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MNASSA download site: www.mnassa.org.za

Cover - One of the winning images of the recent ASSA Astrophotography competition, the Eta Carinae Nebula by Prof Peter Dunsby. *see page 160.*

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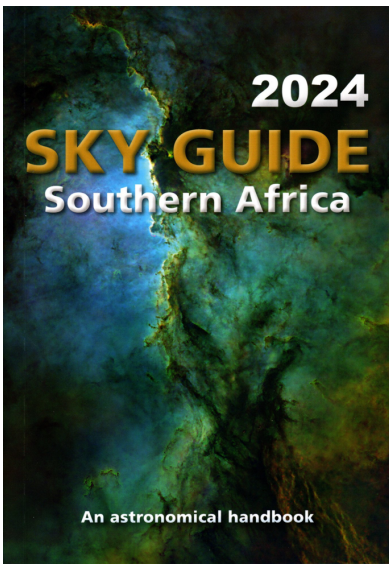
ASSA News: Sky Guide Southern Africa 2024



The 2024 Sky Guide has just been printed and should be in the bookshops soon. It is the 79th Edtion of this highly useful and convenient work, a joint publication of Struik Nature and ASSA.

As well as the celestial almanac pages, with data on the visibilities of the Moon and Planets and images of the sky in different directions and dates, it contains a great deal of generally useful data and an Astrophotography Gallery that shows some of the excellent results being obtained by ASSA members.

There will be a book launch at Exclusive Books, Constantia Branch on 15 November, 1730 for 1800

News Note: Vanessa McBride to leave SAAO and OAD

Vanessa McBride has announced her resignation from OAD/SAAO at the end of October to take up the position of *Science Director* of the International Science Council, based in Paris. She has been affiliated with the SAAO since 2011, where she has been Head of Research, and will leave at the end of this month. She has played an important part in both OAD and the SAAO where she was involved in research and training, as well as in the national and international visibility of the whole of South African astronomy. She had the the major role in bringing the General Assembly of the IAU to Cape Town next year!

The ISC, which she will be joining, is an international NGO formed in 2018 by combining the International Council for Science (ICSU) with the International Social Science Council (ISSC) and is based in Paris.

“The vision of the ISC is to advance science as a global public good. Scientific knowledge, data and expertise must be universally accessible and its benefits universally shared. The practice of science must be inclusive and equitable, also in opportunities for scientific education and capacity development“.

Steavenson Award for Clyde Foster

On 25 October 2023 the British Astronomical Association presented ASSA member Clyde Foster with its Steavenson Award for 2022.

This award is given to a (BAA) member who has made an outstanding contribution to observational astronomy and, in Clyde’s case, for his discovery of “Clyde’s Spot” on Jupiter that has received worldwide attention. In 2021 he already received the Overbeek medal of ASSA.

In a Zoom speech, while accepting the award, Clyde spoke of his original discovery from Centurion, Pretoria, using his Celestron 14, and of the thrill of the international recognition he has received on account of it.

Just recently, Clyde retired from his occupation as an engineer and has moved to Namibia where he has has rebuilt his observatory on the large farm “Goellschau” of 24,000 hectares, some 24 km from the Gamsberg, calling it the “Oryx ”. Here he has quickly become a part of the rapidly developing Namibian astronomical scene, with the HESS gamma-ray telescope nearby and the African mm telescope soon to be constructed (see August *MNASSA*, p.111).

Fig 1. Clyde Foster’s new Oryx Observatory in Khomas, Namibia, with the Galactic Centre in the background.

Fig 2. A screen shot from Clyde's BAA medal acceptance speech showing scenes from his new observatory and its construction

News Note - SAAO Annual Review 2022-2023

The latest SAAO Annual Report is now available online. It provides much interesting general background information on the 25 telescopes and other installations at Sutherland besides the new instrumentation that has been or is being developed. As usual it describes highlights of the research carried out and lists the publications by staff members and outside users of the telescopes.

A recent development is the introduction of the "Intelligent Observatory" concept to automate more of the telescopes and facilitate the coordination between them. There is more and more demand to respond timeously to alerts from other observatories, both terrestrial and in space.

An increasing proportion of th SAAO's effort nowadays goes into "Science Engagement and Outreach". For example, a new "Visitors' Centre" is under construction, there are frequent projects and events, exhibitions, workshops etc. The Observatory also hosts the African Astronomical Society (AfAS), the IAU/OAD and the BRICS Astronomy Group. https://www.saao.ac.za/2023/10/20/saao-annual-review-2022-2023/

News Note: Pro-Am Astronomy Research Collaboration (PARC)

Last year a survey was completed expressing interest in collaborating with professional astronomers from the International Astronomical Union (IAU) on various research efforts. The newly launched IAU Pro-Am Research Collaboration (PARC) initiative promotes and facilitates research initiatives between amateur and professional astronomers. We invite amateur astronomers from around the world to visit the PARC web portal, explore the "Active Projects", and sign up to participate in those that are of interest to you.

PARC Web Portal LINK
https://www.iau.org/science/scientific_bodies/working_groups/professional-amateur/

Please note that new projects will be added as they are proposed by professional astronomers and approved, so be sure to visit the PARC web portal regularly to explore new opportunities.

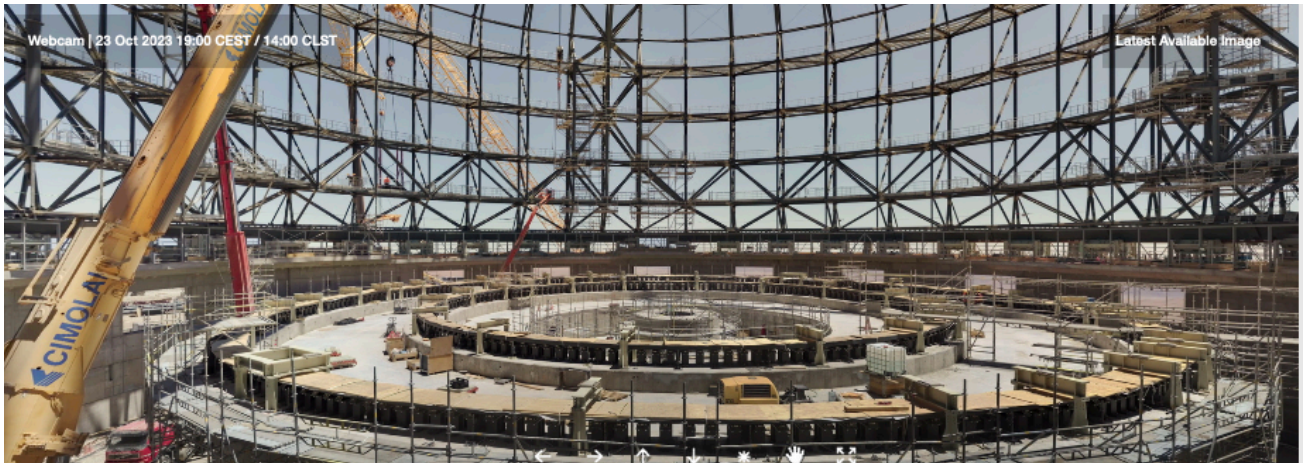
In addition to these research opportunities, the first PARC workshop will take place in person in Mumbai, India, December 1–3, 2023. This is a great opportunity for amateurs to learn about new projects, tools and techniques, and to meet other amateurs and professionals interested in research collaborations. Please visit the link below for more information and to register for the meeting.

PARC Meeting LINK: https://khagolmandal.com/ProAm2023.html

Thank you so very much for your time and consideration, and please share this invitation with others who may be interested. We are looking forward to your participation! If you have any questions, please direct them to Tim Spuck at tspuck@aui.edu or Aniket Sule at aniket.sule@gmail.com.

News Note: Progress on the ESO ELT

The ESO Extremely Large Telescope or ELT is progressing nicely. With a main mirror diameter of 39 metres, its cost is currently estimated at 1.45 billion Euros and first light is expected to be towards the end of this decade.



View of the azimuth support ring for the ELT under construction on 25 October 2023. The dome has a diameter of about 80 metres.

The progress of its construction can be followed via several webcams at https://elt.eso.org/about/webcams/. Also on this site can be found many details of its design and capabilities.

News Note: Journal of Astronomical History and Heritage (JAHH)

This journal has been published since 1998 and, since the start of this year, is now owned and published by the University of Science and Technology of China (USTC). It continues to be edited by Prof Wayne Orchiston (Thailand) and Prof Shi Yunli (China).

It is a quarterly open access electronic journal and features review papers, research papers, archival papers, 'Reminiscences' by notable astronomers, IAU and other reports, and book reviews and is available free of charge at jahh.ustc.edu.cn.

The September 2023 issue has an article by IS Glass on "The first photographs made at the Cape of Good Hope". These were made around 1843 by Charles Piazzi Smyth who was Chief Assistant at the Royal Observatory from 1835 to 1846. They show the Royal Observatory and a now disappeared Magnetic Observatory as well as various other interesting subjects.

Website: https://www.sciengine.com/JAHH/home

Farewell message to Vanessa McBride

Kevin Govender, OAD

It is only on very special occasions that I actually write down the words of a speech. This is such an occasion. It is not a sad goodbye but a celebration of the fact that we have been lucky and privileged to have someone like Vanessa work with us during this time - a special moment along her career trajectory towards ever greater things.

Vanessa joined the OAD in January 2017, having previously served in a joint University of Cape Town/SAAO Senior Lecturer/Astronomer position. Prior to that she was at the University of Southampton in the UK where she did her PhD and Postdoc. Prior to that she worked at the South African Nuclear Energy Corporation, where she and I actually first met in 2001.

When we hired her, people asked why she wanted to work for the OAD. She was a senior scientist and highly respected in the research community. This is probably why people didn't want her to move to the OAD, which appeared to be a path leading away from research. At the same time she was humble enough to see the value of a structure like the OAD. This combination of seniority and humility has really been what defined her time at the OAD and made her rise to the heights of achievement that she has.

During her time since she joined the OAD she took on the lead role in bidding (successfully) to host the 2024 IAU GA in Africa for the first time, and then Chairing the National Organising Committee for the event. A while later she assumed the part time role of Head of Research at the SAAO, and also obtained her Adjunct Associate Prof position at UCT, which she used to continue supervising students over the years. Her diligence and high work ethic led her to rally the South African astronomy community through the Astronomy Town meeting, out of which came the Astronomy Community Task Team, which she nurtured through its infancy to the solid structure it currently is. She also followed her passion for Women in Astronomy and was a founding board member of the African Network for Women in Astronomy. Recently she also became a member of the SALT Board, representing the NRF.

For the OAD Vanessa has been my right hand and has built our strong reputation among the professional astronomy community and senior government officials worldwide. She has bravely stood in for me and led OAD whenever I couldn't, especially during the last few years, including leading a large delegation to the IAU General Assembly Busan, when I had to cancel my participation. She helped to build partnerships and manage important stakeholder relations that have kept the OAD strong and relevant Vanessa really is one of those cases where one's humility prevents one from

understanding the significance of their contributions. Vanessa's contributions have certainly been far more significant than she herself may realise.

During her time with us the OAD has grown from strength to strength. As I reflect on the years that she has spent with us, I know that she has grown too. The OAD spirit and culture, which has certainly gained international recognition, was shaped by her as well, not to mention our other incredible individuals like Ram, Nuhaah, and all the rest of our dynamic energetic team. We have always referred to the global OAD community as a family, and we have always been there for each other. We recognise that we are people first, with families to take care of, and who may need some extra support from time to time. Vanessa has been like my baby sister (for me because I'm older, for others she was probably like an Aunty V).

This position that she takes up at the International Science Council (ISC) is really senior, and she will be in a position to make a much bigger impact on the world in all science, not just astronomy. The ISC is like the parent body of the IAU. They have an audience at the UN. Their mission is science for global public good. And Vanessa will be their Science Director! Big stuff!

Vanessa, saying goodbye to you is really hard. But we are really proud of you Vanessa. Proud of where you have come from and where you are going. Proud of your dedication and commitment to your work and your colleagues, but also proud of your dedication to your family and your wanting to give them new experiences and opportunities in Europe.

You can leave with a clear conscience - you have done your job well. You have prepared us well. Now it's time to spread your wings and show the world who you are - a little girl from the small rural town of Cradock in the Eastern Cape of South Africa, who is not afraid to take on the world.

Take this spirit to Europe, show them who you are, who we are. As South Africans, as Africans, as the SAAO, as the OAD. Show them your heart. Show them your strength. Your passion. Your humility. Your diligence. And we will always be here cheering you on as you embark on this journey to change the world through science.

[Delivered at a farewell function on 23 October 2023].

Obituary and Tributes: Brian David Fraser (1944 – 2023)

ASSA mourns the loss of long-serving member Brian Fraser, who died on 28 August 2023. Brian joined ASSA in February 1971, and was awarded the Society's Long Service Award in 2011, in recognition of his many contributions to amateur astronomy. In that time he served as President of ASSA in 1994/5, as well as serving in a number of roles in the Johannesburg Centre, including Centre Chair in 2005 and 2006 and he was made an Honorary Member of the Centre. In 2007 he received a President's Award from President David Laney. He also served for many years as the Occultation Section Director and briefly as Variable Star Section Director.

Fig 1: Brian David Fraser 3 July 1944 - 28 August 2023

Brian was a key member of the ScopeX organizing team which originated at the telescope making class in 2002 and was supported by ASSA Johannesburg Centre.

Fig 2 a,b & c: Brian wins the ScopeX Raffle prize, takes a short break, and introduces Richard Berry, ScopeX's special quest from the USA. Photos https://www.scopex.co.za/

Brian is survived by his life partner Margie, brother Keith, daughters Debbie and Lindy and granddaughter Samantha.

Tribute: Berto Monard:

Brian was one of the few genuine astronomers in RSA who was involved in all kinds of astro projects and he was also a serious observer. I always had a lot of respect for Brian

not just for this involvement but for the unique person he was and with a good sense of humour.

Tribute: Elizabeth O. Waagen - Contributions to the AAVSO
We were always very appreciative of Brian's carefully made, accurate observations, and of his reporting timely observations of time-dependent events such as new novae and recurrent novae eruptions. We were grateful to him for his tireless work, with the other members of the team, on organizing and digitizing Alexander William Roberts' valuable variable star observations, thus making them available to future researchers. We also appreciated his support of our work through his years of membership. On behalf of the AAVSO, and personally, I extend our deepest condolences to Brian's family, friends, and colleagues in Southern Africa and around the world.

He contributed 723 observations of delta Sco made between August 2000 and September 2011. His total of all variable star observations contributed (including delta Sco) was 1,809 made September 1983 - April 2012. Brian was a member of the AAVSO for 18 years over the period 1986 - 2004. Also, he received an AAVSO Variable Star Observer Award at the 1000 visual observations level in 2013. "

Tribute: Tim Cooper
Brian was an important member of the team that captured Alexander William Roberts variable star observations, digitised and added them to the AAVSO database, making them available to the scientific community for further analysis. The late Danie Overbeek long mentioned the opportunity to capture Roberts' observations, made between 1891 and 1922, but due to the size of the project, deciphering his notes and the unique method that Roberts used to record his observations, Danie saw the task as too daunting. In 2002, the then-Director of the AAVSO, Dr Janet Mattei paid us a visit and presented the Danie Overbeek Memorial Lecture at the 5th Biennial ASSA Symposium. On that occasion she again raised the subject of the Roberts observations and following further discussions we agreed to set up a team including Brian Fraser and Tim Cooper, along with Matie Hoffman, Dawie van Jaarsveldt and Braam van Zyl representing the University of the Free State and the Friends of Boyden.

Brian and I made numerous trips to Boyden together to pore over the 140 packets of hand-written notes wrapped in brown paper, which when stacked on top of each other would have formed a stack 4 metres high! The team managed to capture over 70 000 variable star observations and enter these into the AAVSO database. At the 6th ASSA Symposium held on 14 to 16 October 2004 at The Military History Museum in

Saxonwold, Johannesburg, the project was wrapped up with two papers, with Brian presenting 'Roberts – the Man', and Tim 'Roberts – the Observations'.

Fig 3. Prof Matie Hoffman, Tim Cooper, Braam van Zyl, Brian Fraser at Boyden working on the Roberts observations. Courtesy Dawid van Jaarsveldt

Brian's observations of the variability of the bright star delta Scorpii. In 2000 the star unexpectedly increased in brightness from magnitude 2.5 to 1.7, before settling back to 2.2, and then brightening back again to 1.9, where it has remained again for some years. Brian turned observing the star into a special project and made a significant contribution to the AAVSO light curve of the star, with over 600 individual Johnson B and V band observations using a photoelectric photometer (PEP).

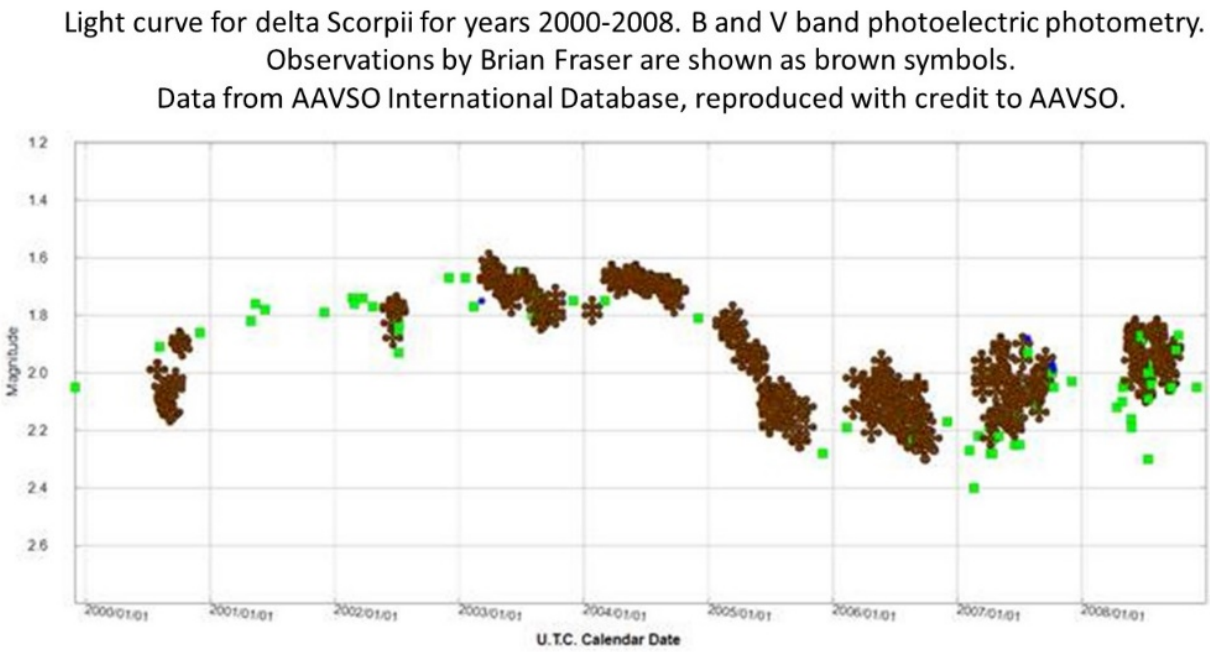


Fig 4. Tim Cooper made this light curve of Brian's observations of the star from the AAVSO data, which shows the behaviour quite nicely. Brian's observations are the brown symbols.

Contributions on Occultation timings

The total of Brian's occultation observations was provided by David Dunham and Dave Herald, of the International Occultation Timing Association (IOTA) and is available on request to the MNASSA Editor. In summary:

Brian made over 250 total lunar occultation timings following his first on 8 June 1973 up to Feb 2008, was involved in more than two dozen grazing occultation expeditions, and four successful asteroid occultation timings (between 1998 and 2005) which helped define the sizes of asteroids 48 Doris, 207 Hedda, 248 Lameia and 250 Bettina.

Tribute: Magda Streicher

Brian became one of my best astronomy friends, sharing and talking to one another on a regular basis for more than 20 years. It was just a wonderful journey to work with him on several projects, especially the Occultation section.

I remember the time when he organized all by himself a flight for the astronomy members to attend the Lusaka, Zambia solar eclipse on 21 June 2001. We were all so thankful and cheering Brian in a loud way on the flight way back, it was such a success.

During my year as ASSA President I was discussing with Brian the possibility for Durban Centre to host the symposium. Durban Centre was not so sure if they could pull it off, successfully.

It was Brian who took the bull by the horns and together we persuaded them to go ahead. It turned out to be the first Durban Centre symposium held in Durban and what a success and joyful even it turned out to be.

Brian was a special astronomy friend to me."

Tribute: Bruce Dickson

Brian, Nigel Wakefield and Clive Winskill took me on my very first graze ... They picked me up in the wee hours at Ernest Oppenheimer Hall and we drove out into the boonies. I had no idea where because I spent the trip unconscious. The AGM Proceedings says it was 04h30 on 2 April, 1983 in Walkerville. So now I also know.

On arriving at the graze site, I was a bit bewildered. "Which star are we meant to look at?" Either Brian or Nigel or Clive or maybe even Danie (Overbeek) - I can't remember which - suggested I look at the moon for guidance.

A month or two later, it was Brian who taught me to use the Tinsley telescope (at the Union Observatory aka as Johannesburg Observatory) - a requirement before Chris Papadopoulos would allow me to use it for my Second Year Physics project. Brian was a very patient man.

A year or two later, the same group plus Monty Northam found 1P/Halley by star-hopping the Jacobs telescope. This was long, long before it was a naked eye object. Brian then used the setting circles to get it in the field of the Tinsley. We weren't the first amateurs to lay eyes on it but we *were* very close. It was six of us at the top of Observatory Hill. All amateur astronomers, all doing their thing, all getting quite cold.

Extract from acknowledgement from Andy Overbeek at Brian's burial
Brian met a teacher in Zimbabwe who said that she would love a telescope for her students.

So, Brian made one and organized for it to be taken to the school in Zimbabwe.
Brian was very involved with outreach, and he invited people to his house in Henley on Klip so that he could share his passion of astronomy with them. He also held a number of astronomy evenings at the Oprah Winfrey School where he delighted the girls by showing them the stars.

He made an enormous amount of effort to motivate the naming of Minor Planet 5038 Overbeek. He also took the trouble to create a Wikipedia article on Danie Overbeek.

Tribute: Chris Stewart
When I joined ASSA in 1976, Brian was already a bit of an institution. Generally quiet, but unafraid to speak his mind (sometimes quite bitingly), he had a wealth of knowledge backed up with practical skills and a wicked sense of humour. As the old guard among the likes of Chris Papadopoulos and Danie Overbeek aged out, he rose to prominence in ASSA.

Brian was practical - a "doer" - involved in various visual observing programs such as the International Mars Watch, occultation timings, variable and double stars. He was equally fond of tinkering as an amateur telescope maker. Around 1990, at the behest of several members of the Johannesburg Centre, he ran a successful mirror making workshop, and later stepped in to lead the ongoing telescope making class during my absence abroad in 1998/99. Many people will freely attribute their success in these areas to his guidance.

Notably, from time to time he also lead excursions locally for occultations, and abroad for solar eclipses. Somehow he managed to arrange these awesome experiences in

mysterious lands at unbelievably low cost that made it affordable despite the declining buying power of our currency.

He quietly stamped his mark on the Society and the people who comprise it. We shall certainly remember him - primarily as a person, but also for his influence on the Society, the knowledge he imparted, and the enriching experiences he enabled us to enjoy.

Now, he is at one with the universe.

Bright Western Cape Fireball of 6 August 2023 (SAFC #455)

Tim Cooper, Director, Comet, Asteroid and Meteor Section

Summary
There has been a regular occurrence of spectacular fireballs seen from the Western Cape in recent years. The last very bright fireball seen from the Western Cape was during the early morning of 18 June 2022 (SAFC #412) and was reported in Cooper (2022). That article additionally summarised bright fireballs seen from the Western Cape on 16 January 2019 (SAFC #316), 9 August 2021 (SAFC #401), and 24 September 2021 (SAFC #403). The most recent event (SAFC #455) occurred at 17h54 on 6 August 2023, and brings the total of such events over the Western Cape to five since January 2019. This article summarises eye-witness accounts and images derived from video footage of the fireball. The brightness reached apparent magnitude -10.4 $\pm$ 1.0, duration of visible passage was 8.15 seconds and the path extended from just south of Matjiesfontein and terminated near the Cape west coast around the vicinity of Velddrif. Note all times are in UT. All azimuths are measured from north (0°) through east.

Eye witness reports
Several reports were received from individuals who saw the fireball. The locations of observers who provided useful information are shown in Figure 1 (locations in parentheses).

Jaco-Chris Koorts (1) saw the fireball from Durbanville, and said it was 'very bright, and easily visible despite bright surrounding lights. It was quite high in the sky, and despite fairly high trees, he could follow the whole trajectory without being obstructed by trees, altitude about 45°. Duration at least 3 seconds, long enough to call out to others who saw the last part of the track. The path was roughly horizontal, path from az/alt

20°, 45° to 340°, 45°. The colour was very bright white and reminded him ‘of when you burn magnesium’. He saw it break up towards the end of the track. No sounds heard.

Eric and Jamie Leigh Bleeker (2) were just getting out of their car when they saw the fireball from Lakeside. Time was given as about 17h50, shortly before start of scheduled load shedding. Size was said to be large, very bright, colour bright white, duration about 5 seconds from the time they first saw it until it faded away. Broke into six or seven smaller pieces, the largest piece continuing before fading. Eric said ‘it looked like a sparkler’. Path from azimuth 62° and burned out in azimuth 20°.

Bert Mars (3) sent a report to the ASSA Report a Sighting page. He saw the fireball from Eversdal just before 18h00, very bright, duration about 3 seconds, started bright white, then all of a sudden seemed ‘to catch fire with an orange colour’ before he lost sight of it behind trees. He said it seemed very close. From a sketch provided path appeared almost horizontal or descending slightly right to left, altitude about 30°, from azimuth 86° to 341°.

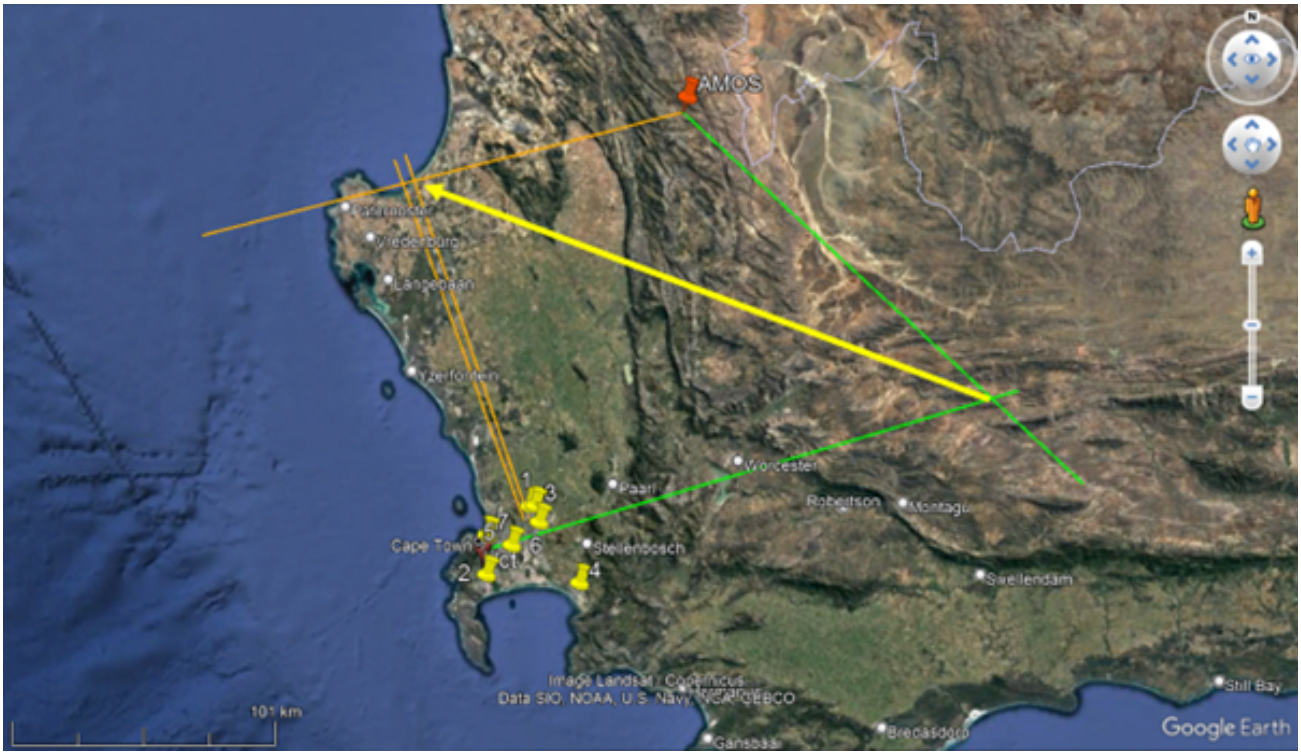


Fig 1: Sightings map and possible ground path for Event #455 on 6 August 2023. Reliable visual reports from Cape Town environs are shown as yellow pins. Location of the AMOS camera at Cederberg Observatory is shown as a red pin. Green lines are in direction of azimuth of start point of the fireball, red lines are in direction of the end points of the fireball.

Juliana de Swardt (4) saw the bright fireball through a north-facing window from her home in Strand, altitude about 40° and moving slightly downwards right to left. Very bright, it looked like 'the ball in front had different colours, and the tail was white'. Duration was long enough to call her husband, who also saw it.

Bob Lunsford, who curates fireball reports to the American Meteor Society fireball page forwarded a report from Smous Buhle (5) who saw the fireball from Manenberg. He reported the time as 17h55, duration 3-4 seconds, brightness estimated as much brighter than a full moon, and colours seen were orange, yellow and white. He said the fireball was 'huge, and appeared lower than an airplane in the sky', and also reported sounds 'like strong wind or almost like a firecracker'.

Monquer Jacobs (6), a member of the ASSA Cape Centre, was outside at the telescope and noticed a bright light in his peripheral vision. He turned his head in the direction and saw the fireball, duration 2-3 seconds, and said 'it appeared to be very low. Very bright, orange white streak, resembled a large firework when it burns out'. Path looking north was roughly from east to west.

Video images and path

One video from a security camera in Vredehoek was posted on Reddit by user Ok_Beat_1773 (https://www.reddit.com/r/capetown/comments/15kclmt/video_meteor_in_cpt_last_night/).

Auke Slotegraaf posted a request to file a report on the ASSA Report a Sightings page, but this met with no response. Unfortunately the location of the camera could not be ascertained. The time stamp on the video starts at 07:55:48 pm [local time]. The fireball enters the frame already bright at top right, and moves towards lower left with descent angle 240°. Screen grabs from the video when the fireball entered the field of view and the point at which it started to fragment are shown in Figure 2. The duration in the field of view is 3.7 seconds, and the fireball is seen to fragment in the last half second before suddenly fading.

The fireball was captured by the AMOS (All-sky Meteor Orbit System) camera at Cederberg Observatory. Time of appearance was 17h54m44s. The camera operates at 20 frames per second, and caught the fireball on 163 frames, giving a duration of 8.15 seconds from beginning to end of ablation. A composite image of the entire path is shown in Figure 3. The fireball first appeared in az/alt 132.2°, 31.1° and was last

detected in 255.4°, 25.6°, that is from RA/Decl. 21h25.7m, -50° 12′ to 11h11.3m, -25° 55′, traversing 100.6° at mean angular velocity 12.3°/sec.

Fig 2: Screengrabs of Event 455 from a security camera located in Vredehoek, Cape Town and posted on Reddit. The exact location of the camera could not be ascertained.

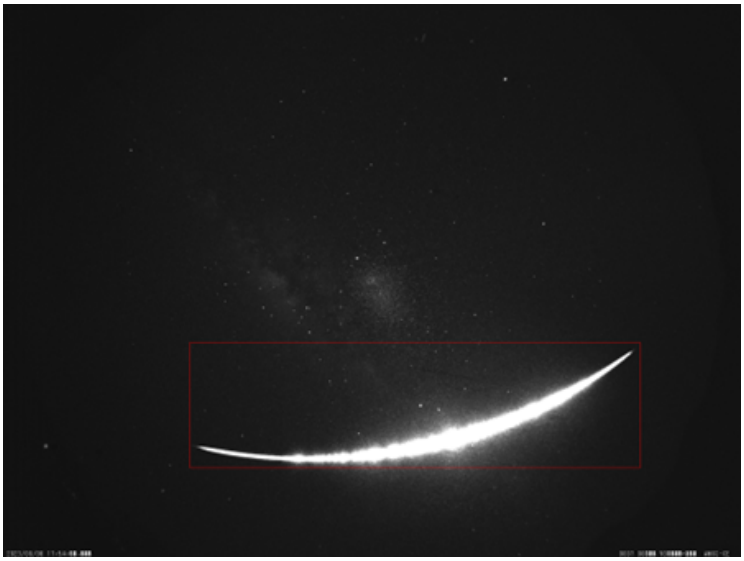


Fig 3: Composite image from 163 frames taken with the AMOS camera located at Cederberg Observatory. Reproduced with kind permission.

The first part of the path of the fireball was captured by a wide-field camera on the roof of a building in Cape Town (pin 7 in Figure 1). The image is bright due to light pollution but nevertheless enabled determination of the start of the path at az/alt 73.4°, 24.3°.

The directions of start and end points are shown in Figure 1. Green lines are in direction of the start point of the fireball and are based on astrometry from video images. Orange lines are in direction of the end points of the fireball. The direction of the end point from the AMOS camera is accurate, but the directions from Cape Town are based on two visual reports, which while in fairly good agreement, are nevertheless uncertain. Based on convergence of these directions, the fireball began ablation just south of Matjiesfontein, and terminated in the area of Velddrif on the west coast. Peak brightness occurred overhead the town of Porterville.

Brightness and light curve

Pixel values obtained from the AMOS camera frames were converted to apparent magnitude of the fireball by calibrating with values obtained on bright stars, planets and the Moon. The apparent magnitude was plotted against duration of the fireball to give the light curve shown in Figure 4. The meteor was first detected at magnitude 3, and in less than one second reached apparent magnitude -4, at which time by definition the meteor became a fireball. The rapid increase in brightness was followed by a more gradual increase peaking after 5.2 seconds at magnitude -10.4 $\pm$ 1.0. Thereafter the brightness decreased to magnitude -4 at 7.7 seconds, followed by a rapid fade and ablation ended at 8.15 seconds.

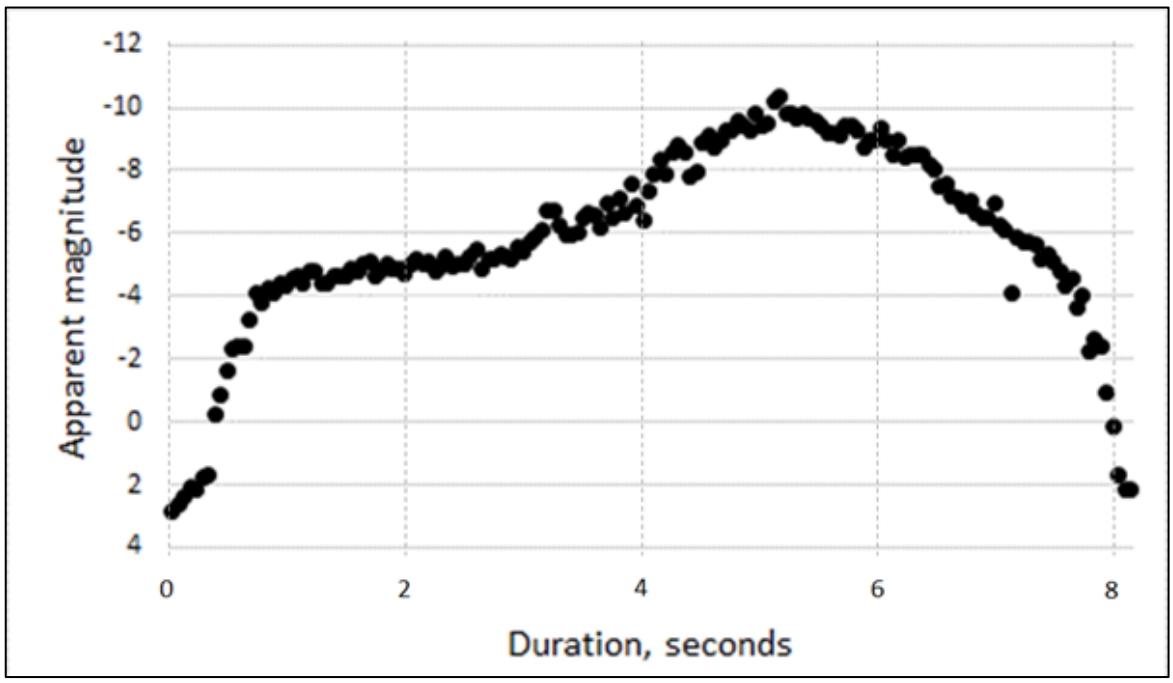


Fig 4: Light curve for Event #455 derived from pixel values from the AMOS camera at Cederberg Observatory.

The various eye witness reports gave the predominant colour seen as very bright white, and occasionally yellow and orange were mentioned. There were no reports of red colour, or bright green often associated with bright fireballs. A spectrum was secured by the AMOS camera and is shown in Figure 5, and shows major emission due to low temperature lines of neutral iron, calcium, and magnesium, as well as singly ionised silicon from silicates, neutral sodium, and atmospheric oxygen at 777.4 nm. Matlovič (2023) mentions the spectrum is probably indicative of an ordinary (L or LL) chondrite.

There is a paucity of emission at longer visible wavelengths than the neutral sodium line at 589.2 nm in the yellow, which supports the colours reported by eye witnesses.

Colours observed and spectrum

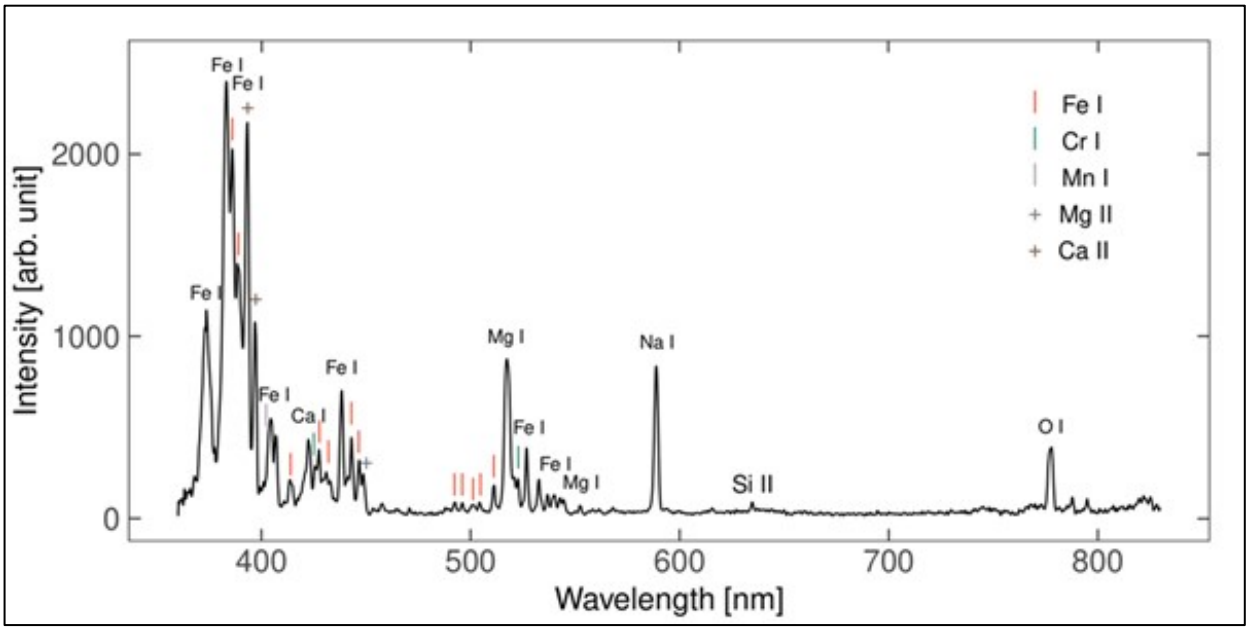


Fig 5: Spectrum for Event #455 derived from the AMOS camera, and reproduced with kind permission. The spectrum shows emission predominantly due to neutral iron, calcium and magnesium, and is probably consistent with the composition of an ordinary L or LL chondrite.

Conclusions

Another bright fireball occurred over the Western Cape on 6 August 2023, with duration 8 seconds, and reaching apparent magnitude -10.4. Path was approximately from south of Matjiesfontein, reached maximum brightness overhead Porterville, and fragmented shortly before burning out in the vicinity of Velddrif on the west coast. The event brings the occurrence of very bright fireballs seen from the Western Cape to five since January 2019. All of these fireballs may potentially have deposited meteorites, but as in the case for previous events, the absence of sufficient video footage for Event #455 which could be calibrated did not permit the accurate determination of any potential fall location.

Acknowledgements

Thanks to Auke Slotegraaf for forwarding the link to the Reddit video footage, Raoul Coetzee for the still image from a security camera in Cape Town, and Kos Coronaios and Carol Botha for forwarding reports from the public. Thanks also to Bob Lunsford for the report sent to the American Meteor Society Fireball page. Sincere appreciation to Juraj Toth and Pavol Matlovič, Comenius University in Bratislava, Slovakia for

permission to use data and images from the AMOS system, and to Pavol for additional comments made in support of this article. Figure 1 was prepared from a Google Earth image downloaded 28 August 2023, credit to Google and AfriGIS (Pty) Ltd.

References

Cooper T. P. (2022), Another bolide seen from the Western Cape, SAFC #412, MNASSA 81, pp182-189.

Matlovič, P. (2023), private communication, email dated 14 August 2023.

Recent Southern African Fireball Observations Events # 459-465

Tim Cooper, Director, Comet, Asteroid and Meteor Section

Summary: This article continues the sequential numbering of reported fireball sightings from southern Africa. By definition, a fireball is any meteor event with brightness equal to or greater than visual magnitude (m_v) –4 . The following events were reported to the author and details are reproduced as given by the observer [any comments by the author are given in brackets]. Where the report originated from the American Meteor Society Fireball page, the corresponding AMS event number is given. All times were converted to UT unless stated, and all coordinates are for epoch J2000.0. Descent angles, if given, are in degrees, with directly upwards = 0°, horizontally left to right = 90°, directly downwards = 180° and horizontally right to left = 270°. Azimuth angles are reckoned from north = 0° through east = 90°.

Event 459 – 2023 September 6 – Harkerville, Western Cape

Observed by Bruce Dickson at 19h07, m_v = -4, orange colour, path from RA/Decl. 18h36, –24° to 14h50, –16°, path length 51°, duration about 3 seconds from the time first seen until it faded. No train or fragmentation. There is a good alignment with the radiant position of the Anthelion meteors.

Event 460 – 2023 September 9 – Djuma, Sabie Sands, Mpumalanga

Bright bolide caught on a webcam overlooking the dam at Djuma Private Game Reserve. Screengrabs from the video show the changing appearance of the bolide in Figure 1.

Fig 1: Event 460 on 9 September 2023, screen grabs from camera at Djuma Private Game Reserve show the changing appearance of the fireball, including disintegration and the moment of disruption when the brightness reached magnitude about – 10.

Time of appearance was at 17h21, the fireball enters the field of view already bright, and descends at angle 193°, duration 2.9 seconds until it disappears from view. The brightness was estimated using a calibration frame taken previously using the same camera, when the Moon and Venus were in the field of view. The fireball enters the field at magnitude -6, with a short trail. At 2.0 seconds the fireball had faded to magnitude 0, and fragments began to break off and are visible in the tail. At 2.1 seconds, there is a bright flash to magnitude –10 $\pm$ 1, which is of extremely short duration. After the flash, the main body is clearly seen to be split, with the smaller fragment trailing the larger body, which continues until fading at 2.7 seconds. The bright flash is accompanied by a sharp audible 'crack' sound. Frame grabs were calibrated from an image showing bright stars to give the path from az/alt 85.6°, 16.3° at the point the fireball enters the field of view, to 83.3°, 9.0° at the point it fades from view. These correspond to RA/Decl. 23h32, -3°22' to 23h53, +2°05', path length 7.6°, angular velocity 2.6°/s, which is slow moving. There is a good agreement with the radiant of the Anthelion meteors.

Event 461 – 2023 September 20 – Hartebeespoort, North West

Fig 2: Event 461 on 20 September 2023, captured by Paul Ludick on GMS camera ZA0004. In the upper right corner is the star beta Ceti, just to the left of the bright flare is alpha Phoenicis. Achernar is the brightest star towards upper left, below right of which is a short streak which is probably an internal reflection of the bright flash. At bottom the constellation of Grus is visible. Direction of motion is from lower left to upper right.

Captured by Paul Ludick on GMS camera ZA0004 at 02h25, duration 4.4 seconds, path from RA/Decl. 00h18m55s, –47.7° to 00h29m54s, –27.5°. Screengrab from the video is shown in Figure 2. There was thin cloud following earlier thunderstorms, but magnitude about m_v –4, with two bright flares close together about one third along the path. The fireball was sporadic.

Event 462 – 2023 September 23 – Hartebeespoort, North West

Fig 3: Event 462 on 23 September 2023 September 23, captured by Paul Ludick on GMS camera ZA0005. Centre right in the image is the planet Jupiter, and the Hyades in the constellation of Taurus can be seen above right, and below that is the Pleiades.

Captured by Paul Ludick on GMS camera ZA0005 at 03h10, screen grab shown in Figure 3. The camera software did not process the astrometry of the meteor, but plotting the path manually gives the path from RA/Decl. 01h14.0, +3.6° to 00h54.7, +14.3°. The fireball was sporadic.

Event 463 – 2023 September 23 – Stellenbosch and Paarl, Western Cape

Observed by Ester Bruwer at around 03h25, as she walked outside saw a very bright yellow-white ball with yellow-orange tail, duration 2–3 seconds, appeared close to the horizon, disintegrated into two or three pieces just before it disappeared behind hills

to the north. From an image provided the path was roughly from az/alt 15°, 15°, moving down left at descent angle 230°, to the horizon in azimuth 5°.

Observed by John Woest who gave the time at 03h28, duration 3-4 seconds, very bright yellow, said to be brighter than the Moon [not visible at the time] ending in a terminal flash and fragments 'that looked like sparkles'. Path from az/alt 2°, 30° to 353°, 21°. AMS Event 5649-2023. The fireball was sporadic.

Event 464 – 2023 September 30 – Modimolle, Limpopo
Observed by Zané Pieterse at 17h44, m_v = -5, said 'I was stargazing when I saw it moving very quickly left to right, duration less than 3 seconds, through the constellation of Grus, the Crane'. Looked like a bright ball with a tail. The ball was white and red, the tail was white and faded quickly as the fireball moved across the sky. No terminal flash, the light just faded, and no sounds heard. She said the ball appeared as though it was spinning. From a sketch provided the path was from az/alt 130°, 51° to 143°, 57°, that is RA/Decl. 23h00, -44° to 22h12, -49°. There is a possibility this was an early Taurid fireball. Event 5788-2023.

Event 465 – 2023 October 3 – De Rust, Western Cape
Observed by Ted Nutting at around 00h25, brighter than Venus which was then magnitude –4.6, but not visible at the time, fainter than the Moon which was then magnitude –12, altitude 31° in azimuth 16°. Duration 2–3 seconds, yellow-orange colour, appeared to have a long fiery tail, 'like a sparkler'. From a sketch provided path from approximately az/alt 310°, 15° to 280°, 30°, or RA/Decl. 23h08, +22° to 22h40, –09°. No terminal flash. The event was sporadic.

Acknowledgments
Thanks to Paul Ludick for forwarding fireballs detected using RMS cameras as part of the Global Meteor Network (https://globalmeteornetwork.org/). AMS reports are courtesy of Robert Lunsford (Secretary General of the IMO).

2023 ASSA AGM: President's Council Report

Dr D Cunama

Good evening all, and thank you for joining us this evening.

I would firstly like to thank Lerika for organising this meeting, and seemingly everything else. Lerika your work for ASSA does not go unnoticed and is greatly appreciated.

I would like to thank our AGM Host, Derek Duckitt, ASSA Hermanus and all the attendees for actively participating.

Next, I want to extend my appreciation to the Council members for their dedication and support throughout the past year. There are many tasks and responsibilities which take place behind the scenes to keep the wheels of ASSA turning and all of your work is pivotal in making that happen, so thank you!

Comet, Asteroid and Meteor Section

A huge thank you to Tim Cooper for running the CAM Section and providing updates

Throughout the year, members made significant observations, capturing visuals of Comet C/2017 K2 and Comet C/2022 E3, as well as conducting extensive meteor shower observations.

The Cameras for Allsky Meteor Surveillance (CAMS) tracked 4 486 meteors. Excitingly, our collaboration with the Global Meteor Network (GMN) expanded coverage in the southern hemisphere, and we are on the cusp of launching a project to promote STEM education in schools.

Additionally, our fireball analyses and contributions to the Southern African Fireball Catalogue (SAFC) have strengthened international cooperation.

We are immensely grateful to all members who participated and contributed and you can read more details in Tim's report.

Astrophotography Section (formerly known as the Imaging Section)

The section has been instrumental in promoting and coordinating the use of astronomical imaging technology by amateur observers, resulting in a remarkable collection of images created by South African amateur astronomers available on our Flickr image archive,

Our collaboration with ASSA Publications has been highly successful, leading to contributions in Sky Guide, MNASSA, and Southern Skies. Furthermore, we are proud of our international collaborations, such as with sponsors like Optolong, which have provided incentives and support to the thriving local astrophotography community.

The recent Big 5 of the African Sky Astrophotography Challenge, sponsored by Optolong, was a great success, bringing forth stunning images. I would like to express my gratitude to our dedicated Section Director, Martin Heigan, for his invaluable leadership.

ASSA Historical Section

As the Astronomical Society of Southern Africa celebrated its centenary, we commemorated this significant milestone with numerous achievements in the field of the history of astronomy.

Notably, a cloud-based backup digital Archive was established, ensuring vital documentation accessibility for future council members and easing historical research. The Bi-Annual ASSA symposium in Cape Town put a spotlight on historical materials, emphasizing the importance of preserving our astronomical heritage.

In our publications, we unveiled captivating articles chronicling the history of different aspects of the Society, thanks to the dedication of the editorial team and various contributors.

Additionally, MNASSA published obituaries, paying tribute to distinguished astronomers who have left an indelible mark on our community.

Special appreciation goes to Archivist and Director of the Historical Section, Chris de Coning, for his leadership and commitment.

ASSA Cosmology

This year, we embarked on an engaging journey through the "History of the Universe" series, featuring 17 YouTube videos, in collaboration with the Hermanus Centre.

These informative videos covered a wide range of captivating topics, from the Big Bang to the nature of space and time. The approachable presentations in layman-friendly language aimed to cater to the majority of our members' interests. While we have seen some enthusiastic participation through Zoom, we are striving to improve attendance, especially from non-Hermanus ASSA members. To better meet the cosmology-related needs of our membership, we plan to conduct a survey to gauge interests and preferences for future directions.

Thanks to Derek Duckitt for his hard work on this.

ASSA Instrumentation Section

Activities primarily focus on communication, outreach, guidance, and education to support the instrumentation needs of both ASSA members and the general public. Through our online platforms, including Facebook pages, WhatsApp groups, and email lists, we provide invaluable resources and technical assistance to members worldwide.

The Amateur Telescope Making (ATM) class has been a cornerstone since 1991, fostering a supportive environment for individuals pursuing their telescope-making projects.

Our Facebook group, "Telescope Making SA," continues to grow in membership, fostering a strong sense of community. Our commitment to promoting interest in astronomy is evident in the refurbishment and donation of telescopes to enthusiastic young individuals.

With 3D printing and innovative techniques, we continue to develop novel components, fostering a healthy level of activity and interest within our section.

Thank you Chris for leading this endeavour and empowering amateur astronomy through instrumentation.

ASSA Observing section

Under the Observing section, the "Southern Skies Quarterly" was developed as a platform to encourage interest in the night sky and share observations and imaging from ASSA members and the public.

While initially well-received, the submissions for the publication experienced a decline, partly due to challenging weather conditions and general apathy. Nevertheless, plans are in place for a 2nd edition in 2023, members are encouraged to contribute

Outreach efforts have been successful, with an astronomy evening at St Dominics in Newcastle attracting over 800 attendees. However, considering the workload and the declining support for "Southern Skies Quarterly," Director Angus Burns proposes several options, including resigning and supporting a new director.

Regardless of the decision, Angus remains committed to supporting ASSA within his time constraints. Thank you for your continued support and involvement in our observational endeavours.

Ask an Astronomer

I'm happy to share the summary of the Ask An Astronomer Report for the year 2023.

ASSA has been actively responding to and addressing 163 queries posted on our website, covering a diverse range of topics. While some of the questions posed were challenging, the majority were insightful and intriguing, reflecting the genuine interest and curiosity of our audience.

Among these queries, 20% were related to Astronomy careers, underscoring the growing fascination with pursuing professional paths in this field. As we continue to foster a deeper understanding and appreciation of Astronomy, we are committed to providing comprehensive and informative responses to all inquiries. Thank you Case in particular for your ongoing support and engagement in our Astronomical community.

Scholarships Committee

The Astronomical Society of Southern Africa is proud to administer two prestigious scholarships for studies in astronomy. This year, we received six eligible applications, and after careful consideration, the ASSA Scholarship was awarded to Adnaan Nauthoo, a brilliant BSc (Hons) student from Mauritius at the University of Cape Town.

Additionally, the Cooke Scholarship was presented to Carys Gilbert, a 3rd-year Physics / Astrophysics student, also at UCT. We are delighted to celebrate the accomplishments of our 2022 awardees, Adnaan Nauthoo and Gary Louw, both BSc graduates with distinctions in Astrophysics and other disciplines.

We extend our congratulations to the recipients and express our gratitude to all who contribute to the success of these scholarships. Thank you for your unwavering support in nurturing the next generation of astronomers.

Double and Variable Star Section

The section has been thriving with growing popularity in astronomy and variable star webinars, providing unique opportunities for interaction with specialists in the field.

Observations of variable stars have been extensive, with Berto Monard submitting 33 133 for an impressive total of 2,902,043 observations to the AAVSO. The author also contributed significantly, collaborating on published papers and actively posting early warnings of exciting astronomical events.

Talks on Variable Stars and DSLR photometry of eclipsing binary stars have enriched our knowledge-sharing efforts.

In recognition of a lifetime of contributions, the Director, Dave Blane, received the prestigious Overbeek medal.

I'd like to express my gratitude to Dave and all contributors and observers.

Photometry and Spectroscopy Section

Within the Amateur Spectroscopy domain, we have observed limited growth, with Percy Jacobs being the only active Amateur Spectroscopist in South Africa, actively contributing spectra to the AAVSO database and other platforms.

To date, Percy has submitted 535 published observations, demonstrating his dedication and commitment to this field. The AAVSO Spectroscopy Section, which began in November 2018, now encompasses data from 11,337 observations by 75 observers.

Percy has also actively shared his expertise through presentations to the ASSA Johannesburg Centre, and his publications in MNASSA have contributed valuable insights to the community. His willingness to guide and support newcomers in spectroscopy showcases the spirit of knowledge-sharing that defines our astronomical community. We are immensely grateful for Percy's contributions and look forward to fostering the growth of Amateur Spectroscopy in the future.

Conclusion

In conclusion, the various reports presented at the ASSA AGM in August 2023 showcase the dynamic and thriving nature of our Astronomical society.

From scholarship initiatives supporting aspiring astronomers to the dedicated efforts of various sections, such as Astrophotography, Cosmology, and Instrumentation, our members' passion and commitment to the field are evident.

The Double and Variable Star Section and the Photometry and Spectroscopy Section continue to contribute valuable observations and research, while the Ask An Astronomer platform fosters curiosity and engagement with the wider public.

Despite challenges and fluctuations in submissions, our dedication to promoting astronomy education, outreach, and exploration remains steadfast.

As we celebrate accomplishments and milestones, we also recognize the need to adapt and evolve to meet future opportunities and challenges.

Together, as a united community of Astronomy enthusiasts, we look forward to furthering our understanding of the cosmos and inspiring the next generation of astronomers.

Our collective efforts exemplify the spirit of curiosity, exploration, and collaboration that defines the Astronomical Society of Southern Africa. Thank you to all members, supporters, and contributors for making this journey a truly enriching and enlightening one. Here's to a bright and exciting future for ASSA and the awe-inspiring world of astronomy.

Incoming Council for 2023/24

Many thanks to Pierre for his work as Vice President and thank him for taking on the Outreach Director work..

Welcome Derek - Hermanus Chair - as the new Vice President sure to be President next August.

Many thanks to Eddy for all his effort as Membership Secretary and welcome Andre Bruton (all the way from George).

Welcome Jacques van Delft as Solar Director (from Bloem)

Ask for volunteers to assist Angus as Observing Director and Dave in Photometry and Spectroscopy.

2023 ASSA AGM: President's Address

Dr Daniel Cunnama

The primary focus of ASSA revolves around fostering and stimulating the exploration of Astronomy.

As my engagement with ASSA deepened over the past few years, I came to appreciate the immense potential of our network. It serves as a hub for remarkable events, discussions, and publications, including the Sky Guide and MNASSA, all contributing significantly to astronomical research.

Presently, Astronomy experiences a remarkable era, marked by the emergence of advanced telescopes such as JWST, SKA, and LSST, and South Africa takes the lead with noteworthy contributions from SALT, MeerKAT, and SKA. Moreover, we proudly anticipate hosting the prestigious IAU General Assembly in 2024.

The fortunate alliance with the government, exemplified by the Astronomy Geographic Advantage Act, investments in SALT and MeerKAT, and the recently devised National AstroTourism Strategy, provides invaluable support.

ASSA finds itself in a unique position, not only as a pillar of support but as an active driver of the future in astronomy. Our central role involves uniting South Africans, evoking excitement, imparting knowledge, and inspiring both upcoming astronomers and a curious and engaged public.

I eagerly anticipate ASSA's continued growth and its lasting impact on the trajectory of African Astronomy.

ASSA Member Numbers	**2022**	**2023**
Country Members	100	86
Honorary Members	13	13
Bursar Members	0	2
Associate Members (Botswana Astr. Society)	0	1
Garden Route Centre	42	28
Cape Centre	83	84
Hermanus Centre	56	51
Johannesburg Centre	62	96

Pretoria Centre	47	44
Durban Centre	138	68

ASSA to give focus on opportunities to increase ASSA memberships across Centres and Country Membership.

The number of members has dropped from 2022.

2023 ASSA AGM: Astrophotography Report

Martin Heigan

The ASSA Astrophotography Section and Optolong collaborated to host the "2023 Big 5 of the African Sky Astrophotography Challenge". Optolong sponsored Light Pollution Filters for the winners, and they were able to select from a range of filters that work the best with their Telescope and Camera.

Links to HR versions of the winning images of the "2023 Big 5 of the African Sky Astrophotography Challenge" on the ASSA Flickr Gallery are given below.

The Southern Pleiades

Winning image by Yolanda Combrink.

Omega Centauri

Winning image by Coenraad van der Merwe.

Eta Carinae Nebula

Winning image by Peter Dunsby.

The Coalsack Nebula

Winning image by Yolanda Combrink.

The Milky Way

e

Winning image by Dawie Venter.

https://www.flickr.com/photos/astrosocsa/53030470122/sizes/o/
https://www.flickr.com/photos/astrosocsa/53031223649/sizes/o/
https://www.flickr.com/photos/astrosocsa/53031044911/sizes/o/
https://www.flickr.com/photos/astrosocsa/53031053906/sizes/o/
https://www.flickr.com/photos/astrosocsa/53030469217/sizes/o/

2023 ASSA AGM: Instrumentation Section Report

Chris Stewart

Activities of the Instrumentation Section continue to largely revolve around communication, outreach, guidance and education, plus the important aspect of encouraging people in the pursuit of their personal instrumentation projects. There is no drive to formally induct members into the Section. Rather, the approach is to address ASSA members' ad-hoc needs for information on a case-by-case basis.

In support of the Society's general communication efforts, which equally support the instrumentation Section's goals, activities in the following media are ongoing:
FaceBook pages
ASSA national FaceBook page
Telescope Making SA
Amateur Telescope Making
Telescope Making Class WhatsApp group
.IO group mail lists

The Section directly supports the needs of both ASSA members and the general public regarding selection, construction, purchase, maintenance and use of instrumentation. This is mostly done via the Amateur Telescope Making (ATM) class, the FaceBook pages, e-mail correspondence, telephonic discussion, and WhatsApp/SMS.

The distinctly South African “Telescope Making SA” Facebook group attracts members from around the world. International involvement produces an energetic flow of ideas, information, technical assistance and encouragement. Some of the (at times unusual) approaches to instrumentation developed locally have, after being highlighted in this medium, been favorably received and copied abroad. Prospective members are vetted prior to admitting them to the group and appropriate behaviour is gently but firmly enforced. At the time of writing, the Telescope Making SA Facebook page currently has 1,075 members, an increase of 59 since the last report. Since FB have restricted the more detailed information previously enjoyed, due to heightened data privacy legislation globally, it is no longer possible to provide a detailed breakdown of the demographic. The international “Amateur Telescope Making” group of which the author is also an administrator, currently boasts a worldwide membership of 8642.

The ATM class has been continuously active since July-1991, with expertise, materials and components freely shared for individuals’ projects. Physical classes are ongoing, subject to rare intermittent interruptions due to school activities where we meet. Members come and go according to their needs and available time, work at their own pace on individual projects, and sometimes return after a long hiatus dictated by personal circumstances. The class is run informally in a flexible manner to accommodate the vagaries of members’ lives. Consequently, there is no easy way to ascertain the actual numbers of people or projects engaged in at any one time. However, a handful of newcomers are making good progress on their first instruments, whilst others are continuing their projects. Membership of ASSA, whilst encouraged, is not a prerequisite for participation in the ATM class. A class register is kept as an indication of activity levels, but signing it is not enforced. Recorded attendance remains steady at 6-12 people per week. Apart from the Facebook interactions, there has been limited exchange of e-mails, phone calls and WhatsApp messaging.

Novel components continue to be produced, with 3D printed parts now the norm. Again, several eyepieces were constructed from salvaged optics and distributed pro bono to worthy candidates. Unfortunately supplies of such objects are dwindling, so anyone with “junk” optics of any kind is invited to donate same in order to continue supporting the community. An old 5-inch telescope on a basic equatorial mount was acquired, refurbished, and donated to an enthusiastic Girl Guide, where it is seeing use and helping to promote youthful interest in astronomy. A sophisticated Foucault tester is underway, sporting a high quality camera which should at times help in a group setting.

Overall, the foregoing indicates a continuing healthy level of activity and interest.

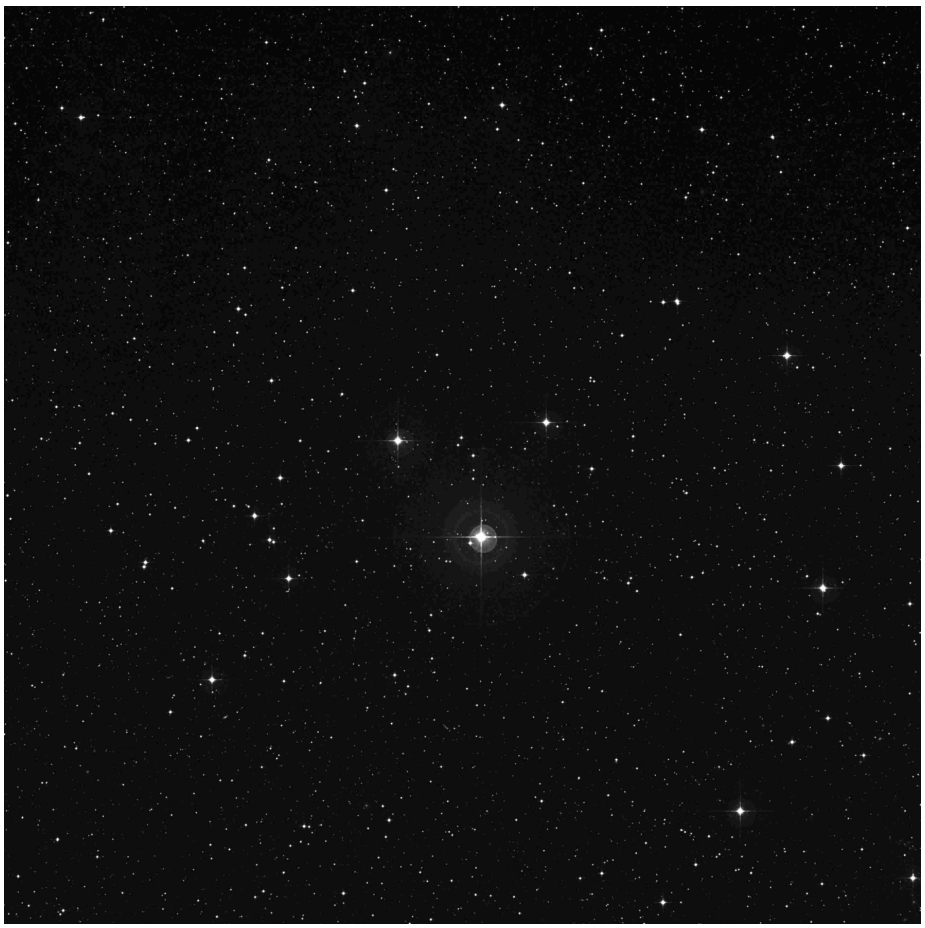
Streicher Asterisms

Magda Streicher

STREICHER – J0500-78
Mensa

At first it represents only a nice bright triangle of outstanding stars in a relatively busy star field. A very faint stringy grouping is situated between the northern two stars magnitude 8 stars running south towards the brighter magnitude 6.2 yellow tinted colour star that appears double. Loosely scattered field stars on either side of the triangle gave perhaps a larger impression.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER DSH J0500-78	Asterism	05h00m.24	-78°13’.11	11.5	47’

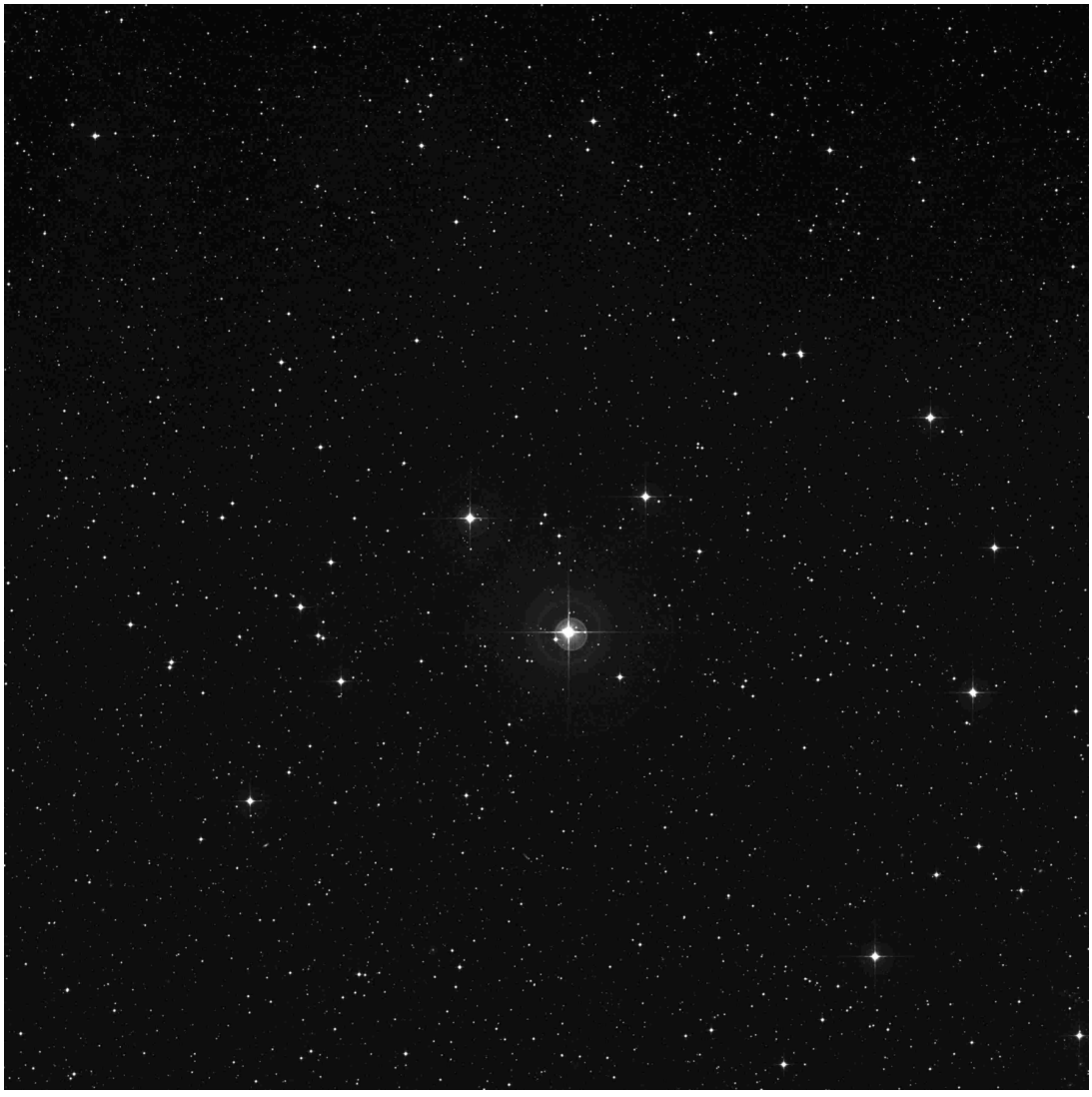


Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER – J0615-73
Mensa

A few slightly outstanding stars, not much of a grouping but still brings the thought of a broken spade to my mind. This star spade is less than a degree east from the galaxy NGC 2199 with the open cluster NGC 2209 further south. A very tight grouping of various magnitude stars gathers towards the north-western field of view.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER DSH J0615-73	Asterism	06h15m.58	-73°27'.22	10	26'

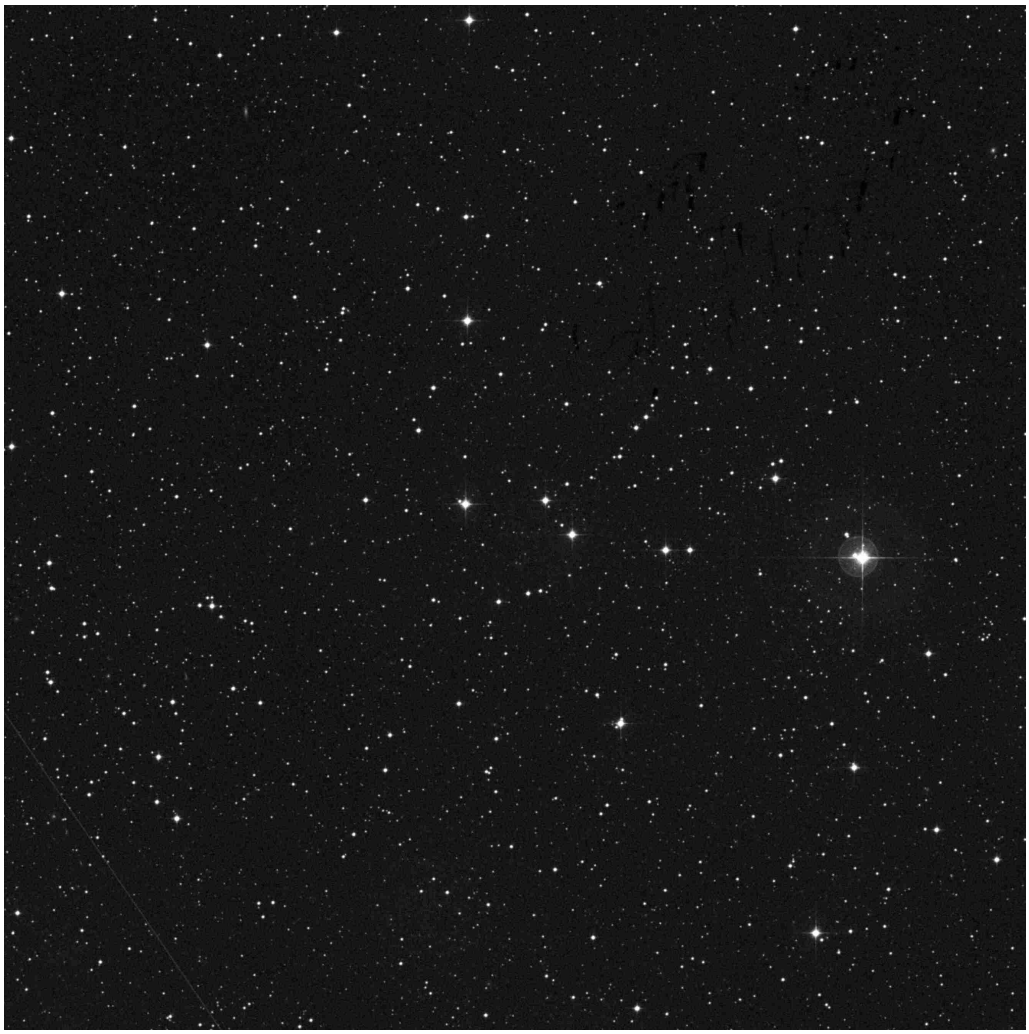


Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER – J1713-87
Octans

The starry skies are literally overloaded with star strings and plenty should be seen at random when searching through observable areas. Some are just more outstanding than others seen as this little lacy string, which is a real gem in our southern constellation Octans. This dainty string formation is situated less than a degree from the magnitude 5.2 chi Octantis.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER DSH J1713-87	Asterism	17h13m.02	-87°57'.16	10.5	26'

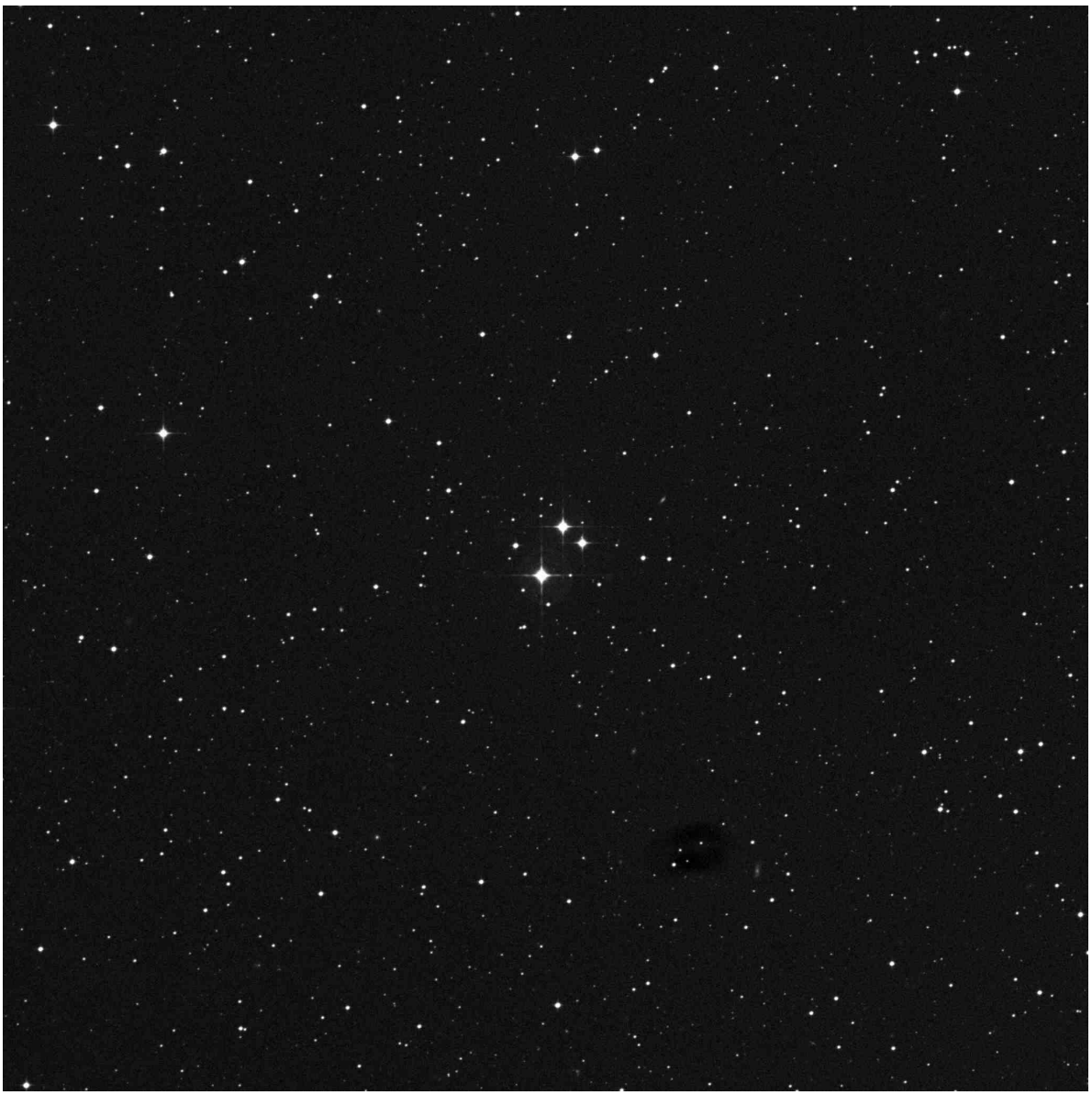


Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER – J2125-39
Microscopium

Conspicuous nice little group of bright stars drape against a bed of fainter stars that splash into the field of view. The open spiral galaxy NGC 7075 is situated only a degree north-east. Asterisms are the beauties of the starry skies, never seas to amaze me.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER DSH J2125-39	Asterism	21h25m.42	-39°11'.54	9	7'

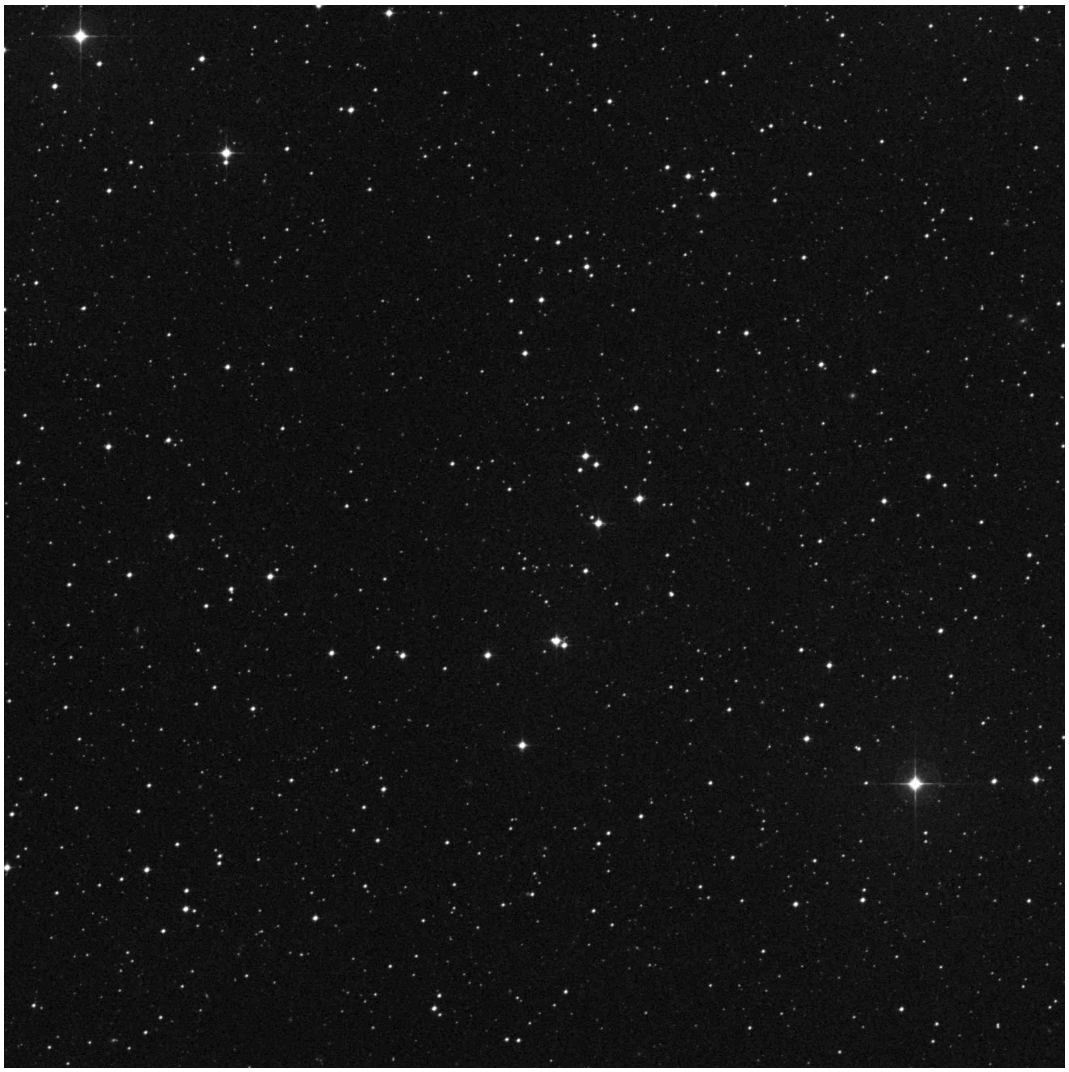


Picture Credit: http://archive.stsci.edu/cgi-bin/dss

STREICHER – J2135-65
Indus

First spotted the modest arrangement of relatively bright stars draped along a shallow curve a degree east of the very faint galaxy IC 5107. What keep attention is the stars in a close triangular and faint gradering of stars a few arc-minutes towards the north. Further north another gathering of various magnitude stars can be seen also slightly outstanding against the background starfield.

OBJECT	TYPE	RA	DEC	MAG	SIZE
STREICHER DSH J2135-65	Asterism	21h35m.18	-65°39'.22	10	30'



Picture Credit: http://archive.stsci.edu/cgi-bin/dss

Colloquia

Colloquia and Seminars (now Webinars) form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

These form an important part of a research facility, often as a sort of pre-publication discussion or a discussion of an individual's current research, and as such it is virtually impossible to "publish" this material. However, by recording the topics discussed in the form below does indicate to those, who are unable to attend, what current trends are and who has visited to do research: it keeps everyone 'in the loop' so to speak

With the passing of CV19, these Colloquia and Seminars are returning slowly to their normal face-to-face format, but a spin-off from the pandemic is that Colloquia and Seminars are often Hybrid sessions. It has also meant that now there Webinars on interesting topics from around the globe! The editor however still focusses very much on sessions held locally, by South African astronomers or visitors to South Africa

Title: X-ray surveys with eROSITA
Speaker: Dr. Axel Schwope
Date: 11 September
Venue: SAAO Auditorium - Hybrid
Time: 11h00

Abstract: eROSITA on the SRG mission (Spektrum-Roentgen-Gamma) has performed four complete X-ray all-sky surveys with an imaging telescope array in the energy range 0.2-10 keV. Compared to ROSAT it has a much improved spatial and spectral resolution, an extended energy range, and gives much longer exposure times. The scanning pattern uncovers strongly variable sources. The sensitivity between 0.3 and 2.3 keV is similar to that of XMM-Newton. All these properties make eROSITA the ideal discovery machine of (accreting) compact objects, in particular with white dwarf primaries. The talk will review the mission profile, discoveries made serendipitously during the first two years and describe the initiatives underway to comprehensively explore the full content of the eROSITA all-sky survey catalogs.

Title: Mapping and Studying Galaxy Clusters Behind the Magellanic Clouds

Speaker: Jess Craig. PhD student, Keele University
Date: 14 September
Venue: SAAO Auditorium - Hybrid
Time: 11h00

Abstract: Due to high levels of stellar contamination and dust extinction, the sky behind the Magellanic Clouds remains less well-studied than less obscured areas. Therefore, knowledge of background galaxies (and hence galaxy clusters) in this area is limited. The VISTA Survey of the Magellanic Clouds (VMC) provides a high resolution (0.8 arcsec), high sensitivity (20.3-21.9 Vega mag), near-infrared view of 170 square degrees covering the Magellanic Clouds, Magellanic Bridge and Magellanic Stream, allowing background galaxies to be resolved at higher redshifts than any previous survey of this area. By pairing this with early results from GASKAP-HI - a high-resolution radio survey of neutral hydrogen gas in the Milky Way and Magellanic Clouds - we account for dust reddening in the Small Magellanic Cloud (SMC) region and use machine learning to compute photometric redshifts for galaxies behind the SMC. This allows us to map the 3D structure of galaxy clusters behind the Magellanic Clouds. For nearby clusters ($z<0.1$), we also study kinematics and interactions with the intergalactic medium using radio continuum observations from the ASKAP-EMU survey and spectroscopic observations with the SAAO 1.9m Telescope and Southern African Large Telescope (SALT). We aim to create a catalogue of galaxy clusters behind the Magellanic Clouds, which can be used with other catalogues in studies of large-scale structure. In the future, our techniques may be adapted for use in other dense stellar regions, such as the Milky Way galactic plane

Title: Mapping the baryonic Universe: a new window into the cosmos
Speaker: Dr Hamsa Padmanabhan
Date: 15 September
Venue: UWC Room 1.35
Time: 11h00

Abstract: Mapping the baryonic content of the Universe, especially after the epoch of Cosmic Dawn --- the birth of the first stars and galaxies --- promises rich insights into both astrophysics and cosmology. The technique of intensity mapping (IM) has emerged as a powerful tool to explore this phase of the Universe by measuring the integrated emission from sources over a broad range of frequencies. A particular advantage of IM is that it provides a tomographic, or three-dimensional picture of the Universe, unlocking significantly more information than we presently have from galaxy surveys. Astrophysical uncertainties, however, constitute an important systematic in our attempts to constrain cosmology with IM. I describe an innovative approach which allows us to fully utilize our current knowledge of astrophysics in order to develop

cosmological forecasts from IM. Analytically driven extensions to this framework allow us to interpret the latest auto-correlation IM results from the MeerKAT facility, as well as its counterparts in the microwave and sub-millimetre regimes. The framework can be used to exploit synergies with other complementary surveys, thereby opening up the fascinating possibility of constraining physics beyond Lambda CDM from future IM observations

Title: Opening up the radio sky at the highest of resolutions
Speaker: Dr Jack Radcliffe. University of Pretoria and University of Manchester
Date: 20 September
Venue: SAAO Auditorium – Hybrid
Time: 11h00

Abstract: In the past few decades, radio surveys have provided us with unique insights into many areas of astrophysics such as star formation, supernovae, active galactic nuclei, pulsars, cosmology and much more. A key aspect of these surveys is the technique of Very Long Baseline Interferometry (VLBI) which can provide some of the highest resolutions possible in astronomy. This method has been crucial in understanding the inner workings of galaxies such as AGN-star-formation feedback, dark-matter substructures in gravitational lenses, and providing the first two direct images of a black hole shadow.

VLBI has been typically limited where the largest surveys require many years of observations to build up an extensive sample. However, computational improvements have enabled us to map multiple sources within a single VLBI survey and push into the lower frequency regime through the International LOFAR telescope. In this talk, I will talk about the scientific and technical discoveries arising from such surveys and focus on the bright future of VLBI surveys. This includes the transition from the current modus operandi of a small number of surveys of a few 'famous' deep fields to a ubiquitous VLBI survey instrument. I will conclude the talk by talking about the upcoming developments in VLBI, such as the incorporation of SKA and MeerKAT, ultra-wideband receivers, and GPU-accelerated correlation and calibration.

Title: Impact at SAAO
Speaker: Dr Genevieve Simpson (NRF's SPP business unit) and Dr Vanessa McBride (SAAO & OAD)
Date: 28 September
Venue: SAAO Auditorium – Hybrid
Time: 11h00

Abstract: Impact is one of the four pillars of the NRF's 2025 strategy, the other three being excellence, transformation and sustainability. With a growing focus on the impact of research and research infrastructures, it's important to understand the terminology and our own potential contributions in this area. In this talk, Dr Genevieve Simpson from the NRF's SPP business unit, will present the NRF's framework for advancing societal and knowledge impact of research. Vanessa McBride, from SAAO & OAD, will look at how this framework can be developed in the context of SAAO's research, infrastructure and community engagement programmes.

Title: The art of building a smooth cosmic distance ladder in a perturbed universe
Speaker: Dr Obinna Umeh
Date: 20 September
Venue: UWC Room 1.35
Time: 11h00

Abstract: How does a smooth cosmic distance ladder emerge from observations made from a single location in a lumpy Universe? Distances to the Type Ia supernova (SN1A) in the Hubble flow are anchored on local distance measurements to sources that are very nearby. We described how this configuration could be built in a perturbed universe where lumpiness is described as small perturbations on top of a flat Friedmann-Lemaıtre Robertson-Walker (FLRW) spacetime. We show that there is a non-negligible modification (about 11%) to the background FLRW area distance due to the presence of inhomogeneities in the immediate neighbourhood of an observer. We find that the modification is sourced by the electric part of the Weyl tensor indicating a tidal deformation of the local spacetime of the observer. We show in detail how it could impact the calibration of the SN1A absolute magnitude in the Hubble flow. We show that it resolves the SN1A absolute magnitude and Hubble tensions simultaneously without the need for early or late dark energy.

Title: Dark Matter Across Galactic Scales: Current Challenges and Perspectives
Speaker: Dr Gauri Sharma
Date: 06 October
Venue: UWC Room 1.35
Time: 11h00

Abstract: The discovery of rotation curves of disk galaxies by Rubin et al. (1980) has had far-reaching implications for the fields of astrophysics and cosmology. These findings have introduced the need of an elusive component that astrophysicists have dubbed "dark matter", which is believed to be made up of dark particles that are necessarily

beyond the standard model of elementary particles. Since then, dark matter has become a building block of the current cosmological model (ΛCDM), in which the dark matter provides the initial gravitational wells upon which galaxies are built. The role of dark matter in shaping the galaxy dynamics has been firmly established and confirmed in the local Universe. However, until recently, it was not possible to validate it at high redshifts. Thanks to integral field units (IFUs), which are high-resolution spectrographs, we are now able to gain valuable insights into the early Universe and shed light on the formation and evolution of galaxies over cosmic time. In particular, observations based on IFUs allow us to study the resolved velocity profiles, or rotation curves, of galaxies at high redshifts. This enables us to answer some of the most intriguing open questions in modern astrophysics. These include: Is the nature of dark matter cold as presumed in the most successful ΛCDM cosmological simulations? What is the fraction of dark matter in high-redshift galaxies compared to locals? Do dark matter halos evolve similarly to galaxies? Do baryonic processes impact the distribution of dark matter and, if so, can they be constrained? In my talk, I intend to elaborate on each of these questions. Specifically, I will present a combination of previous studies and a new study of mine that utilizes data from KROSS, KGES and KMOS3D data, comprise ~300 disk-like galaxies, a largest sample up to date, spanning a redshift range of $0.5 < z < 2.5$. I will present accurate rotation curves, dark matter estimates, and scaling relations. Finally, I will engage in a discussion on how we can examine the assembly history of galaxies and disk-halo co-evolution using gas kinematics at high-redshift. This work provides significant insights into the early Universe and galaxy formation, highlighting the need for future advancements in our kinematic and dynamical modelling techniques.

Title: Cluster Archaeology with the SKA Pathfinders and Precursors
Speaker: Dr Christopher J. Riseley. University of Bologna, Italy.
Date: 06 October
Venue: UKZN Venue: Online SAAO Zoom
Time: 15h00 (possibly 16h00)

Abstract: Clusters of galaxies form at the intersections of the Universe's large-scale structure. These environments are filled with a hot plasma "soup" known as the intracluster medium (ICM), which provides a unique environment for rich physical processes. Many clusters host large-scale diffuse synchrotron sources associated with the ICM, providing direct evidence of particle acceleration on ultra-large scales. However, understanding the mechanisms at work, and how they are mediated by the connection between the hot gas, cosmic ray electrons and magnetic fields is complex and many open questions remain. The key to unlocking the answers lies in uniting

multi-wavelength data across the electromagnetic spectrum, with radio, X-ray, and optical wavelengths providing the most critical insights.

In the past decade, the maturing suite of Pathfinder and Precursor instruments for the Square Kilometre Array (SKA) has given observers the tools with which to make significant steps in our understanding. Highly sensitive radio interferometers like MeerKAT, the Australian SKA Pathfinder (ASKAP), the LOw-Frequency ARray (LOFAR) and the Murchison Widefield Array (MWA) have been transformational. However, a single frequency alone cannot tell the whole story, as we require knowledge of several key ingredients: the cosmic ray electron spectrum, the magnetic field, and the thermal structure. Simply put: to understand the ICM, we must unite the Pathfinders and Precursors.

In this talk I will present an overview of the results from several such studies synergising the SKA Pathfinders and Precursors. I will showcase selected targets from the MeerKAT-meets-LOFAR mini-halo census — the first statistically-significant and observationally-homogeneous study of mini-haloes, perhaps the most enigmatic diffuse radio sources in galaxy clusters — as well as deep targeted studies of massive southern clusters performed with MeerKAT, ASKAP and the MWA. I will discuss what these new results tell us about the nature of particle acceleration, ageing and energy loss mechanisms on the largest scales in the Universe, and how they expand the picture of our understanding of shocks and turbulence in the ICM.

Title: Observations of kinetic feedback in radio-loud Active Galactic Nuclei (AGN) hosts
Speaker: Dr Sthabile Kolwa
Date: 12 October
Venue: SAAO Auditorium – Hybrid
Time: 11h00

Abstract: Radio-loud Active Galactic Nuclei (AGN) host galaxies are known to produce jets sufficiently powerful to disrupt and even expel gas from their host galaxies. With optical integral field unit (IFU) MUSE observations, we observe rest-UV line emission from gas that has been chemically enriched through previous star-forming epochs and also photoionised by the AGN. In cases where the jet axes are aligned with the extended ionised gas morphologies, we find a clear feedback association between the high energy output of the jets and the ionised gas. Additional evidence for such AGN feedback is seen in the very complex Ly-alpha halo morphologies which are prevalent around radio galaxies at Cosmic Noon (z ~ 3). With ALMA, we trace the cold gas component of the interstellar medium (ISM) in the radio galaxies via neutral carbon emission. With our findings indicating only faint traces of emission, we infer cold

molecular gas fractions of <20%. From this, we conclude that both gas depletion through star-formation and molecular gas outflows driven by the jets lead to a diminished gas supply in the ISM. Overall, our MUSE and ALMA studies add significantly to the body of work in galaxy studies that illustrate the impact of AGN in terminating star-formation via powerful jets that these objects produce.

Title: Synergies across the spectrum for cosmology and astroparticle physics
Speaker: Dr Stefano Camera, Department of Physics, University of Turin, Italy
Date: 20 October
Venue: UWC Room 1.35: Online SAAO Zoom
Time: 11h00 (possibly 16h00)

Abstract: I shall review novel approaches that I have explored over the years to extract information optimally from varied observations across the electromagnetic spectrum. The aims are varied as well, and in particular I shall discuss: optimising parameter constraints for the concordance cosmological model; testing the inflationary principle through measuring its non-Gaussian imprint on the cosmic large-scale structure; confirming the validity of general relativity on the largest cosmic scales; probing the particle nature of dark matter; and learning about the origin and composition of ultra-high energy cosmic rays**.**

Title: Exploring the formative and explosive physics of merging galaxy clusters
Speaker: Dr. Emily Moravec from NRAO
Date: 27 October
Venue: UKZN Venue: Online SAAO Zoom
Time: 15h00 (possibly 16h00)

Abstract: In this talk, I will explore the effects of merging galaxy clusters on cluster galaxy populations such as radio-AGN and radio galaxies. First, I will present the results of an on-going investigation of the connection between galaxy cluster properties and radio galaxies at high redshift. Then I will talk about the effect of merging clusters on the morphology of radio-AGN in a low redshift sample of merging and non-merging clusters at low redshift. And lastly, I will present a multi-wavelength analysis of a particularly interesting high-redshift, massive cluster-cluster merger.

Errata

We apologise that the Issue numbers contained in the footers of the August issue of MNASSA were erroneously printed as 5 & 6 instead of 7 & 8.

The **Astronomical Society of Southern Africa** (ASSA) was formed in 1922 by the amalgamation of the Cape Astronomical Association (founded 1912) and the Johannesburg Astronomical Association (founded 1918). It is a body consisting of both amateur and professional astronomers.

Publications: The Society publishes its electronic journal, the *Monthly Notes of the Astronomical Society of Southern Africa (MNASSA)* bi-monthly, the annual *Sky Guide Southern Africa*.

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page : https://assa.saao.ac.za for details. Joining is possible via one of the local Centres or as a Country Member.

Local Centres: Local Centres of the Society exist at Bloemfontein, Cape Town, Durban, Hermanus, Johannesburg, Pretoria and the Garden Route Centre; membership of any of these Centres automatically confers membership of the Society.

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