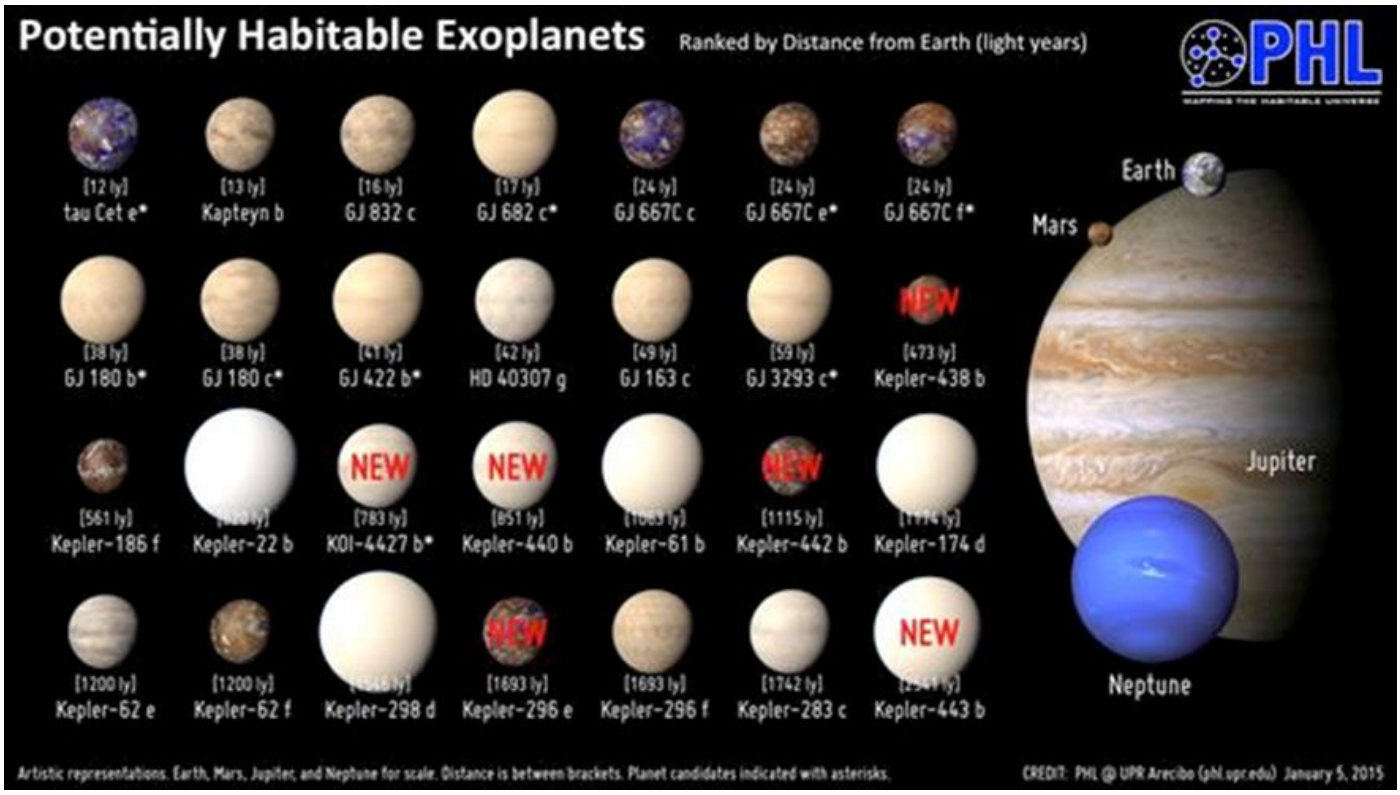


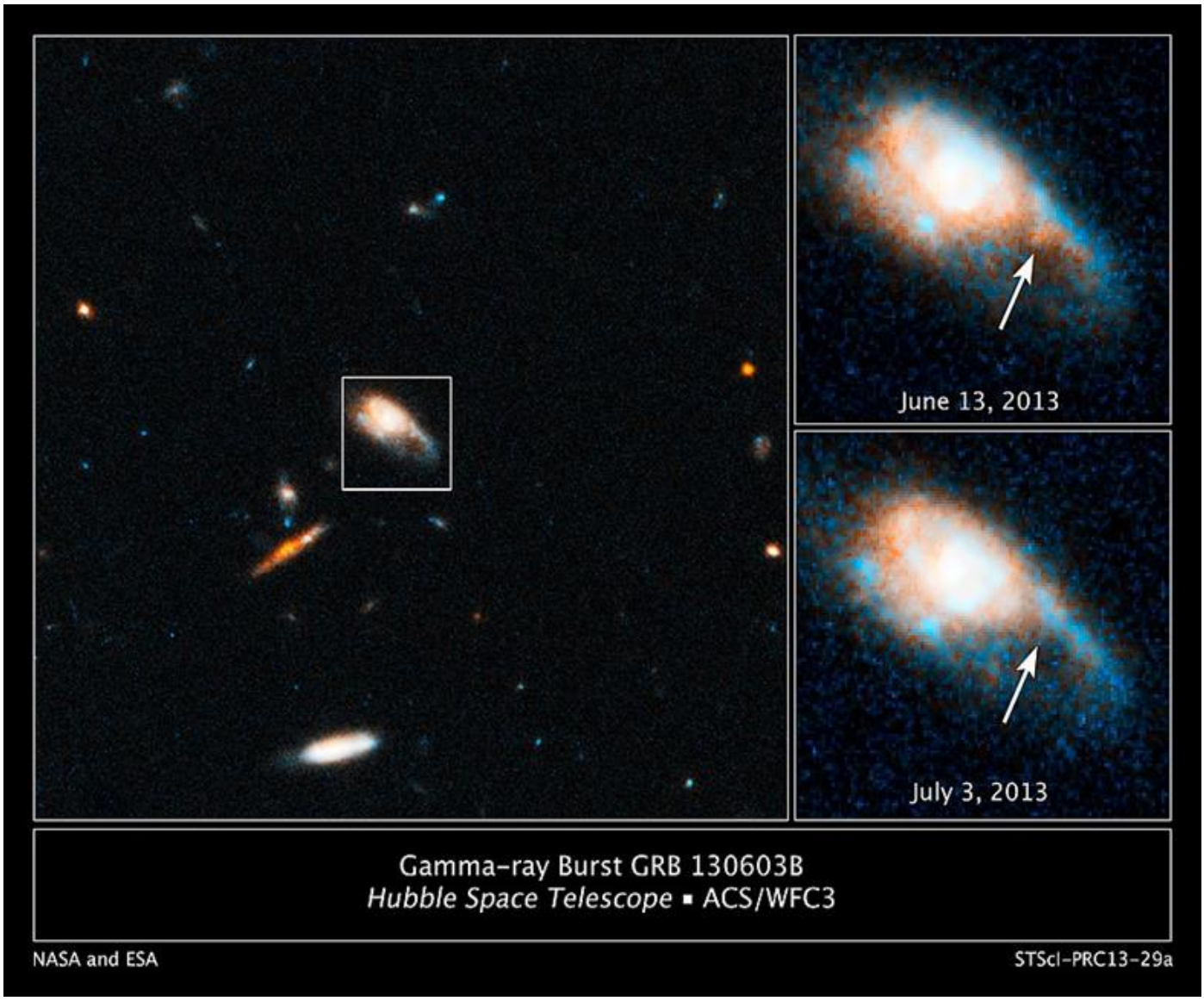
Image Credit: Phil@UPR

Well, perhaps not. In a sobering paper published a few years ago in the prestigious *Physical Review Letters*, astrophysicists Tsvi Piran and Raul Jimenez argue that most planets in the universe have been wracked by frequent galactic-scale environmental catastrophes that could destroy nascent life more complex than a single-celled organism.

The sources of these catastrophes are so-called long gamma ray bursts (LGRBs). These enormously violent events occur upon the collapse of a massive star which runs out of fuel, collapses, and sprays out more energy and radiation than a supernova along a highly directional beam. Only the most massive stars collapse and create a LGRB, but the universe contains a lot of stars, so in the universe as a whole, these events happen frequently. Using space-based satellites, astronomers notice some sort of GRB somewhere in the sky about once a day. They flash only briefly, but they are so bright we can easily detect them across billions of light years if we happen to lie in the path of the gamma rays. (*Gamma-ray bursts (GRBs) are flashes of high-energy radiation arising from energetic cosmic explosions. Bursts of long (**greater than two seconds**) duration are produced by the core-collapse of massive stars).*

A long gamma ray burst lasts for just a few seconds, but it ejects so much energy it would wreak havoc upon the biosphere of any nearby planet in the direction of its beam. The surface of a close-by planet might be fried by the gamma rays themselves. But even at a distance of a few thousand light years, a LGRB would destroy the protective ozone layer in the atmosphere of an Earth-like planet for several weeks or even months.

...Is the Universe Too Dangerous for Life



ABOVE Credit : Wkipedia

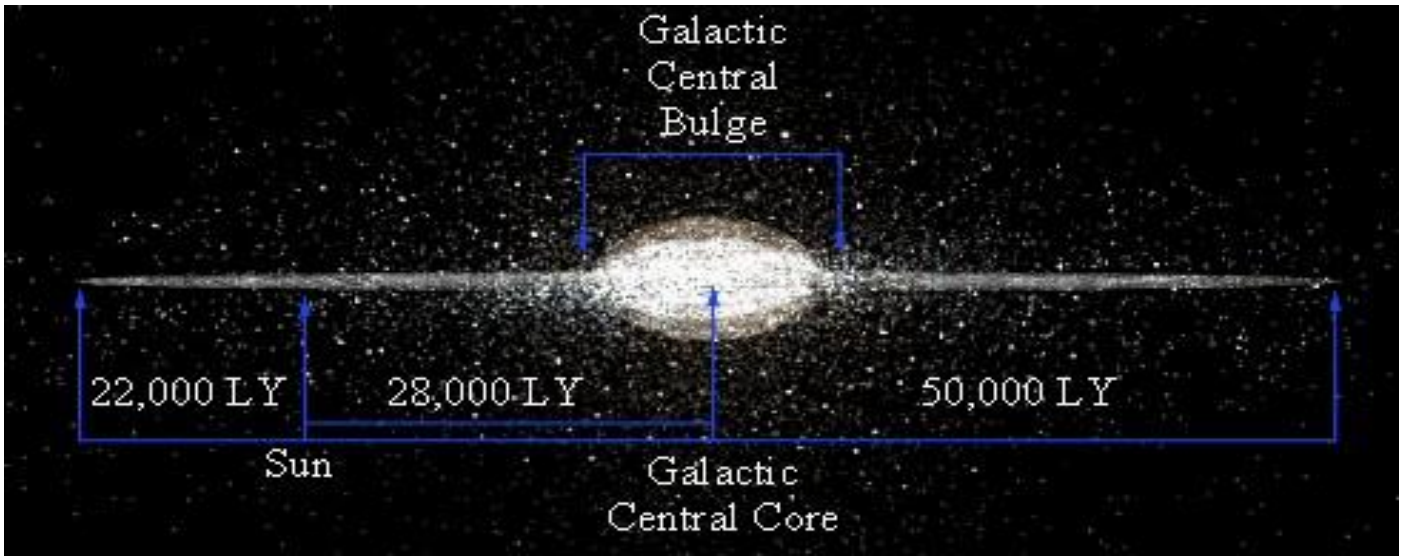
Without ozone, ultraviolet light from a planet's star would irradiate biological life (as we currently understand it) and completely degrade the biosphere. And computer models show that ozone might also form at ground level in the atmosphere where it's toxic to most forms of life. Under these conditions, any complex surface life forms would be doomed. Simple life might survive, but its evolution to more complex forms would be set back by millions or billions of years.

LEFT: Artist's illustration of a bright gamma-ray burst occurring in a star-forming region. Energy from the explosion is beamed into two narrow, oppositely directed jets.

...Is the Universe Too Dangerous for Life

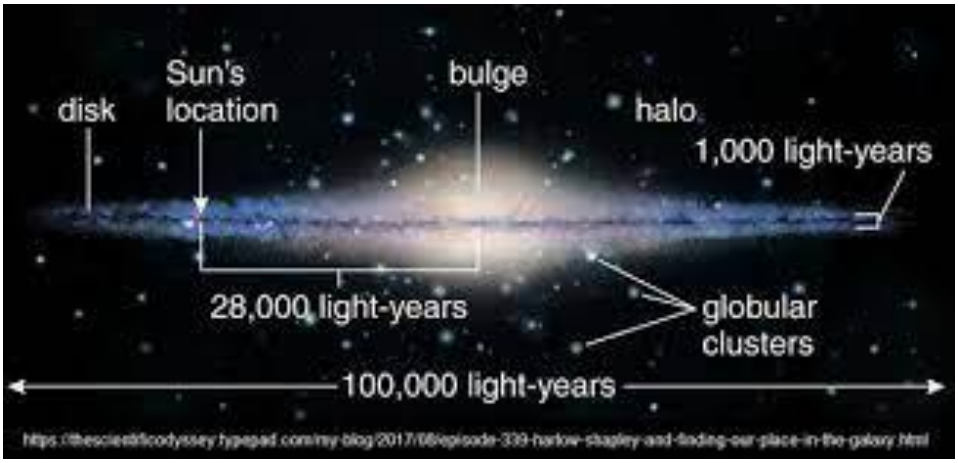
The likelihood of a planet suffering a blast from a LGRB increases with the density of nearby stars, since a small fraction of these stars will detonate as LGRBs. So regions of a galaxy where stars are packed close might be especially inhospitable. Using estimates of the distribution of stars in galaxies, the intensity and frequency of long GRBs, and our current understanding of stellar lifecycles, Piran and Jimenez calculated the probability of a planet in a spiral galaxy like the Milky Way suffering from a LGRB.

The result? In any 500 million year period, a planet within about 13,000 light years of the center of the Milky Way has a 95% chance of getting blasted by a lethal LGRB .



ABOVE: Measured Milky Way Galactic Core- Credit - Quora.com

Further from the galactic center, where stars are further apart on average, the news is a little better. About 30,000 light years from the center of the Milky Way, the chance of a planet suffering a lethal LGRB is about 50% in a 500 million year period. Our Earth is about 25,000 *(latest calculation in 2023 is 26 670)* light years from the galactic center, so even in our relatively benign neighborhood, there is roughly 50-50 chance our planet suffered the effects of a LGRB ometime in the last 500 million years. Some scientists speculate such an event may have caused one of the five known mass extinctions on Earth, perhaps the Cambrian–Ordovician extinction about 488 million year ago. No one knows for sure. *(The Cambrian–Ordovician extinction event occurred in the early Phanerozoic Eon extinction event eliminated many brachiopods and conodonts, and severely reduced the number of trilobite species.)*

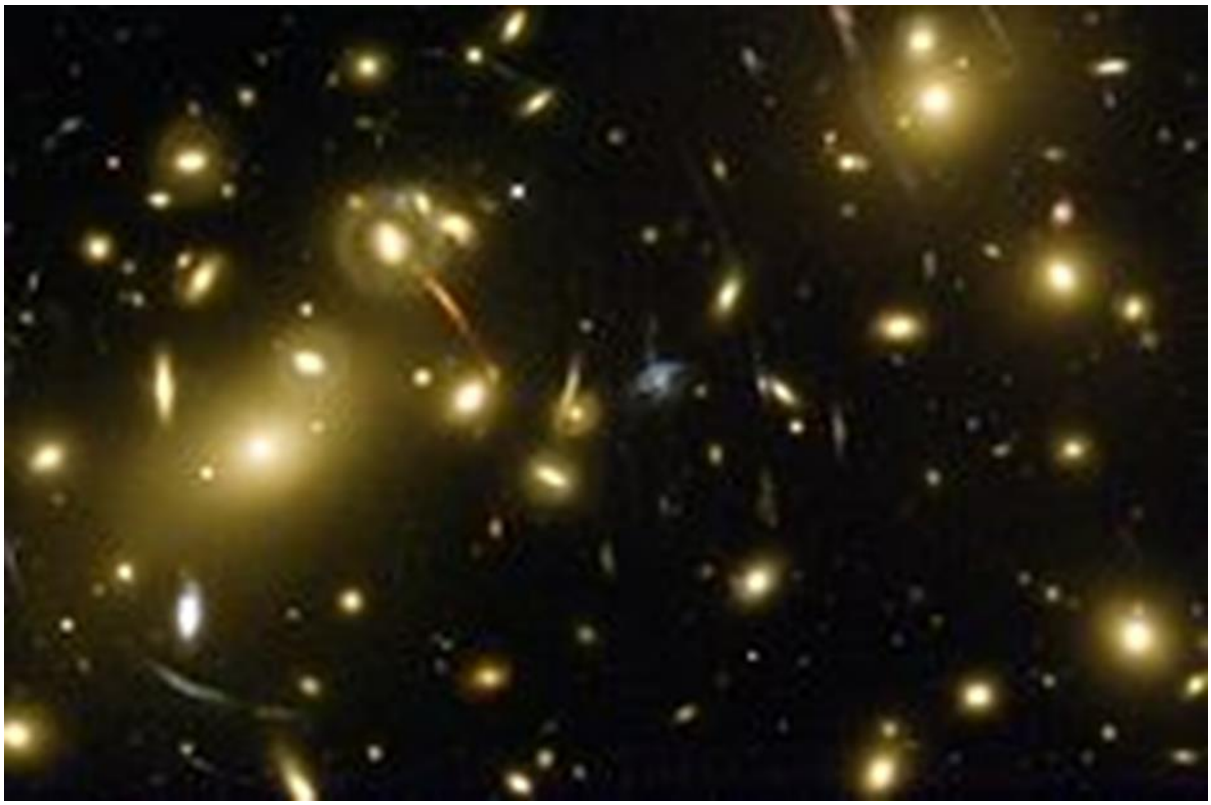


LEFT: Measured Milky Way from Galactic Centre. Credit - Quora.com

...Is the Universe Too Dangerous for Life

Though to set your mind at ease, at present, there are no stars capable of generating a LGRB presently lie close enough to Earth to do us harm, so we are in no danger from these events in the foreseeable future.

How about other galaxies? In most cases, the news is worse. In our own relatively sparse galaxy cluster, the so-called Local Group, galaxies are hundreds of thousands or millions of light years apart. Therefore, planets are in no danger from LGRBs from nearby galaxies such as the Large Magellanic Cloud or the Andromeda Galaxy. But most galaxy clusters are much denser than our Local Group, so the environment might be more dangerous. The study by Piran and Jimenez shows only galaxy clusters with $1/10^{th}$ the density of the average galaxy cluster have an environment safe for Earth-like life to evolve over the long term.



Abell 2218. Credit: NASA/ESA

Billions of years ago, the results are even more woeful. Galaxies were smaller then, stars were closer together, and massive stars in the earlier universe were more likely to detonate as LGRBs. After running the numbers, Piran and Jimenez found that until about 5 billion years ago, most planets in the universe had a high probability of suffering a GRB. So complex biological life (again, as we currently understand it) was extremely unlikely to form on any planet in the first 8.8 billion years of the universe.

At the end of their paper, the two speculate that the lethal effects of GRBs may at least partly explain the famous Fermi Paradox. This argument, first posed by the physicist Enrico Fermi, wonders why with such a large number of stars in the universe, and with the great age of the universe allowing enough time for life to evolve and slowly propagate across a galaxy, there should be many civilizations within range of contact of Earth. So where are they? According to this study, maybe they were fried by gamma rays before they got off the ground.

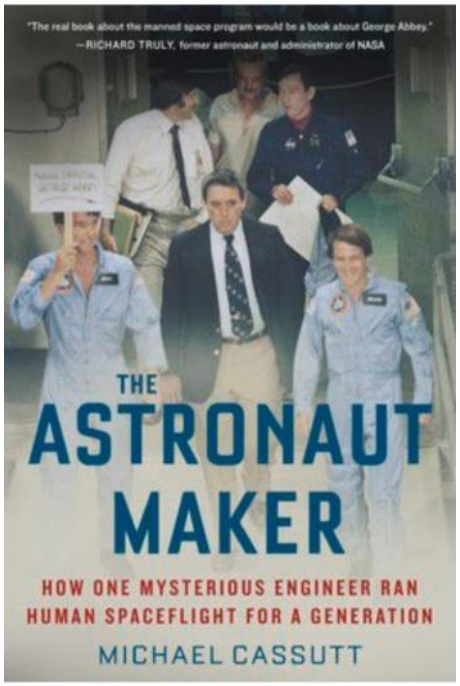
...Is the Universe Too Dangerous for Life

But the study by Piran and Jimenez contains many estimates and approximations. The most important is the assumption that all life in the universe has an Earth-like fragility to the direct and indirect effects of gamma rays on a planet's atmosphere. We have no idea if this is true.

Astronomer and SETI advocate Seth Shostak tries to look on the bright side. Even with the inner part of many galaxies, and with entire dense clusters of galaxies off limits to complex life, there still may be plenty of stars, perhaps the majority of stars in a relatively safe galaxy like the Milky Way, in the safe zone for life to evolve. "The idea that certain regions of many galaxies might be sterile — or at least limited to life that requires a microscope to see — is interesting and sobering", say Shostak. "But pessimism about habitats for life has a bad track record. We once thought that in our own solar system, only Earth had the right conditions for life. Today, we know of a half-dozen worlds within the reach of our rockets that could support some biology."

His advice is to "… do the experiment. The theoreticians may point to the sky and say 'it's dead, Jim.' But unless you look, you'll never know for sure."

Librarian's Page



If you're looking for an interesting historical read, "The Astronaut Maker" is sure to keep you spell bound. I've popped it onto my holiday reading list, right next to Mitchener's "Space".

One of the most elusive and controversial figures in NASA's history, George W. S. Abbey was said to be secretive, despotic, a Space Age Machiavelli. Yet Abbey had more influence on human spaceflight than almost anyone in history. His story has never been told-until now. The Astronaut Maker takes readers inside NASA to learn the real story of how Abbey rose to power, from young pilot and wannabe astronaut to engineer, bureaucrat, and finally director of the Johnson Space Center. During a thirty-seven-year career, mostly out of the spotlight, he oversaw the selection of every astronaut class from 1978 to 1987, deciding who got to fly and when. He was with the Apollo 1 astronauts the night before the fatal fire in January 1967. He was in mission control the night of the Apollo 13 accident and organized the recovery effort. Abbey also led NASA's recruitment of women and minorities as space shuttle astronauts and was responsible for hiring Sally Ride. The Astronaut Maker is the ultimate insider's account of ambition and power politics at NASA.

Available from Amazon and Takealot.

Enjoy!
Claire

ASSA Durban - Librarian

At the Eyepiece

February 2023 by Ray Field

The Moon is full on the 5th, last quarter on the 13th, new on the 20th and first quarter on the 27th. The Moon is near Pollux on the 3rd, Regulus on the 8th, Spica on the 11th, Alpha Librae on the 12th, Antares on the 14th, near Tau Sagittarii on the 17th, Mercury on the 19th, near Uranus on the 25th, near the Pleiades on the 26th and near Mars on the 28th.

Mercury is near the Moon on the 19th and very near the Sun. Mercury is not suitable for observation this month.

Venus is visible in the evening twilight but is difficult to see due to the bright twilight and its closeness to the Sun.

Mars, the “red” planet is a bright object visible to the “naked eye” in the evening twilight this month. It is in Taurus this month and is in the “Pleiades area” of the sky. Nice to watch this with binoculars.

Jupiter, the largest planet in the Solar System, is in Pisces and Cetus this month. Its largest 4 moons are close together in the sky this month.

Saturn, the “ringed planet” is in conjunction with the Sun on the 18th and is not well placed for observations now.

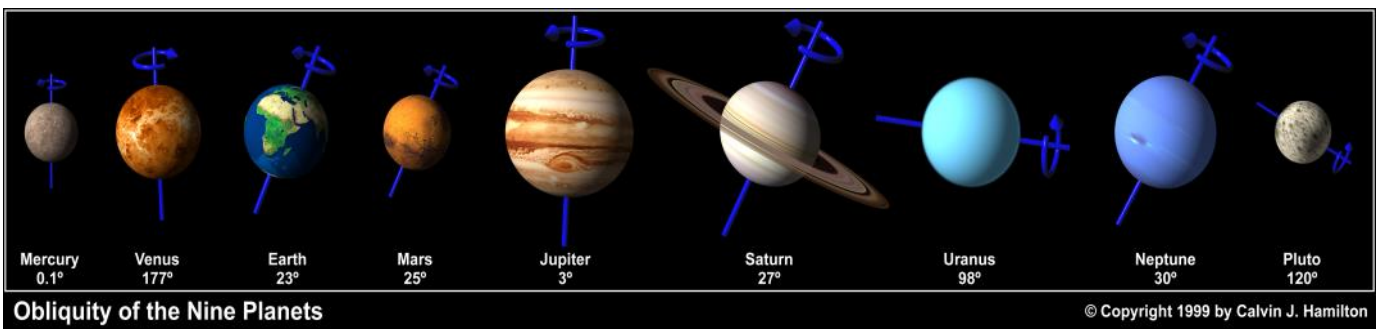
Uranus is near the Moon on the 25th and usually needs at least binoculars to be seen. I have seen its tiny, greenish disk in my Celestron 8” telescope. A “goto” facility helps in finding it quickly. Uranus is in Aries all year.

Meteor showers. With unfavourable prospects for observation this month we have the “tail-end” of the Alpha Centaurids with a maximum ZHR of 5 and the Gamma Normids, also a southern shower, at a ZHR of 5. (See page 86 of the ASSA Sky Guide 2023)

Comets. No bright comets are predicted this month.

The Starry Sky from Durban. Early in the evening the Southern Cross is low over the South East followed by the Pointers. The star-rich “3 crosses” area is rising up ahead of the Southern Cross. Orion is high over the North , with Taurus, Messier 45, the Pleiades and Castor and Pollux are low over the North East below the bright star Procyon. The “Square of Pegasus” is setting low over the Noth West. The bright star “Fomalhaut” has almost set over the North West.

References include ASSA Sky Guide 2023 and Philips Planisphere for 35° South.



How do you Measure the Mass of a Star?

By Bruce McLure and Theresa Wiegert

ABOVE: Artist's concept of the binary star system of Sirius A and its small blue companion, Sirius B, a hot white dwarf. The 2 stars revolve around each other every 50 years. Binary stars are useful to determine the mass of a star. Image via ESA/ G. Bacon.

To measure the mass of a star, use 2 stars

There are lots of binary stars – two stars revolving around a common center of mass – populating the starry sky. In fact, a large majority of all stars we see (around 85%) are thought to be part of multiple star systems of two or more stars! This is lucky for astronomers, because two stars together provide an easy way to measure star masses.

To find the masses of stars in double systems, you need to know only two things. First, the semi-major axis or mean *distance* between the two stars (often expressed in astronomical units, which is the average distance between the Earth and sun).

And second, you need to know the *time* it takes for the two stars to revolve around one another (aka the orbital period, often expressed in Earth years).

With those two observations alone, astronomers can calculate the stars' masses. They typically do that in units of solar masses (that is, a measure of how many of our suns the star "weighs." One solar mass is 1.989×10^{30} kilograms or about 333,000 times the mass of our planet Earth.)

...Measuring the Mass of a Star

Sirius is a great example

We'll use Sirius, the brightest star of the nighttime sky, as an example. It looks like a single star to the unaided eye, but it, too, is a binary star. By the way, you can see it yourself, if you have a small telescope.

The two stars orbit each other with a period of about 50.1 Earth-years, at an average distance of about 19.8 astronomical units (AU). The brighter of the two is called Sirius A, while its fainter companion is known as Sirius B (*The Pup*).

ABOVE: At Heng Ee Observatory in Penang, Malaysia, this photo of Sirius A and Sirius B was captured (a white dwarf) on January 26, 2021. Image: Michael Tech

Finding the mass of Sirius A and B

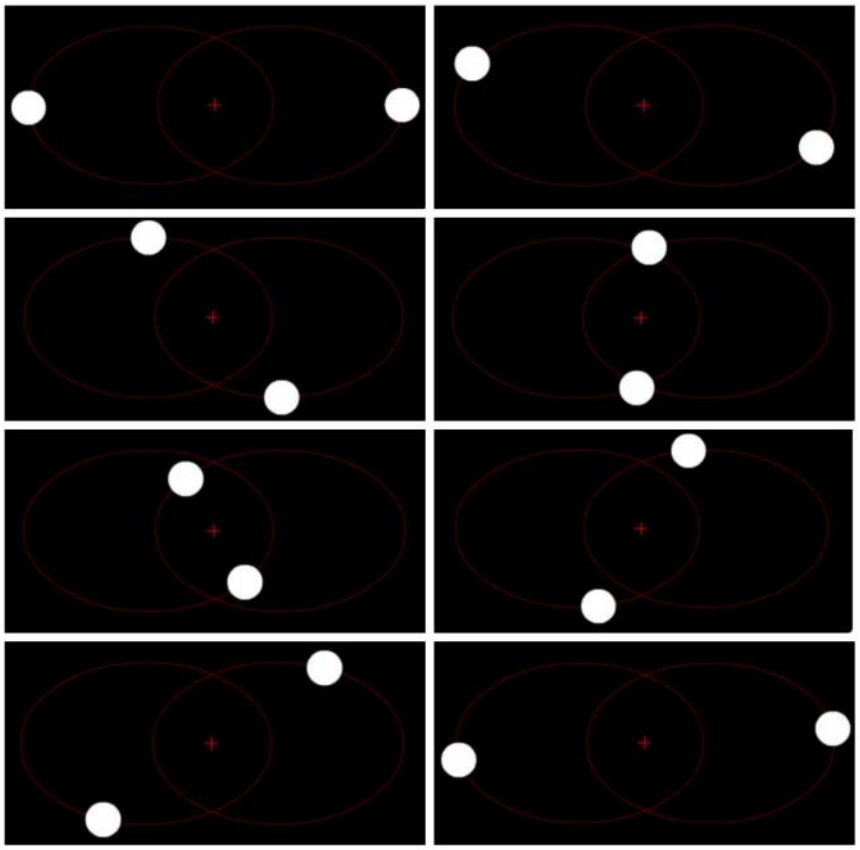
So how would astronomers find the masses of Sirius A and B? They would simply plug in the mean distance between the two stars (19.8 AU) and their orbital period (50.1 Earth-years) into the easy-to-use formula below, first derived by Johannes Kepler in 1618, and known as Kepler's Third law:

Total mass = distance^3/period^2
Total mass = 19.8^3/50.1^2
So total mass = 7762.39/2510.01 = 3.09 times the sun's mass

Here, the distance is the mean distance between the stars (or, more precisely, the semi-major axis) in astronomical units, so 19.8, and the orbital period is 50.1 years.

...Measuring the Mass of a Star

The resulting total mass is about three solar masses. Note that this is not the mass of one star but of both stars added together. So, we know that the whole binary system equals three solar masses.



LEFT: An example of a binary star system, whose component stars orbit around a common center of mass (the red cross). In this depiction, the two stars have similar masses. In the case of the Sirius binary star system, Sirius A has about twice the mass of Sirius B. Image via Wikimedia Commons. https://earthsky.org/upl/2014/02/Orbit5.gif

Then finding the mass of each star

To find out the mass of each individual star, astronomers need to know the mean distance of each star from the barycenter: their common center of mass. To learn this, once again they rely on their observations.

It turns out that Sirius B, the less massive star, is about twice as far from the barycenter than is Sirius A. That means Sirius B has about half the mass of Sirius A.

Thus, you know the whole system is about three solar masses by using Kepler's Third Law. So now you can deduce that the mass of Sirius A is about two solar masses. And then Sirius B pretty much equals our sun in mass.

What about the mass of a star not in a binary system?

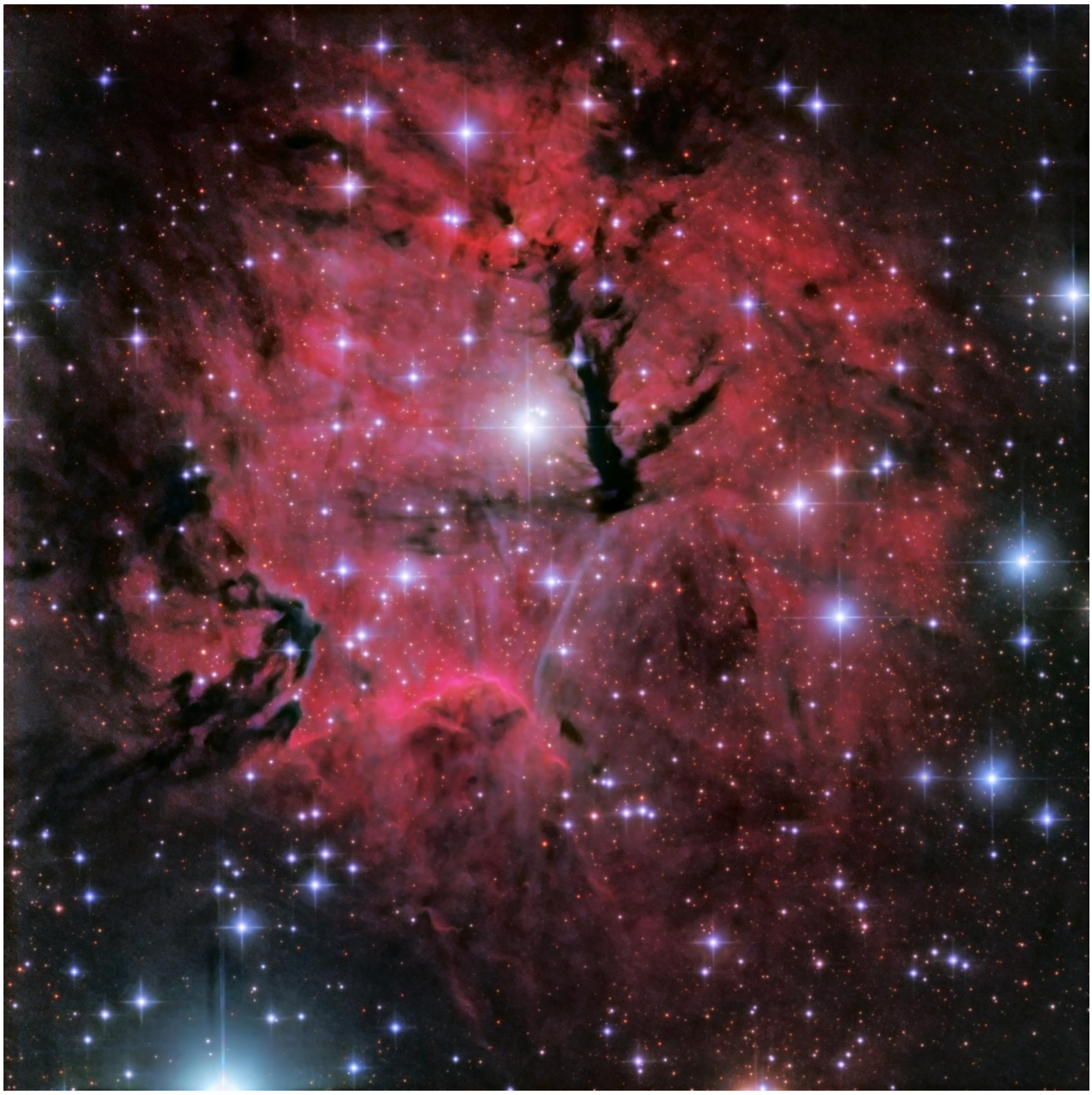
But what about stars that are alone in their star systems, like the sun? The binary star systems are once again the key: Once we have calculated the masses for a whole lot of stars in binary systems, and also know how *luminous* they are, we notice that there is a relationship between their luminosity and their mass. In other words, for single stars we only need to measure its luminosity and then use the mass-luminosity relation to figure out their mass. Thank you, binaries!

Bottom line: For astronomers, binary star systems are a quite useful tool to figure out the mass of stars.

https://earthsky.org/space/how-astronomers-learn-the-masses-of-double-stars/

The Cover Image - Gum 15 Nebula

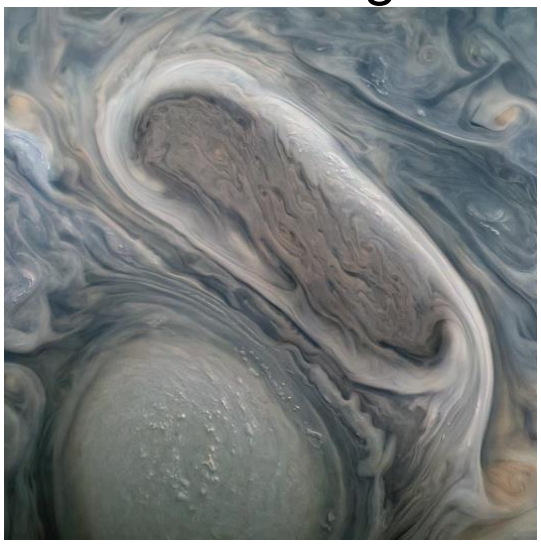
by John Gill



ABOVE FRONT PAGE: Gum 15 is a nebula from the Gum catalog, located in the constellation of Vela, about 3,000 light-years from Earth. It is shaped by aggressive winds flowing from the stars within and around it. The bright star in the center of the nebula is HD 74804, a double star. Data kindly supplied by AdamBlockStudios.com and processed by myself using PixInsight.

RIGHT INDEX PAGE: An image of two large rotating storms on Jupiter captured by Juno in November 2021. Citizen scientist Kevin M. Gill processed the image to enhance the color and contrast, using raw JunoCam data.

Index Image

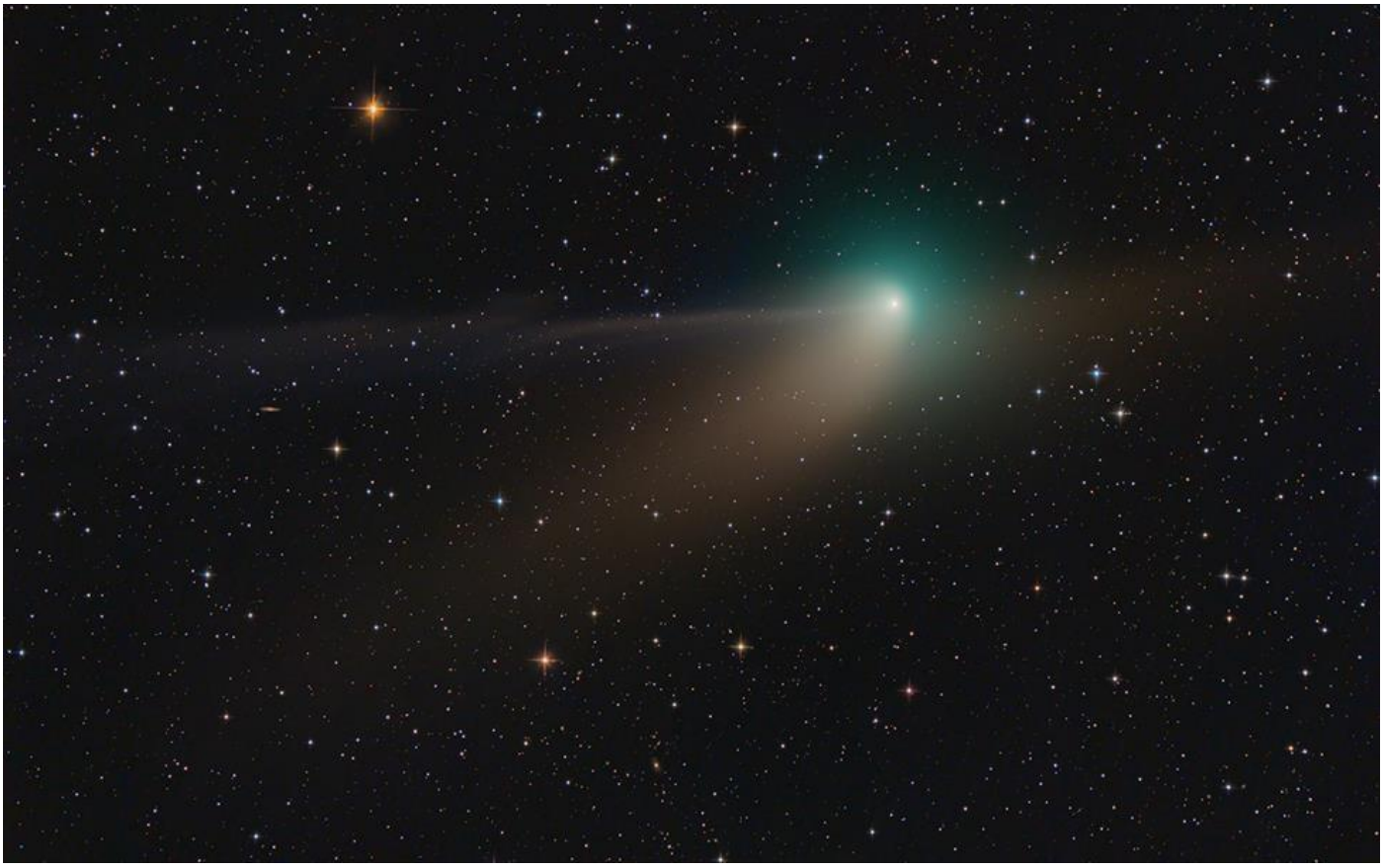


Spectacular Images of the Rare ‘Green Comet’ Gracing Our Skies

A green comet flew past Earth before disappearing from our Solar System, never to be seen again.

The comet made its closest approach to Earth in the early hours of 1 February 2023. At a relatively close 42 million kilometres (26 million miles) from Earth, it offered a rare opportunity for sky gazers to witness a comet.

The C/2022 E3 (ZTF) comet is so rare that woolly mammoths and saber-toothed cats were still roaming the Earth when it last swept by our planet. Astronomers were able to trace its orbital history and determined it is flying by Earth for the first time in roughly 50,000 years and won’t be seen again for thousands of years.This commet is a long period comet from the Oort cloud, a collection of icy bodies that are believed to exist in the farthest-flung part of the solar system.



ABOVE: Comet C/2022 E3 (ZTF) seen from Payton, Arizona on January 21, 2023. Credit and copyright: Chris Schur.

Bolin and Fran, using a special camera, the wide-field survey camera which takes a photo every 30 seconds through the forty-eight-inch telescope at the Zwicky Transient Facility at the Palomar observatory in California,

Researchers have taught machine-learning algorithms to detect moving objects in the sky by analysing these images.

“On March 2nd, all we knew was that we had found a moving object. We reported it to the Minor Planet Centre – they are the clearing house for these things,” Tom Prince, one of the lead scientists reported.

...Rare ‘Green Comet’ Gracing Our Skies

While it was initially thought to be an asteroid, the space rock’s condensed coma – its nebulous envelope – indicated it was a comet.

This rare ‘green’ comet passed through our Solar System and astrophotographers have been out capturing photos. This comet, named C/2022 E3 (ZTF), it could be seen from a very dark site by the naked eye or using a telescope or binoculars when it made it’s closest approach to Earth on February 1. The images here were taken with several minutes of exposure time.

This comet has been dubbed the “Green Comet” because of its greenish hue. Professor Paul Wiegert from Western University in Canada said that comets contain carbon-bearing molecules, which break down under ultraviolet light from the Sun. This produces, among other things, dicarbon molecules which produce the eerie green glow associated with some comets. Scientists say it is formed on the head of the comet when larger carbon-based substances are broken down by sunlight as the comet approaches the sun. This, experts say, explains why the tail of the comet is not green.

The lead photo comes from photographer Chris Schur from Arizona, and he points out that the comet has a rare sun-ward pointing anti-tail.

“The gas tail is the bluish white ray extending to the left,” Schur explained via email. “The broad fan-like dust tail is pointing downward and is a lovely golden yellow hue. The amazing anti tail is pointing to the right and is also a beautiful golden hue as well.”

Chris said he carefully processed the head region of the comet so it clearly shows the star-like nucleus of the comet surrounded by a teal-green glow from ionized carbon atoms.at

Below are more photos from around the world , gathered from Universe Today’s Flicker pool and Twitter.

LEFT: Comet 2022 E3, captured in Tucson AZ foothills. Credit: Eliot Herman.

RIGHT: Captured from Florence Arizona Credit: Andrew McCarthy

Comets can also change quickly in their appearance, as images from Andrew McCarthy show. The image on the right is from January 19, and the image here is highly processed.

...Rare ‘Green Comet’ Gracing Our Skies

Still tracking the Green comet. Comets change quite quickly as they near the sun. In this case, the long tail appears much less dramatic as in the previous image, and the dust tail is kicking out in a broad fan-shape. As in the below image.

LEFT: Captured from Florence Aeizona Credit: Andrew McCarthy 2023-01-21

BELOW: Captured from Cismont, Virginia. Credit: Brennan Gilmore

Major changes in the structure of Comet C/2022 E3 (ZTF) with the appearance of a large anti-tail. First photo 24 Jan 10:50 UTC. Second shows comet development from 30 Dec - 24 Jan.

BELOW: Comet C/2022 E3 (ZTF) on the night of January 22/23, 2023 when it was in Draco, with it near the reddish star Edasich (aka Iota Draconis) at top, and the edge-on galaxy NGC 5907 below the comet. The dust tail of the comet was showing a strong anti-tail spike ahead of the comet’s greenish coma, as this was two days before we crossed the plane of the comet’s orbit when we would see its dust tail “edge-on.”

The coma of the comet is strongly cyan or green from glowing diatomic carbon molecules, common for comets. There was little sign of the blue ion tail in my exposures this night.

Captured from Cismont, Virginia. Credit: Alan Dyer

https://www.universetoday.com/159755/spectacular-images-of-the-rare-green-comet-gracing-our-skies/

https://www.independent.co.uk/space/green-comet-2023-tonight-earth-sky-location-b2272690.html

ASSA Durban Minutes of General Meeting

January 2023 - 19:30 via Zoom

1. Welcome
2. Piet Strauss welcomed members in a joint Durban and Johannesburg meeting Meeting started at 19:30
3. Guest speaker (Willie Koorts)
   - Willie gave a presentation on SAAO in Sutherland
4. Present and Apologies (Durban Hosted Meeting)
   - Approximately 36 members attended, including JHB and DBN
   - Apologies: Mike Watkeys, Michael Caine. Some members were disconnected at 20:00 due to load shedding
5. Debbie welcomed Durban members at 20:40
6. Previous meeting minutes and matters arising
   - Previous meeting was the year-end function. No minutes were recorded
7. Piet Strauss presented a viewing calendar for 2023
8. Treasurers report
   - Unavailable at present. Bank access to be finalised
9. Library
   - Locked in the school cupboard.
   - No updates
10. Events
    - Intro-Astro course coming up. Details to follow
    - Outing in June long weekend; astronomy and geology combined
      * Details to follow. Still looking for a venue with camping and chalets
      * Please let committee know
11. Ndaba
    - We are looking for a new editor urgently
12. General
    - Clear skies with all the load shedding
    - Sky Guides can be paid online and collected from Mike Hadlow, Piet Strauss or Claire Odhav

Meeting closed at 21:00 to dodge the next load shedding

ASSA DURBAN ZOOM MEETING

Durban members meeting continuation details:
Meeting ID: **88037701479**
Passcode: **297674**

Public Viewing Roster ASSA Durban

Dome Master	Email	Assistant	Telescope Volunteer	Public Viewing
Alan Marnitz	alan@astronomydurban.co.za	TBC	TBC	17th Feb
Alan Marnitz	alan@astronomydurban.co.za	TBC	TBC	24rd March
Alan Marnitz	alan@astronomydurban.co.za	TBC	TBC	21st April
Alan Marnitz	alan@astronomydurban.co.za	TBC	TBC	19th May

PUBLIC VIEWING:

Public viewing is on site at the Marist Brothers St Henry's School in the dome and around the pool area; usually the first Friday evening closest to the New Moon.

Please note there is a roster with a booking system. Once the number of telescopes are confirmed, Individuals will be contacted to confirm dates and times. Please book your place!!!

NOTIFY OBSERVATORY MANAGER:

Members interested in attending the above viewing evenings and/or becoming involved in assisting with the viewing evenings, please send your names to Alan Marnitz on cell number 082 305 9600, or via email: alan@astronomydurban.co.za

VOLUNTEERS REQUIRED:

Volunteers to please identify which role you are willing to assist with, Dome Master, Viewing Assistant or a Telescope Volunteer. After which, attendance will be confirmed and viewing dates will be announced.

Viewing Assistant - Learning about the new telescope, assisting with the viewing evenings, assisting viewing members as required.

Telescope Volunteers - Members willing to bring their telescopes to the viewing evenings to set up around the pool for public viewing.

VOLUNTEERS TUTORIAL:

Mike Hadlow to organise an afternoon / evening to train volunteers as Dome Masters and the use of the large telescope. Date to be confirmed and viewing dates will be announced ASAP.

Viewing Contact:	Phone	Email
Alan Marnitz	082 305 9600	alan@astronomydurban.co.za

Notice Board

MEETINGS:

- GENERAL MEETING to be held on **8th February2023** via Zoom https://us02web.zoom.us/j/88037701479?pwd=UU5xMUFjbWIVWUtMWTd1Y1I2ZDNQdz09 **@ 7:30pm or as notified.**
- PUBLIC VIEWING MEETINGS - please refer to website under the tab "Viewing and Events" for any updates with regards dates & public viewing, please click here: https://astronomydurban.co.za/events-viewing/

MNASSA:

- Monthly Notes of the Astronomical Society of Southern Africa.
- Available at www.mnassa.org.za to download your free monthly copy.

NIGHTFALL:

- Fantastic astronomy magazine. Check it out.
- Available from the ASSA website assa.saao.ac.za/about/publications/nightfall/

MEMBERSHIP FEES & BANKING:

- **Membership Subscriptions were due on the 2022-07-01 for the 2022-2023 financial year. PLEASE pay outstanding subscriptions.**
- **Please pay Subscription fees via EFT.**

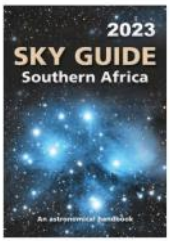
Pay Fees Online

Membership fees indicated below:

- Single Members: **R 190:00**
- Family Membership: **R 230:00** for family membership.
- Under 18 members: **Free to join meetings**
- Cash/Cheques: **Please note: NO cheques or cash will be accepted - Cash deposits incur bank charges**
- Account Name: **ASSA Natal Centre**
- Bank: **Nedbank**
- Account No. **1352 027 674**
- Branch: **Nedbank Durban North**
- Code: **135 226**
- Reference: **SUBS 22-23 SURNAME and FIRST NAME**
- Proof of Payment: treasurer@astronomydurban.co.za

SKY GUIDE 2023 - Limited number will be available !!!

- Contact: Mike @ Mike@astronomydurban.co.za
- Price: **R 100.00**
- Reference when paying: **SG 2023 SURNAME and FIRST NAME**



RESIGNATIONS from ASSA:

Please send an email immediately notifying the Secretary at secretary@astronomydurban.co.za stating your wish to resign from the society.

COMMITTEE POSITIONS & CONTACTS:

Chairman	Debbie Abel	Debbie@astronomydurban.co.za
Vice Chair	TBC	
Secretary	Francois Zinserling	Secretary@astronomydurban.co.za
Treasurer	Francois Zinserling	Treasurer@astronomydurban.co.za
Guest Speaker Liaison	Piet Strauss	Piet@astronomydurban.co.za
Observatory & Equipment	Alan Marnitz	Alan@astronomydurban.co.za
Observatory Assistant	TBC	
Publicity & Librarian	Claire Odhav	Claire@astronomydurban.co.za
Out-Reach - Public	Cheryl Venter	Sheryl@astronomydurban.co.za
Out-Reach - Schools	Sihle Kunene	Sihle@astronomydurban.co.za
St. Henry's Marist College Liaison	Moya O`Donoghue	Moya@astronomydurban.co.za
'nDaba Editor	John & Corinne Gill	John@astronomydurban.co.za
Website & Facebook	John Gill	John@astronomydurban.co.za

ELECTRONIC DETAILS:

- Website: www.astronomydurban.co.za
- Emails : AstronomyDurban@gmail.com
- Instagram: https://www.instagram.com/astronomydurban/