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RECOGNITION	Articles from <i>MNASSA</i> appear in the NASA/ADS data system.

Cover: The late Prof Brian Warner (1939-2023), one of the most influential academics in recent South African astronomical history. See Obituary p. 93



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International Astronomical Union (IAU) Cape Town 2024

From 6 to 15 August 2024 this major jamboree of astronomy will be held in Cape Town at the International Conference Centre. The IAU was founded in 1919 and every three years it has held a conference known as the “General Assembly”, except when interrupted by war and Covid-19. This is the first time that it is to be on the continent of Africa. Only twice before has it taken place in the Southern hemisphere – in 1973 in Sydney, Australia, and in 1991 in Buenos Aires, Argentina.

The Union has 12784 members currently and the coming event will probably attract 2000 to 3000 of them. Apart from plenary opening and closing sessions there will be a number of Public and other invited discourses presented by well-known figures.

The core activity consists of six “IAU Symposia”, three in the first week and three in the second, on major topics of current interest. In addition there will be 12 more specialised “Focus Meetings”. During each General Assembly there are a great many smaller administrative meetings of different Commissions and Working Groups of the IAU. Also there will be many business meetings concerned with national affiliations, finances and resolutions to be put before the members.

Between lectures the General Assembly presents an opportunity for astronomers from all over to meet and chat over tea and coffee. There is usually a vast area devoted to poster displays, arranged by themes, as well as exhibits by observatories, space agencies, publishers and other commercial interests. A “daily newspaper” is also usually part of the scene.

As can be imagined, as many as possible of the arrangements are handled by professional conference organisers, but the whole event will place a huge strain on the local astronomical community. The co-chairs of the Cape Town event are Vanessa

McBride (SAAO/UCT/OAD) and Charles Takalani (AfAS). Many others will be assisting with various aspects.

The Organising Committee plans to work closely with groups such as ASSA, the Cape Centre, Iziko Planetarium, science centres and the various astronomy facilities as well as outreach groups across Africa to put together a program that the public and schools can get involved in (across Africa, as well as Cape Town). They plan to encourage each group to host its own events during this time and will help to market and possibly organise as necessary. Such events will potentially include star parties, stargazing, drawing workshops, public talks, panel discussions etc.

Please keep an eye on the GA2024 website (<http://astronomy2004.org>) for updates.

News Note: South African Telescopes contribute to discovery of a new white dwarf pulsar

The discovery of a rare type of spinning white dwarf star in a binary star system – only the second one known – provides a new understanding of the role of magnetic fields in stellar evolution.

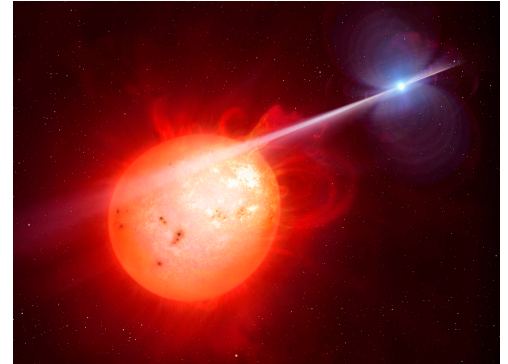
White dwarfs are small dense stars, typically the size of Earth but with a mass about 200,000 times greater, nearer to the mass of the Sun. This means that a teaspoon of white dwarf material would weigh around 15 tonnes. They form when a low-mass star, like the Sun, or even less massive, has burnt all its fuel, losing its outer layers. Sometimes referred to as “stellar fossils”, they offer insight into different aspects of star formation and evolution. White dwarfs begin their lives at extremely hot temperatures before cooling down over billions of years.

The rare type of white dwarf “pulsar” was discovered by an international team of astronomers, including from South Africa, namely the South African Astronomical Observatory (SAAO), the University of Cape Town (UCT) and the South African Radio Astronomy Observatory (SARAO), where a number of different telescopes were used to observe this new object. Some of the researchers were also involved in the discovery of the nature of the very first such system, found only in 2016, and known as AR Scorpii. These rapidly rotating and strongly magnetic (about a billion times the Earth’s magnetic field) white dwarf pulsars lash their stellar companion – a red dwarf – with powerful beams of charged particles and radiation, causing the entire system to brighten and fade dramatically over the minutes-long rotation period of the white dwarf. The bulk of the energy of these systems is powered by the slowing down of the spinning white dwarf, due to the drag exerted by its strong magnetic field. A key theory which explains

the strong magnetic fields is the “dynamo model” – that white dwarfs have dynamos (electromagnetic generators) in their cores, as does the Earth, but much more powerful.

Fig 1. An artist’s impression of a White Dwarf pulsar (credit: Mark Garlick)

But for this theory to be tested, scientists needed to search for other white dwarf pulsars to see if their predictions held true.



In their publication on (15 June 2023) in *Nature Astronomy*, the research team describes the newly detected white dwarf pulsar, J191213.72-441045.1 (J1912-4410 for short), which is in a binary system with an orbital period of just over 4 hours. However, the white dwarf’s rotation period is just a little over 5 minutes long, meaning it is spinning about 270 times faster than the Earth does.

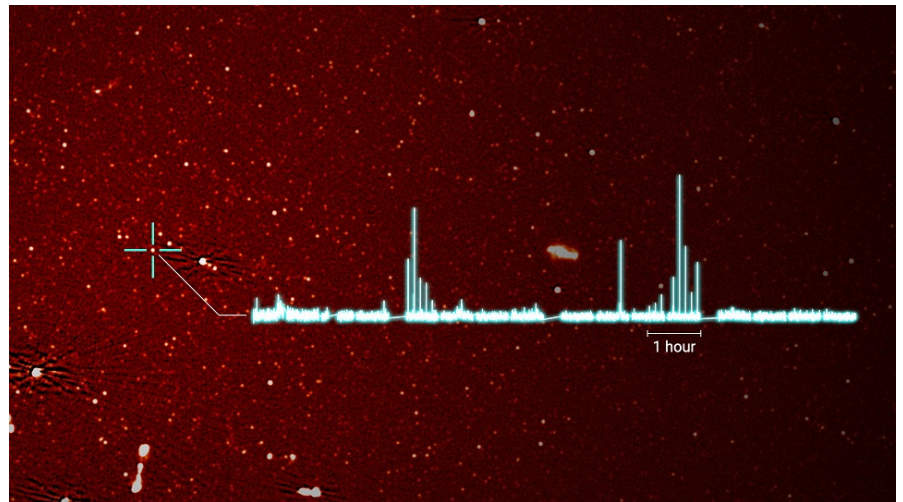
Dr Ingrid Pelisoli, Research Fellow at the University of Warwick’s Department of Physics, and lead author, said that the origin of magnetic fields is a big open question in many fields of astronomy, and this is particularly true for white dwarf stars. The magnetic fields in white dwarfs can be more than a million times stronger than the magnetic field of the Sun, and the dynamo model helps to explain why. The discovery of J1912-4410 provided a critical step forward in this field”.

Using data from a few different survey telescopes to find potential white dwarf pulsar candidates, focusing on those that had similar characteristics to AR Sco. After observing a couple of dozen candidates, it was found that one showed very similar light variations to AR Sco. This was then followed up using a number of other telescopes, both from the ground and space.

Some of the telescopes used included the optical ones at the Sutherland site of the SAAO, including the 10-m diameter Southern African Large Telescope (SALT).

Professor David Buckley of the SAAO, UCT and the University of the Free State, together with his SAAO and University of Johannesburg colleague, Prof Stephen Potter, who initiated the South African optical observations, stated that, as with AR Sco, they were able to show that J1912-4410 also shows pulsed polarization and pulsed spectral lines, confirming its white dwarf pulsar nature.

Fig 2. A radio image from MeerKAT showing the position of J1912-4410, plus the radio light curve showing the occasional 5 min spin pulses (credit: Ian Heywood).



But equally important were observations done with the MeerKAT radio telescope array, undertaken following a request for Director's discretionary time by Prof Patrick Woudt (UCT) and Prof Buckley. These observations revealed amazingly sharp radio pulses, at the same 5 min spin period, but only at very specific times, coinciding at precisely the same orbital phase. Prof Woudt stated these beautiful MeerKAT observations show how short repeat snapshot radio observations can reveal the strongly pulsed radio emission, as is demonstrated in these observations of J1912-4410. Buckley added that the radio light curve of J1912-4410 is remarkably different to AR Sco, with only a very brief period when the very narrow pulses are seen. In fact, in the first ~40 min observation they were lucky to catch them at all and if they hadn't, then possibly the second longer 8-hour observation may not have happened.

This new discovery is important as it supports the predictions made by the dynamo model. Due to their old age, the white dwarfs in the pulsar system should be cool. Their companions also have to be close enough that the gravitational pull of the white dwarf was, in the past, strong enough to steal mass from the companion, causing them to be fast spinning. All of those assumptions hold for the new pulsar found: the white dwarf is cooler than 13,000K, has a spin of around five minutes, and the gravitational pull and radiation from the white dwarf have a strong effect on the companion star.

Dr Pelisoli concluded that this research is an excellent demonstration that science works – we can make predictions and put them to the test, and that is how any science progresses.

News Note: Keeping up with SKA progress

The SKAO project is well under way. Readers who want to keep up with developments should look at <https://www.skao.int/en/news-events/contact-skao-magazine>. The June issue of 48 pages is No 13. This magazine covers the international radio astronomy scene, with special emphasis on developments at the SKAO installations in the UK, Australia and South Africa.

News Note: Euclid Space Telescope

The Euclid Space Telescope of ESA, launched on 1 July, is an important addition to the existing Hubble and James Webb space telescopes. It has a primary mirror diameter of 1.2 m and carries two main instruments. Intended as a survey instrument, it has a 600 megapixel visible light camera as well as infrared cameras and is also equipped for near-infrared spectroscopy. The aim is to survey the galaxy content of one third of the sky to elucidate:

- the formation of cosmic structures
- the nature of dark matter
- how the expansion of the universe has changed over time
- the nature of dark energy
- large-scale gravitational phenomena.

To reveal dark matter it will concentrate on gravitational lensing. A three-dimensional picture out to $z=2$ will be the result of the general survey: the redshifts will be determined partly by precise spectroscopy and with lower precision by multicolour photometry.

Like the JWST and GAIA, Euclid is heading for an orbit near the Lagrangian L2 point so that its solar panels will always face the Sun and the telescope itself will be shaded and cold.

A Possible Galactic Nova That Went Overlooked 30 Years Ago?

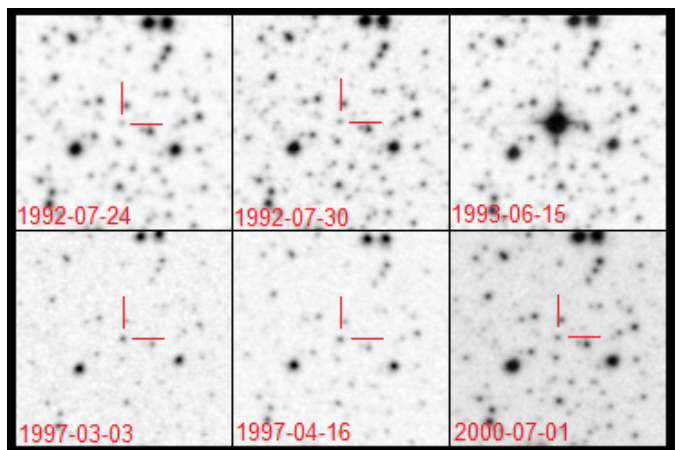
T. Prestgard

Email: trygvep@hotmail.fr

Thirty years ago, a possible galactic nova occurred $\sim 10'$ North of SAO 225638 (Visual mag +4.4 [1]) that possibly escaped the eyes of astronomers. Fortuitously, it was captured on a photographic plate from the Australian Astronomical observatory (AAO) on June 15th, 1993, where it remains forever recorded. Moreover, additional images and spectral data were taken over the next couple decades (as part of unrelated works), which has made it possible to somewhat “piece together” the evolution of this object since its eruption. This work is primarily based on my own interpretations, which includes the use of data from the VizieR database [2].

The transient was first reported in 2019 as part of a personal search for overlooked astronomical transients and planetary nebulae. This was made possible using the Aladin Lite website tool [3]. A variety of DSS plates are available of this region, one of which showed a bright “star” that appeared much fainter in other images. This specific plate was taken on 1993-06-15 by the UK Schmidt Telescope of the AAO. Below is a compilation of several images taken by the AAO over the course of 1992 – 2000. Notice that the object is still brighter in the period of 1997 – 2000 than in July of 1992 images. The object’s primary designation is USNO-B1.0 0423-00551514.

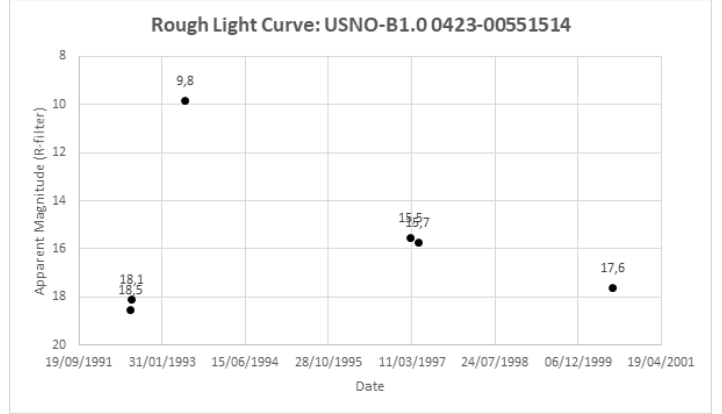
Fig. 1: Discovery frames covering the period of 1992-07-24 to 2000-07-01. The images are $2' \times 2'$ and were extracted from https://archive.stsci.edu/cgi-bin/dss_plate_finder and <http://www-wfau.roe.ac.uk/ssss/halpha/hapixel.html>



Photometric measurements from [4] indicated that the transient had an apparent magnitude of $m_R = +9.8$ mag (R-filter) in the 1993 image. Considering the astrometric data from Gaia DR3 [5], this indicates an absolute magnitude of $M_R = -4.5$ mag on June 15th, 1993, with a minimum of $M_R = -2.7$ mag based on the astrometric uncertainties. It is likely that the transient was not captured at its brightest. According to T. Kato [6], the absolute brightness of the event suggests that it was possibly a nova. As a result, it is currently classified as a nova candidate in AAVSO’s Variable Star Index (VSX) [7].

Fig 2. Rough light curve of the transient based on the preliminary estimations of magnitude using the images presented in Fig.1. In this plot I have assumed that the red plate from 2000-07-01 was taken in a similar filter to the DSS Red plates.

For the purpose of this work, rough magnitudes were calculated of the transient as observed in each frame from Fig. 1. The calculations are based on calibration curves that were manually created for each image, these being based on the magnitudes of six field stars using [8]. For this it was assumed that the reference stars were non-variable. Fig. 2 plots the results of these rough calculations. It shows that the progenitor was probably around $R = +18.0 - 18.5$ mag prior to the 1993 eruption. The plot shows that the object likely took several years before fully returning to its original brightness, much like novae tend to do [e.g. 9].

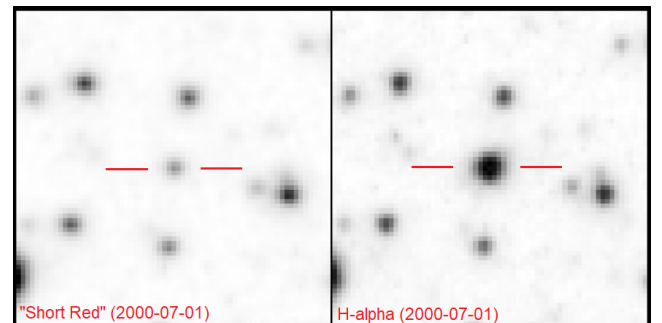


As can be seen in Fig. 3, the object appears much brighter in an $H\alpha$ frame, compared to a standard “Short Red” frame taken on the same day (Fig. 3), suggesting $H\alpha$ emissions at the time those images were taken. I suspect these emissions could possibly have been reminiscent of the ejecta from the 1993 Nova eruption. Indeed, at the later stages of nova eruptions (as the object becomes cooler), the ejecta is ionized by the central white dwarf star in a similar way to planetary nebulae, notably showing [OIII] and $H\alpha$ emission lines [e.g. 10]. In fact, USNO-B1.0 0423-00551514 was initially mistaken for a potential planetary nebula (PN) by [11] (PN G326.9+08.2). However, the authors mention that the spectra were of low SNR, as stated in the HASH database [12]. Note, it appears that the spectra were taken in 2007, hence ~ 14 years after the event.

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Fig 3. Comparison between an $H\alpha$ -frame and a reference “Short Red” (R or r-filter) frame from the AOA. These images were extracted from the following website:

<http://www-wfau.roe.ac.uk/ssss/halpha/hapixel.html>

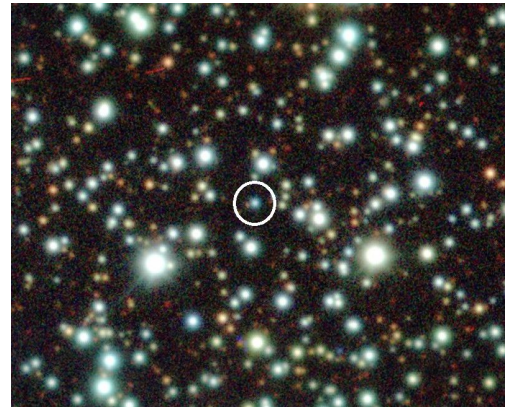


Today, the object has long since reached its

quiescent state. DECaPS DR2 images (Fig. 4) and Gaia DR3 measurements [5] show the progenitor to be relatively blue ($BP-RP = 0.58$), with a magnitude of $m_{\text{Gaia}_G} = +18.2$. Note

though that the source appears to be mildly variable [13], with an amplitude in the Gaia G band of $\Delta m_{\text{Gaia}_G} = 0.30$ mag.

Fig 4. The progenitor of the 1993 Nova candidate as seen in a DECaPS DR2 colour image extract from [1]. The images reveal a relatively blue object, likely due to the contribution of a white dwarf.



Considering the brightness of the event, the question remains whether anyone might have serendipitously imaged the 1993 Nova? Any data on this object would be of great help! If so, please contact the author.

Coordinates(J2000.0): 15:18:18.241 -47:38:28.30.

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Recent Southern African Fireball Observations Events # 438-447

Tim Cooper, Director, Comet, Asteroid and Meteor Section

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. AMS reports are courtesy of Robert Lunsford (Secretary General of the IMO). 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° .

Event 438 – 2023 May 10 – Brackenfell, Western Cape

Observed by Sue-Anne Miller at 04h50, was standing outside during early morning twilight, when she saw a ‘large bright blue object from directly overhead’, duration about 2 seconds and path to about altitude 30° in azimuth 80° , just upper right of Jupiter which was then magnitude -2 , altitude 12° in azimuth 69° . Said to be brighter than the 77% illuminated Moon, which was nearly overhead and magnitude -11.8 . The path is in good agreement with the radiant of the alpha Scorpiids, part of the Anthelion complex.

Event 439 – 2023 May 13 – Sandton, Gauteng

Observed by Sindiswa Mhlontlo at 17h10, very bright fireball said to be brighter than the Moon, duration 3-4 seconds, and path from az/alt 194° , 25° to 256° , 27° . The head appeared white surrounded by orange and red and the fireball left a persistent white train visible for about 1 second. The fireball was possibly Anthelion, which radiant position was just above the horizon at the time. AMS Event 2573-2023.

Event 440 – 2023 May 15 – De Rust, Western Cape

Observed by Ted Nutting at 02h10, brighter than the Moon which was then a 22% illuminated crescent, magnitude -9.7 , altitude 17° in azimuth 82° , lit up the side of his veranda, which first attracted his attention to the fireball and on turning round saw the fireball descending directly downwards, descent angle 180° , from about 45° altitude in azimuth 292° (north-west). Duration about 2 seconds, colour described as bright emerald green. The fireball may have been a bright Anthelion meteor.

Event 441 – 2023 May 26 – Lake Kariba, Zimbabwe

Observed by Frances Morris at 18h45, bright green fireball, about the same brightness as the Moon, which was then 41% illuminated, magnitude -10.6 , altitude 34° in azimuth 306° . Duration 1-2 seconds, path from az/alt 337° , 35° , descending downwards and slightly to the left at descent angle 190° , and reached the horizon. Persistent train visible for about 1 second, no fragmentation and no sounds heard.

Event 442 – 2023 May 27 – Bloemfontein, Free State

Observed by Karen de Goede at 19h02, reported to the ASSA Report a Sighting page as well as to the AMS Fireball page, $m_v = -6$, duration estimated between 5 and 7 seconds, colour was mainly yellow, was a yellow-orange ball when first seen, and as it descended red, blue and green colours were observed. Path approximately from az/alt 97° , 90° (directly overhead) to 84° , 50° , that is RA/Decl. $12^{\text{h}}15$, -29° to $14^{\text{h}}54$, -18° , path length 36° from Corvus to Libra, and the fireball was probably sporadic. The fireball showed a persistent train visible for about 3 seconds, length estimated as 20° . No terminal flash or fragmentation and no noise heard. AMS Event 2799-2023.

Event 443 – 2023 June 6 – Hartebeespoort, North West and Bredell, Gauteng

Captured by Paul Ludick on GMN camera ZA0004 at 01h16m19s and screen grab shown in Figure 1. Path from RA/Decl. $20^{\text{h}}33.8$, -68.0° to $18^{\text{h}}31.7$, -77.2° . Captured by Tim Cooper on CAMS@SA cameras 6000 and 6004 at 01h16m19s and the two frames are aligned and shown in Figure 2. Path from RA/Decl. $18^{\text{h}}29.3$, -54.5° to $16^{\text{h}}24.3$, -55.2° , and the bright terminal flash occurs just outside the field of view. The paths as seen from both sites were plotted gnomonically in order to derive the radiant at RA/Decl. $23^{\text{h}}40$, -13.3° in eastern Aquarius and shown in Figure 3. Speed 69 km/sec. The fireball was sporadic.

Fig 1. Event 443 captured by Paul Ludick on GMN camera ZA0004 on 6 June 2023. Above right just outside frame is the 95% illuminated Moon.

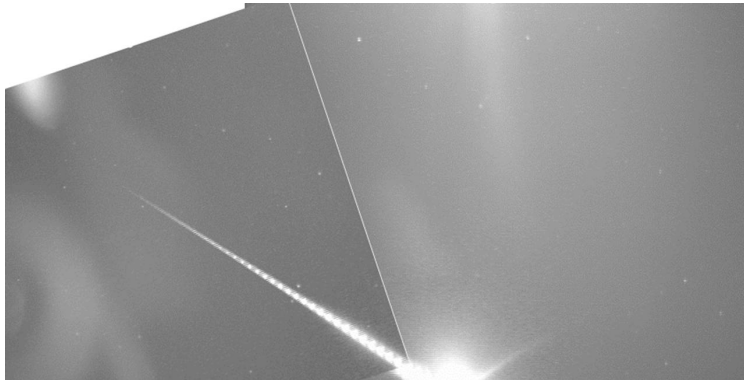
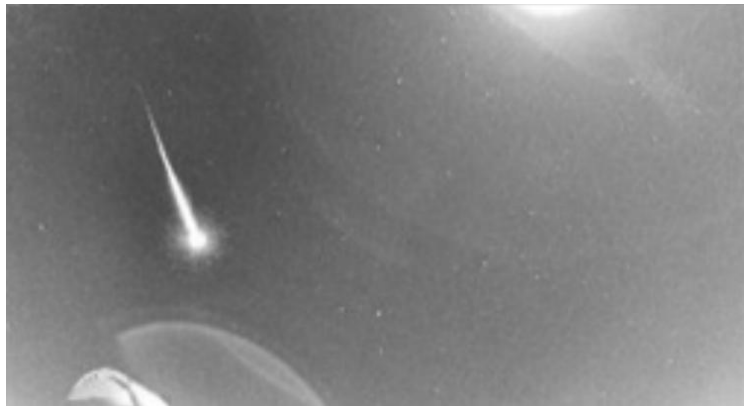
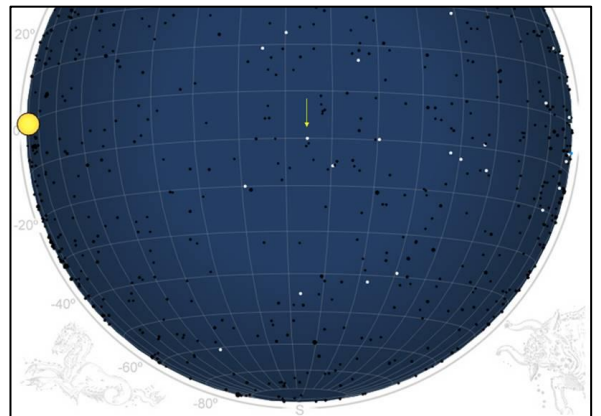


Fig 2. Event 443 captured by Tim Cooper on CAMS@SA cameras 6000 and 6004 on 6 June 2023. The nearby bright Moon caused the bright areas in the image. Either side of the fireball in the left hand frame can be seen the stars beta and gamma Arae.

Fig 3. Radiant position for Event 443 on 6 June 2023 close to the star omega Aquarii. The fireball was sporadic. Diagram reproduced with credit to Cameras for All-sky Meteor Surveillance (CAMS) at <http://cams.seti.org/FDL/>



Event 444 – 2023 June 10 – Various, Western Cape

A bright fireball was reported from several locations across the Western Cape, from Rondebosch in the west to Mossel Bay in the east. The largest number of reports were from the area around Hermanus. Judy Wessels was driving along Park Road, Rondebosch, headed in direction 92° , when at about 16h50 the fireball moved from overhead towards the same direction as she was travelling. Speed was very fast, 'the outer rim glowing white/yellow and not completely round, almost like the tip of a sparkler on a birthday cake, and seemed to have things falling off it which [gave] the impression of it leaving a trail behind it. We were in a car so we heard no sound'. The object burned out about 5° above the horizon in azimuth 92° . Hendrik Flowers and three others were on Paarl Mountain, looking over the town, when they saw a bright meteor descending between the Franschhoek and du Toit's Kloof mountains, roughly

in azimuth 120°. Johan Southey and others saw it from Onrus, while sitting around the fire, descending from az/alt 80°, 45° at descent angle 195°. The view was obscured by a foreground tree, but they could clearly see a very bright green light descending to the horizon. Werner Viljoen saw the fireball from Sandbaai, 'no sounds noticed, duration 6-8 seconds, direction south to north, colour white to light yellow, with smaller pieces breaking off as it burned up, and when it [finally] broke up it lit the sky for about 2 seconds'. Dominic Krynauw saw the fireball from Kleinmond looking towards Hermanus, which is in direction 105°, 'looked like a shooting star but bigger and I do remember it looked like a burning ball of fire'.

Event 445 – 2023 June 12 – Velddrif, Western Cape

Captured by Gavin van der Merwe at 02h40 on a security camera and reported to the ASSA Report a Sighting page. Screengrabs in Figure 4 show the path from top of frame, when the fireball was already bright, descending at descent angle 178°, duration in-frame measured as 1.8 seconds before suddenly fading. The frame was calibrated using footage taken the following morning, when the Moon was in the field of view, azimuth 68.1°, altitude 17.4° and magnitude -9.4 after correcting for atmospheric extinction. The fireball peaks about 0.5 seconds after entering the frame and appears brighter than the Moon. Path from az/alt 94°, 19° to 96°, 12°, path length 6.0°, angular velocity 3.3°/sec. The fireball was sporadic, and given the brightness was probably asteroidal.

Event 446 – 2023 June 16 – near Daniëlsrus, Free State

Observed by Jemona and Corné Bonthuys at 18h08, while driving on the R26 from Bethlehem, headed towards azimuth 15°, about 5km from Daniëlsrus, when they saw a bright fireball to the right of the car moving from right to left, low above and parallel to the horizon. From a sketch provided path very approximately from az/alt 40°, 15° to 30°, 15°. Duration a few seconds, Jemona did not have time to take a photo on her cell phone. The head was elongated, had a tail which 'looked like flames', and moved quickly before fading. Colour was initially green, turning blue, but yellow also noted and 'it was almost like something that was burning'. Very much brighter and larger apparent size compared to Venus, which was then magnitude -4.5, and set a little earlier. The fireball was sporadic.

Event 447 – 2023 June 23 – various, Western Cape

Several reports of another bright fireball seen from the Western Cape during bright morning twilight. Jaques Myburgh was driving on Kruis Street, Brackenfell heading in direction 300°, the fireball was to his left when first seen, path from 270°, 20° to 290°, 10°, descent angle 153°. Time given as 05h30, 'spotted a bright streak heading the same direction and splitting up into [many] pieces,' duration about 3 seconds before disintegrating and then suddenly disappeared. Kara Bouma and her daughter Layla were on the Simondium-Klapmuts road close to the Vrede en Lust intersection, driving

slowly in heavy traffic, when they saw the fireball off to their right [west] and in the direction of the Simonsberg Mountain. Duration about 2-3 seconds, the fireball was bright yellow, and they said 'looked like a big shooting star but then it broke into two pieces which just dissolved. Kara noted the time on her clock as 05h27. Sonja Brand gave the time as 05h25 when she saw the meteor while driving on the N1 freeway in direction 258° and just before the Platteklouf offramp, crossed the freeway moving almost horizontally left to right, red ball surrounded by white, with a tail that appeared to be 'wavy'. She lost sight of the fireball when it passed behind hills in the Northern Suburbs. Bronwyn Evans saw it from near Glencairn towards direction NNW (azimuth 338°), slow moving then disintegrated and suddenly disappeared. 'Seemed much larger than any shooting star'. She collected reports from others in the area, and most agreed the colours seen were green and white.

Acknowledgments

Thanks to Peter Morris, Kos Coronaios and Johan le Roux, who assisted in collecting reports of these fireballs. Figure 1 credit to Paul Ludick using an RMS camera as part of the Global Meteor Network (<https://globalmeteornetwork.org/>). Figures 2 and 3 credit to Cameras for All-sky Meteor Surveillance (<http://cams.seti.org/FDL/>). Figure 4 reproduced with kind permission of Gavin van der Merwe

Obituary – Brian Warner (1939-2023)

Brian Warner was one of the most distinguished astronomers in South Africa. His name is synonymous with Astronomy at the University of Cape Town. When he arrived at UCT in 1972 he was the founding Chair of Astronomy in the newly established Department of Astronomy. He remained chair and head of department for 33 years until his retirement at the end of 2004.

Brian was born in Crawley Down in England on 25 May 1939. He came from a humble background, his father being a gardener on a country estate and his mother a charwoman. He did not pass the notorious "eleven plus" exam but was nevertheless admitted to the East Grinstead Grammar School on a teacher's recommendation. He also became a friend of the well-known amateur astronomer and broadcaster Patrick Moore and was able to use his telescope.

He obtained his BSc (1961) and PhD (1964) from University College London. His thesis supervisor was Roy Garstang and its subject was abundances in late type star. His work on Barium stars still has significant impact. More than half a dozen papers on atomic oscillator strengths of various elements and photospheric abundances from the mid-to late-1960s continue to be cited more than 55 years later. After his PhD, Brian was a

Senior Research Fellow at Balliol College (Oxford) in the United Kingdom where he held the Radcliffe-Skinner Fellowship and made use of the Radcliffe Observatory in Pretoria (1965-1967). Subsequently he became an associate professor at the University of Texas in Austin, USA, at first doing spectroscopy but later becoming involved in the nascent field of high-speed photometry with David Evans and Ed Nather.

When Brian came to South Africa in 1972 to start the Department of Astronomy at UCT, he brought high-speed photoelectric photometry to South Africa. The introduction of this novel technique to South Africa at the time of the creation of the new Sutherland station of the South African Astronomical Observatory, meant that the southern skies were now accessible for the study of high-time domain astrophysics. His eagerness to observe the southern skies is best illustrated by the fact that in July 1972, Brian was the first observer on the newly established reflector in Sutherland (the 20-inch telescope), ahead of the formal opening of the site in March 1973. In the years that followed Brian established himself firmly as the international expert on high speed photometry and cataclysmic variables.

Fig 1. A young Brian Warner with UCT in the background (SAAO photo PB043_P5064).



Over his long and remarkable academic career, Brian received numerous honours and awards for his outstanding scholarship. He was an NRF A-rated researcher throughout his active research career. He obtained a DSc from the University of London in 1972, a DSc from the University of Oxford in 1986 and a DSc (honoris causa) from the University of Cape Town in 2009. He was a Fellow of the University of Cape Town, an Honorary Fellow of the Royal Astronomical Society and of University College London. His contributions to astronomy through his publications span a staggering 63 years from 1960 to 2022.

Brian represented South African astronomy at various national and international levels. He was vice-president of the International Astronomical Union from 2003 to 2009, during a time when South African astronomy underwent rapid growth with the building of the Southern African Large Telescope and the successful bid for the Square Kilometre Array. He was one of the founding members of the Academy of Science of South Africa and was awarded the Academy's Science-for-Society Gold Medal in 2004. Other significant recognitions include the John F.W. Herschel Medal from the Royal Society of South Africa and the Gill Medal from the Astronomical Society of Southern Africa.

In 1999, Brian became one of three distinguished professors at UCT. He chose the title Distinguished Professor of Natural Philosophy, most appropriately, as his academic interests reached far beyond astronomy, including, amongst others, the history of science (particularly early astronomy at the Cape and the work of John F.W. Herschel). The remarkable “Flora Herschelliana” (Brenthurst Press) by Brian and John Rourke published in 1998, exemplifies Brian’s unique combination of profound academic scholarship and an all-round knowledge and interest in the natural world around us. This knowledge he shared enthusiastically and widely. Drives with Brian to the Sutherland observatory in the Karoo made the fascinating geology en-route come alive thanks to his broad academic scholarship and love for sharing the beauty of the natural sciences.

Brian is best known internationally for his work on Cataclysmic Variable stars. In 1995 he completed the seminal research monologue on Cataclysmic Variable stars (Cambridge University Press) – a book that remains essential reading today for all researchers in the field as the primary reference for all things ‘cataclysmic’. The book earned Brian the prestigious invitation to give an invited discourse at the triennial General Assembly of the International Astronomical Union in August 1997.

Brian was an all-round academic, an astrophysicist, a natural scientist, a ‘Renaissance Man’ with a tremendous knowledge of natural history and classical music, who once made his own harpsichord. His humorous side is captured best in his two books of poems, *Dinosaurs’ End* and *Scatological Verse*, where he explores topics in natural history in various irreverent styles.

In recent years, Brian’s mobility was increasingly affected by a number of strokes. During the pandemic, when every aspect of departmental life moved online, Brian joined the weekly departmental discussions with staff and students on zoom, to remain connected to the staff and students in the department he started 50 years earlier.

Over his illustrious career Brian supervised 17 PhD and 15 MSc students, many of whom have become global research leaders in the area of cataclysmic variable stars. His generosity of spirit is reflected not only in the support and mentorships of students but also through the sharing of his deep knowledge with society in general through public talks and summer schools. He gave his time freely to chair a number of boards, including the Board of Trustees of the South African Museum and the Board of Extramural Studies at UCT.

His lasting legacy in the development of high-time domain astrophysics is reflected in the broad range of impactful astronomical discoveries in high-time domain astrophysics with the Southern African Large Telescope and the SKA precursor

telescope, MeerKAT - half a century after those first observations from Sutherland - by the next generations of astronomers he supervised and mentored.

Brian is survived by his ex-wives Carol and Nan, his children Dianne and Philip, grandchildren Savannah and Jessica and two great grandchildren Harvey and Emily.

He died 5 May 2023 in Cape Town and will be dearly missed by all who knew him.
(Preceding based mostly on an obituary by Prof Patrick Woudt, UCT)

List of Honours

McIntyre Award (1983) of the Astronomical Society of Southern Africa
The John F.W. Herschel Medal (1988) of the Royal Society of South Africa
South Africa Medal (1989) of the Southern African Association for the Advancement of Science
Gill Medal (1992) of the Astronomical Society of Southern Africa
Honorary fellow of the Royal Astronomical Society (1994)
Honorary member of the Royal Astronomical Society of New Zealand (1995)
Science-for-Society Gold Medal (2004) of the Academy of Science of South Africa
Honorary fellow of the Royal Society of South Africa (2008)
Honorary doctorate from the University of Cape Town (2009)
Honorary fellow of University College London (2009)
Fellow of The World Academy of Sciences (2009)

Some recollections of Brian Warner

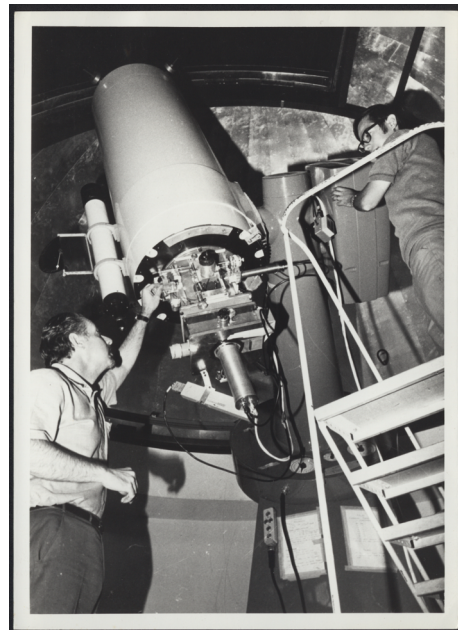
Brian's five years in Texas led him to his interest both in high speed photometry and in the history of Cape astronomy, two of the main themes of a very productive life. His interest in both themes must have been stimulated by David Evans who was his colleague when he worked in Texas. Evans had spent a long time at the Royal Observatory, Cape, and was also a pioneer of studying stellar diameters via Lunar occultations. Not only was he a pioneer of high speed photometry but he had also dug into the large collection of Herschel Family Papers possessed by the University of Texas and had edited the Cape diary of John Herschel.

In Texas Brian met R.E. (Ed) Nather, an exceptionally able electronic engineer who knew minicomputers inside out. He designed the equipment that the group used to confirm the visible light curve of the Crab Nebula pulsar, then newly observed. Brian organised for their photometer to be duplicated to bring to South Africa when he came here in 1972 and for Ed Nather to set it up.

Of course, the use that Brian and his research students made of this photometer is legendary.

Cape Astronomical History: As a historian, Brian concentrated on the twenties and thirties of the 19th century which were periods of tremendous astronomical activity. We can think of the formation of the Royal Astronomical Society in London and in Cape Town the founding of the Royal Observatory, both in 1820. Sir John Herschel came out in 1834-38 and used his giant telescope, then perhaps the largest useful one in the World, to make his famous deep surveys of nebulae and double stars, Henderson made the first observation of the distance to a star in 1832-33 and Piazz Smyth took the first photographs on the continent ca 1842-43.

Fig 2. Ed Nather and Ron Olowin (one of the early staff members at SAAO) working with the UCT photometer on the 20-inch telescope at Sutherland. This versatile instrument, built in Texas, had an offset guider stage with the capability of photometrically monitoring the offset star. A central section contained a filter box and a photomultiplier with pulse counting electronics received the light from the star. A Nova minicomputer was used to count the pulses and feed a visual display. The results were recorded on paper tape via a Teletype. (Photo: SAAO_PB065_P7629) .



Brian searched archives near and far for material concerning 19th century Cape astronomy and in 1979 produced his book “Astronomers at the Royal Observatory, Cape of Good Hope”. This was the first of several historical books that he wrote (often with his wife Nancy’s help) that appeared over the following two decades. They included works on Fearon Fallows, the first astronomer at the Observatory, about Piazz Smyth, on William Mann, a pioneer mountaineer and astronomer, Sir John Herschel, Lady Herschel and Thomas Maclear. Several of these people had kept detailed diaries and left drawings and sketches, providing grist for Brian’s mill.



Fig 3. L-R Dave Crawford, Robert Stobie and Brian Warner at the Herschel Symposium 1992. (Photo: SAAO_PB018_P1430).

I sometimes thought of Brian as a 19th Century “Man of Science” and indeed the sobriquet of “Natural Philosopher” that Patrick Woudt use in his obituary is quite appropriate, considering his wide range of interests. He was a tremendous admirer of Sir John Herschel who was something of a role model and he even organised a conference through the Royal Society of SA for the 200th anniversary of Herschel’s birth in 1992. Two years later he set up another one in commemoration of Thomas Maclear’s birth (1994).

Outside the strictly historical, he wrote books on John Herschel’s camera obscura landscape drawings of the Cape and, of course, his “Flora Herscheliana” with John Rourke about his botanical drawings.



Fig 4. L-R Case Rijdsdijk, Brian Warner and Stella Kafka, AAVSO, at the 18th ASSA Symposium dinner at the SAAO in 2018. Ian Glass immediately behind Brian (photo: editor).

On a personal note I remember fondly the Friday lunches at the Pig and Whistle in Rondebosch where the young UCT and SAAO astronomers used to get together to discuss anything and everything – almost 50 years ago.

I miss Brian’s lively conversation, his erudition and his quick wit. When I reached the age of 35 I remarked to Brian one lunchtime that I felt sad that at having

already reached half my Biblical life span. “Oh”, he immediately replied, “It’s much worse to be 36. Then you are a perfect square.”

(Ian Glass)

Memorial Meeting

A "Celebration of Brian Warner's Life in Astronomy" was held at UCT on 25 May 2023, attended by friends, colleagues and former students.

The participants were welcomed by Nan Warner, Brian's former wife, Patrick Woudt, the current head of the Astronomy Department, UCT, Daya Reddy, Acting Vice-Chancellor of UCT and Maana Ramutsindela, Dean of the Faculty of Science. The event was divided into appropriate themes.

On "Brian and Astronomy at UCT", Prof George Ellis FRS, Don Kurtz and Sarah Blyth (the latter both former students) spoke.

"Brian the Natural Philosopher" was the theme of contributions by John Rourke (Botanist), Hugh Amooore (UCT Registrar, retired, and Secretary of the Owl Club, a social society of which Brian was an enthusiastic member) and Ian Glass (SAAO), who spoke on his contributions to astronomical history.

"Brian and all things Cataclysmic" was contributed by Vanessa McBride (Astronomy Department Head, UCT, elect), Paul Groot, Astronomy Department, and Patrick Woudt, current Department Head. Brian was of course noted for his book on Cataclysmic Variables that Paul referred to as the Bible of the subject.

Brian's granddaughter Savannah van Heerden thanked the participants for attending.

Please See also the front cover of this issue for a portrait of Brian in full academic regalia.

Obituary - John Donald Fernie (1933-2022)

Don Fernie was born in Pretoria 13 November 1933 and studied to MSc level at UCT, finishing in 1955. He took his PhD at the Goethe Link Observatory of the University of Indiana, working on the Distribution of Classical Cepheids in the Galaxy.



Following his PhD he returned to Cape Town, lecturing at UCT in Physics and Astronomy. There was then little hope that a full astronomy department would be created and he left for Canada in 1961. He joined the University of Toronto and David Dunlap Observatory, where he had a distinguished career, becoming Chairman of the Astronomy Department and Director of the Observatory in 1978-1988.

His astronomical interest was mainly in the photometry of variable stars and he eventually published over 100 papers. Several of these concerned R CrB.

Fernie was Vice-President of the Royal Astronomical Society of Canada in 1972 and afterwards President. He was active in the International Astronomical Union and was President of Commission 27 (Variable Stars) as well as participating in various other committees.

He wrote two books: “The Whisper and the Vision: The Voyages of the Astronomers” (1976), Clarke, Irwin & Co, Toronto and “Setting Sail for the Universe: Astronomers and their Discoveries” (2002), Rutgers University Press. In addition he wrote many articles for the “American Scientist”.

Asteroid 8875 Fernie was named after him.

He visited South Africa in 1989 and gave a lecture to the ASSA Cape Town Centre.

He died 27 June 2022.

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

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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: Towards an understanding of the Circumgalactic Medium of Nearby Galaxies

Speaker: Dr. D.J. Pisano from the University of Cape Town

Date: 26 May

Venue: UKZN Venue: Online SAAO Zoom

Time: 15h00 (possibly 16h00)

Abstract: In order to better understand how galaxies accrete gas from their surroundings, it is necessary to map neutral hydrogen (HI) emission down to extremely faint column densities; more than three orders of magnitude below what is seen in the star-forming disks of galaxies. Such accretion should be common in galaxies today if they are to sustain ongoing star formation for more than a few billion years. I will discuss the latest results from recent and ongoing surveys of nearby galaxies using the Green Bank Telescope, Parkes, the Australia Telescope Compact Array (ATCA), MeerKAT and their implications for the local accretion rate of galaxies as well as the promise for future surveys with the Square Kilometer Array

Title: A bird's eye overview of machine learning

Speaker: Prof. Chris Thron, Texas A&M University-Central Texas

Date: 1 June

Venue: SAAO Auditorium – Hybrid

Time: 11h00

Abstract: Machine learning is the "engine" that powers the impressive capabilities of modern AI, such as self-driving cars and ChatGPT. It has also become wildly popular throughout engineering and all of the sciences. Unfortunately, much machine learning research is either deeply flawed or fundamentally wrong because of misapplication of machine learning principles. This talk will lay out the mathematical foundations of machine learning, and use practical examples to point out best practices as well as pitfalls in the use of machine learning in applications that relate to predictive models. Finally, we provide resources for getting up to speed quickly in the field.

Title: Testing structure growth with new CMB lensing measurements from the Atacama Cosmology Telescope

Speaker: Dr. Blake D. Sherwin University of Cambridge

Date: 7 June

Venue: UKZN Venue: Online SAAO Zoom

Time: 15h00 (possibly 16h00)

Abstract: I will present new measurements of CMB gravitational lensing with the Atacama Cosmology Telescope (ACT). These new ACT DR6 CMB lensing measurements allow the dark matter distribution, projected over a wide range of redshifts, to be mapped over 9400 square degrees at state-of-the-art precision. I will discuss the implications of our lensing results for cosmic structure growth and the S8 tension (a previously reported discrepancy between CMB and low-z measurements.) I will also present new constraints on the neutrino mass and the Hubble constant

Title: The recent outburst of NS LMXB XTE J1701-462

Speaker: Kelebogile Gasealahwe

Date: 8 June

Venue: SAAO Auditorium – Hybrid

Time: 11h00

Abstract: XTE J1701-462 is a neutron star low mass X-ray binary (NS LMXB), the only source apart from Cir X-1 to present Z and Atoll source properties. NS LMXBs are classified Z- or Atoll based on the patterns traced out by the X-ray colour-colour diagrams (CDs) or the hardness intensity diagrams (HIDs) when the hard and soft X-ray colours plotted against each other reveal either a Z shape track traversed on time-scales of hours to days or 'banana - island' shape over days to weeks. XTE J1701-462 was first discovered in 2006 when it went into outburst and the light curve revealed the transition from Z to Atoll behaviour. The source recently went into outburst (2022 - 2023) since the discovery and we observed it nearly weekly with MeerKAT at 1.28 GHz as part of ThunderKAT, one of MeerKAT's Large Survey Programmes. The first radio detection was on the 16th September 2022 and we continued detecting the source till it went radio quiet in mid-December 2022. We present the radio analysis as well as X-ray analysis for quasi-simultaneous observations taken with MAXI. We also place the source on the radio:X-ray plane, illustrating it is positioned at high X-ray luminosities, close to the Z sources as expected.

Title: What is Symmergent gravity?

Shadow and deflection angle by Symmergent gravity

Speakers: Prof Durmus Demir (Sabancı University, Turkey

Prof Ali Ovgun (Eastern Mediterranean University).

Date: 9 June

Venue: UKZN Venue: Online SAAO Zoom

Time: 15h00 (possibly 16h00)

Abstract: Symmergent gravity is a new framework in which gravity emerges in a way guided by gauge invariance, reconciled with quantum fields, and accompanied by new particles [1,2]. In this talk, we shall introduce Symmergent gravity with a detailed discussion of its main properties and salient predictions. The talk will dwell mainly on the gravitational sector.

Abstract: In this talk, we discuss Symmergent gravity theory via the weak gravitational lensing and shadow of its black hole solutions. For this purpose, we first determine their weak deflection angle using the Gauss-Bonnet theorem. Next, we compute their shadow. Finally, we test modified gravity theories using the shadows of M87* and Sagittarius A* black holes as observed by the Event Horizon Telescope in the extreme-field regime. We close the talk by giving future prospects on black hole observations

Title: Probing student engagement of Size and Distance in introductory astronomy

Speaker: Dr Tshiamiso Makwela, IAU Office of Astronomy for Education

Date: 20 June

Venue: UWC Room 1.35

Time: 11h00

Abstract: Astronomy Education Research has shown that students have many challenges when it comes to understanding key concepts in Astronomy. Amongst these is a poor understanding of astronomical scales. Recently, for example, both distances and sizes have been shown to present similar difficulties to students in both South Africa and Norway. It is difficult to attribute the findings simply to inadequate teaching due to the significant differences between the two countries with regard to language, culture, and the type of science teaching. It has therefore been suggested that since astronomical distances and sizes lie beyond immediate human experience the explanation might in fact lie at a deeper cognitive level. Therefore, the present thesis aims to explore the link between astronomical sizes and distances and cognition.

Title: Anomalous gas safari: Insights from MeerKAT's view of galaxy interactions

Speaker: Sriram Sankar SAAO/UCT

Date: 23 June

Venue: SAAO Auditorium – Hybrid

Time: 12h00

Abstract: Much like humans, the growth and evolution of galaxies are strongly influenced by their environments. Galaxies huddled together in groups or even bigger clusters shape and are shaped by their environments, but the relative contribution of external and internal processes remains poorly understood. In low-intermediate mass groups, gravitational interactions can both trigger and suppress star formation, alter the morphology of galaxies, and even fuel the central supermassive black holes. The Hydrogen 21 cm emission (HI) is a powerful tool for studying the relationship between galaxies and their environments, as cold gas traced by HI fuels star formation and is susceptible to various environmental effects that create unique structures. HI also provides valuable information about how galaxies acquire and lose cold gas. In this talk, I will discuss the case of two low-mass groups observed as a part of the MeerChairs survey. I will illustrate the separation and characterisation of "anomalous gas" produced in the interactions in the form of leading gas, lagging gas, extended envelopes, tails, and bridges. In this era of resolved, sensitive HI observations, characterising anomalous gas associated with galaxies experiencing diverse environmental effects can offer insight into various gas accretion and removal mechanisms that shape galaxies and their environments.

Title: QuartiCal - scaling flexible radio interferometric calibration from your laptop to the cloud

Speaker: Dr Jonathan Kenyon, SAAO/Rhodes University

Date: 22 June

Venue: SAAO Auditorium - Hybrid

Time: 11h00

Abstract: Calibration is and will remain an integral component of the processing of radio interferometer data. Consequently, the scale of contemporary and planned instruments will push many existing software packages and algorithms to, and possibly beyond, their limits. It is in this context that we present QuartiCal, a new Python package for the calibration of radio interferometer data. Based on existing work in the field of complex optimisation, QuartiCal implements fast and highly customisable calibration routines. This flexibility allows QuartiCal to handle many calibration use cases, from calibrator solution transfer to direction-dependent effects. QuartiCal's speed is due, in part, to its extensive use of Numba - a just-in-time compiler that utilizes LLVM to compile slow Python code to optimized machine code. Finally, QuartiCal's

performance is further augmented using Dask, a Python package that supports and simplifies running code in distributed computing environments. Utilizing this functionality, QuartiCal can scale from running locally on a laptop to running across many nodes in the cloud.

Title: : Optical spectroscopy of galaxy groups

Speaker: : Prof Ilani Loubser, Centre for Space Research, North-West University

Date: 29 June

Venue: SAAO Auditorium - Hybrid

Time: 11h00

Abstract: I will first present some results of a study of brightest group galaxies (BGGs) from the Complete Local Volume Groups Sample (CLoGS). We studied the stellar kinematics of these BGGs using MUSE spectroscopy, and we combine our results with X-ray, radio and molecular gas observations to infer the merger history as well as the origin of the cold gas in BGGs. In the second part of the talk, I will show results of our campaign to follow-up interesting, individual galaxies in the Fornax A group, currently falling into the Fornax cluster. Our sample was chosen from new HI observations of Fornax obtained on the MeerKAT radio telescope. We study the stellar populations of the galaxies using observations from SALT and connect it to their gas content to study pre-processing in the group.

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 Africa South* and *Nightfall*.

Membership: Membership of the Society is open to all. Potential members should consult the Society's web page : <http://assa.saa.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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