SALT Newsletter

April 2026

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Cover image: SALT entrance door. -- *Credit*: Lisa Crause

Letter from the Head of Astro-Ops

Dear SALT Community,

The past few months have flown by, and winter is slowly making its presence felt here in South Africa. Recent events in my personal life have prompted moments of reflection — particularly on how fragile and fleeting life can be. It has been a reminder of the importance of being present, both in our own lives and in the lives of those we care about. Grief, I've come to realise, exists alongside love; the one gives meaning to the other.

At the same time, I find myself in quiet awe of what humankind is capable of. Watching Artemis II journey through space and return images of the Moon and Earth serves as a powerful reminder of our shared perspective. From that vantage point, our existence can appear almost infinite, yet the legacy of humanity will have lasting consequences. It is up to us to choose kindness and to uplift one another.

I am pleased to share several exciting updates from SALT Operations. These include recent work on the LFC, which required the replacement of a key optic, among other improvements. Another major milestone is the commissioning of the latest slitmask IFU, the SMI-300, which is scheduled for on-sky testing later this month. Please see the articles in this newsletter for further details on both developments.

The African Astronomical Society held its annual conference in Botswana in March. Itumeleng Monageng kindly stepped in to present a SALT proposal tool workshop, and we encourage you to read his article for an update on how the session was received.

Speaking of proposal tools, I am pleased to share that Christian, Head of the SALT Astronomy Operations Software team, has developed a series of video tutorials covering installation of the SALT proposal tools, as well as the creation of Phase 1 and Phase 2 proposals, among other topics. The playlist is available here: https://www.youtube.com/playlist?list=PLbNB8TDizjI7T2upgaUqg44tPMxPRQQMY. Please feel free to share this with your students or other interested users — we hope this resource will make the proposal process more accessible. The videos are also linked on the Astronomers section of the SALT website for easy reference. Many thanks to Christian for his efforts in putting these together.

We are also delighted to welcome Zwido Khangale as the newest SALT Astronomer, who joined the team in April. Zwido will be working closely with the polarimetry group. Please look out for his introduction in the next newsletter.

The SALT Annual Report for 2025 will be published soon. It is a packed edition, so please keep an eye out for that.

Until next time,
Danièl

SCIENCE HIGHLIGHT

SALT Helps Witness the Aftermath of a Planetary Collision

by Anastasios Tzanidakis (University of Washington, USA)

Planet-formation theories hypothesise that during the final hundred million years of planetary evolution, terrestrial planets like Earth reached their final form through a series of violent collisions among Mars-size protoplanets — known as a 'giant impact'. These collisions are responsible for ejecting copious amounts of dust and debris around its star that, theory argues, could survive for millions of years. Giant impact collisions are understood to be essential in shaping the final architecture of our Solar system and similar systems. They sculpt planets and moons, alter atmospheres, and are possibly fundamental catalysts for the emergence of life. Despite the critical role of giant impacts in late-stage planet formation, the initial conditions and outcomes of such impacts remain an open frontier. Gaia-GIC-1 (also known as Gaia20ehk) is among only a handful of known planetary collision afterglow systems, and notably represents the possibility of the first such candidate to be discovered by ESA's *Gaia* satellite mission.

Gaia20ehk was first flagged by the *Gaia* Photometric Science Alerts system in 2020. We have constrained the system to be a young F-type star located roughly 5.5 kpc away. The *Gaia* light curve revealed three quasiperiodic optical dips separated by 380.5 days, each with a depth of ~25%, pointing to transiting material at 1.1 AU from the host star. The system has since remained in an irregular fading state, fluctuating between G~19.8 mag and fainter than 20.8 mag.

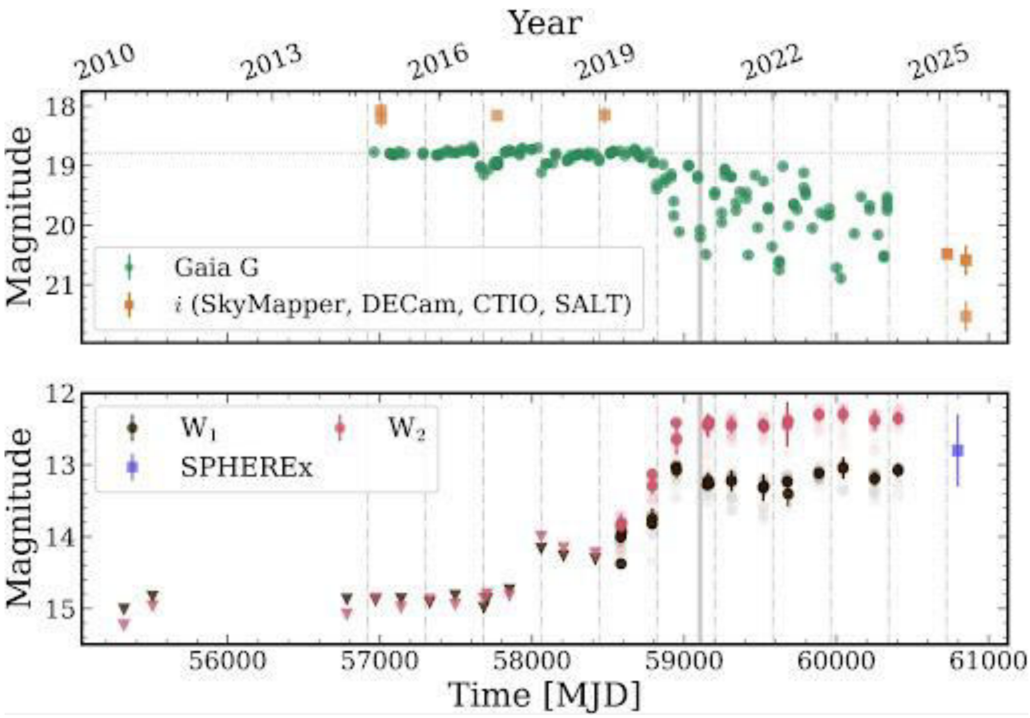


Figure 1: Compiled optical and infrared light curve of Gaia-GIC-1. *Top*: Optical *Gaia* G and *i*-band light curves. The dashed horizontal line is the median *Gaia G* magnitude in quiescence. *Bottom*: *WISE* photometry in *W1* and *W2*, where upside-down triangles indicate the 3σ upper limits. The dashed vertical grey lines mark a 380.5-day interval, and the highlighted solid grey line is the epoch of the *Gaia* alert.

Using archival WISE/NEOWISE data, we found a mid-IR brightening anti-correlated with the optical fading, and most recently confirmed by the SPHEREx mission, that the source is still infrared bright. Fitting the infrared excess yielded a dust temperature of 900 K and a minimum dust mass of 4×10^{20} kg, comparable to approximately Saturn's moon Enceladus, consistent with freshly generated warm circumstellar dust.

SALT observed Gaia-GIC-1 with the RSS on 22 February 22 2025 through the Director's Discretionary Time as part of a multi-facility campaign. The spectrum was largely featureless, consistent with the stellar source being heavily obscured by variable dust, with hints of the Ca II infrared triplet and Na I D lines, indicating a potential underlying stellar photosphere. Most importantly, the SALT spectrum enabled a tentative ruling out of H-alpha emission, suggesting that there is possibly little to no active accretion disc and thus eliminating the classification of accretion-driven variability. An acquisition image with the SALTICAM in the *i*-band also confirmed that the source had faded with respect to prior detections from SkyMapper and DECam.

The current leading hypothesis for all of this is a giant impact between two sizable planetesimals on a bound orbit. Gaia-GIC-1 is the first of such candidate systems to be discovered with Gaia, while continued multi-messenger follow-up and monitoring will be essential to better understand the thermal properties and dust composition of the debris. In the meantime, imminent surveys such as the Vera C. Rubin Observatory promise to uncover many more systems like it.

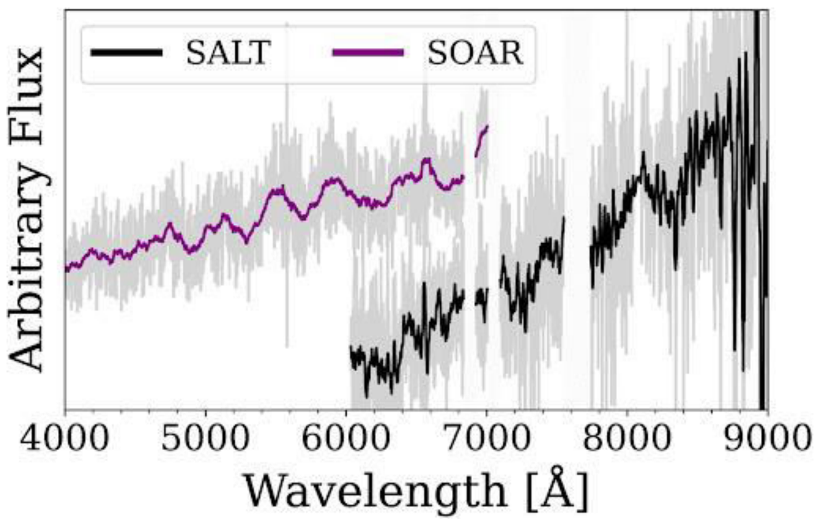


Figure 2: – Optical spectra of Gaia-GIC-1 obtained with SOAR (purple) and SALT (black) telescopes. Grey lines show the unbinned spectra, while the colored lines show binned versions for clarity.

The authors would like to thank Danièl Groenwald and the SALT observing staff for accommodating the requested Director's Discretionary Time.

Published as Anastasios Tzanidakis and James R. A. Davenport 2026 ApJL 1000 L5

Slitmask SMI-300

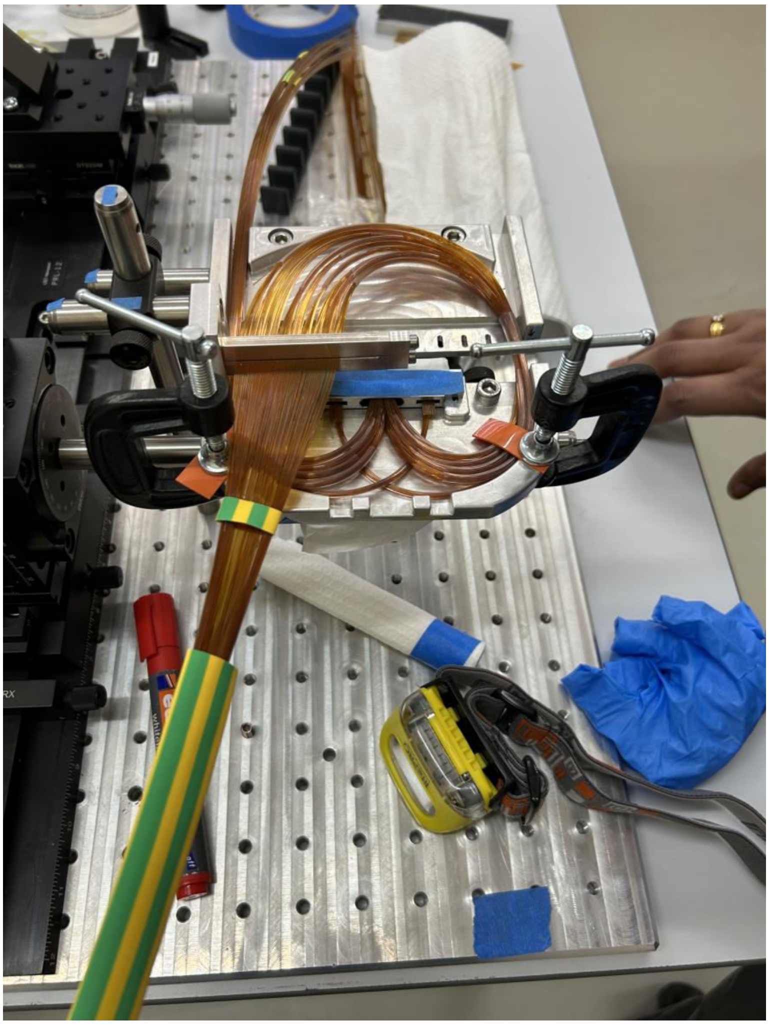
The SAAO Instrumentation team, together with SALT Technical and Astronomy Operations, has successfully completed the hardware phase, culminating in the production of an SMI-300 cassette. The SMI-300 improvements focused on the design and optimisation of the optical and fibre assemblies to enhance throughput performance and ease of assembly.

Following the hardware assembly, the unit was characterised to determine the focal ratio degradation and flux throughput. Together, these parameters define the overall throughput and performance of the system.

The SMI-300 has achieved a total throughput of 75% (relative to a 1-arcsecond slit). With the successful completion of the characterisation phase, the unit is now ready for deployment to SALT for on-sky commissioning.

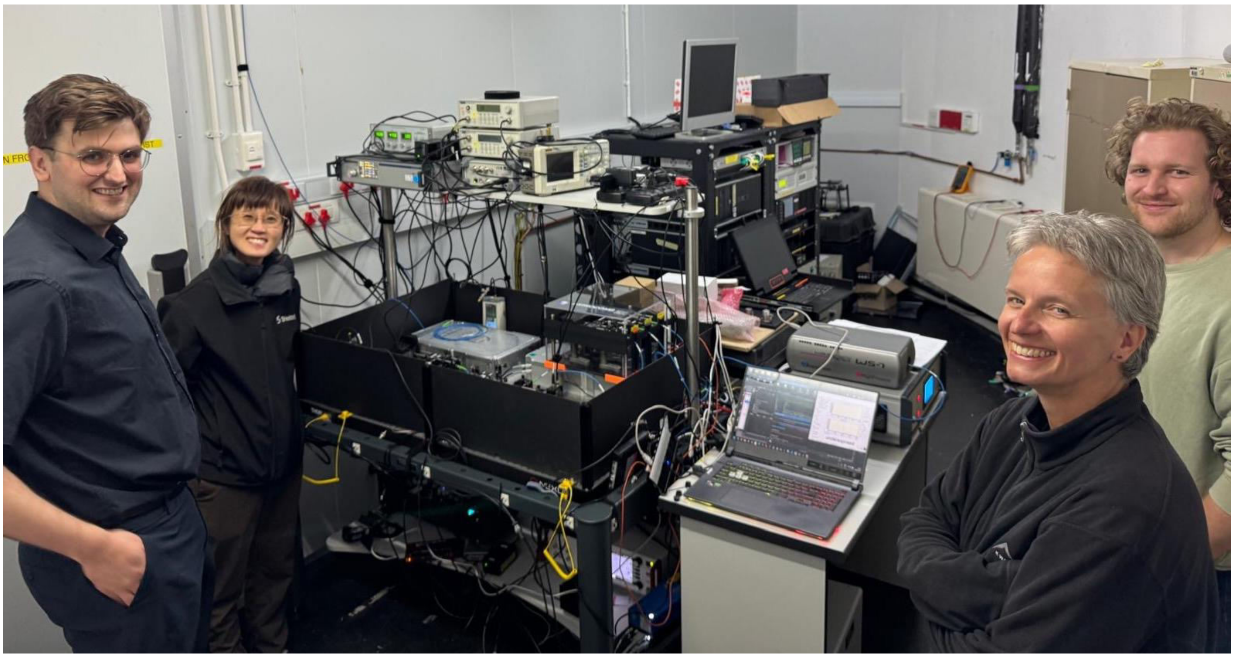
A one-week commissioning campaign is currently being discussed and planned at SALT for the end of April.

Antoine Mohoro.—



March 2026 LFC Campaign

The laser physicists Shan Cheng and Jake Charsley (from Heriot-Watt University in Edinburgh) returned to SALT for the first two weeks of March, bearing loads more equipment for the laser frequency comb (LFC) that they're building for our High-Resolution Spectrograph (HRS). Former SALT software developer Malcolm Scarrott joined the team as he's now an MSc student at the SAAO, working on the LFC.



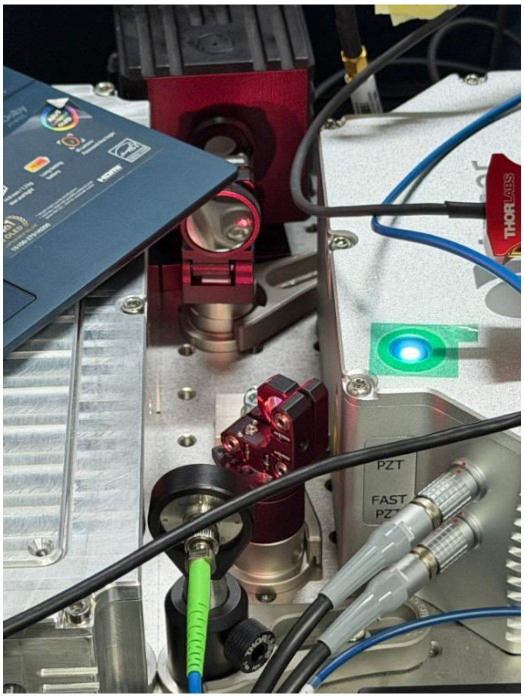
The LFC team: From left to right: Jake, Shan, Lisa and Malcolm.

The comb development project has been revised somewhat following the work done back in November. The focus of this trip was to replace a number of the optics within the system to include superior coatings to improve the wavelength coverage of the comb, and also to stabilise the system with better temperature control and insulation.

Three other two-week trips are now planned for the rest of 2026: one in June in which the last of the hardware (specifically a new spectral flattener and optics for coupling comb light into the HRS) will be installed, then two more runs sometime in September and December to work on automation to render the comb more of a turn-key system. These visits are a fantastic opportunity for Malcolm to get to grips with all aspects of the comb, working closely with Shan and Jake. Diving in the deep end, he got to assemble and test the new beat-detection unit within the first week!

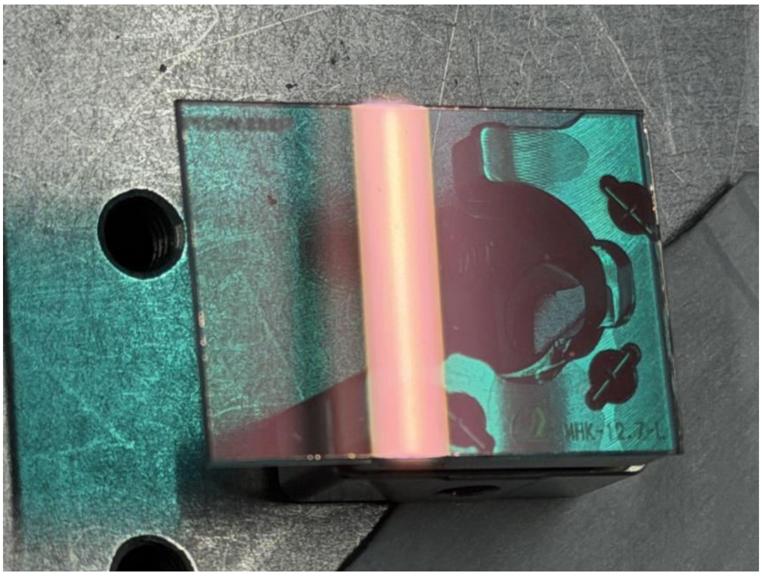
Below is a list of the many tasks completed during the first two weeks of March:

- ❖ Added water-cooled optical breadboards to the comb bench to improve the temperature stability of the system.



- ❖ Added optical feeds to allow the output from the main laser to be directed into a power meter, as well as a small USB spectrograph, to be able to easily check the performance and health of the laser (right).

- ❖ Added a titanium-sapphire wavelength-specific beam-splitter that's designed for this sort of laser to split the light before it can be directed into particular comb modules (below).

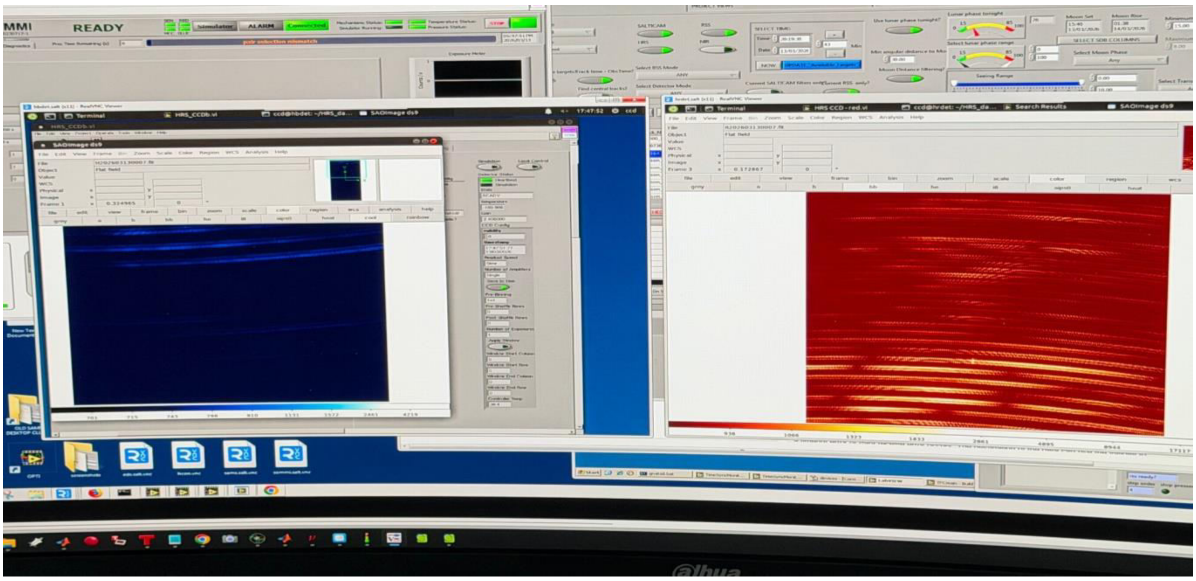


- ❖ Built a new rack-mounted beat-detection unit to improve the electronic locking of the comb.

- ❖ Installed a new f2f interferometer module for locking the comb's carrier envelope offset frequency.

- ❖ Upgraded the optics and opto-mechanics within the Fabry-Pérot cavity (last page).

- ❖ Replaced various optics within the system to include coatings that will yield better performance, especially at the green end of the wavelength range (below).



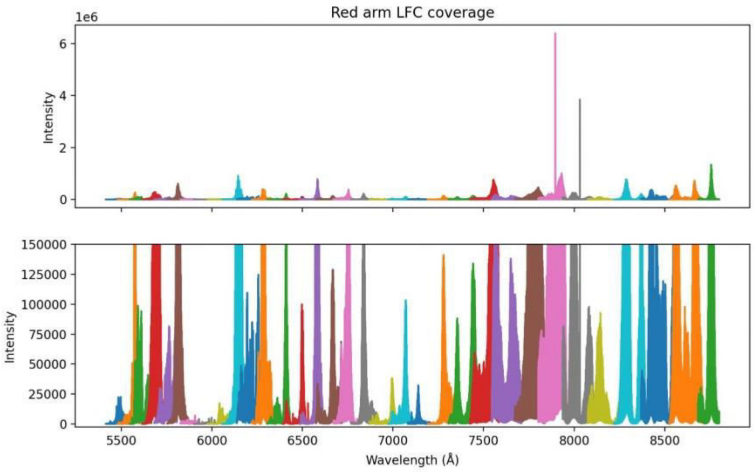
- Replaced the launch-optics on the high-stability (HS) bench to improve the coupling of comb light into the HS fibres.

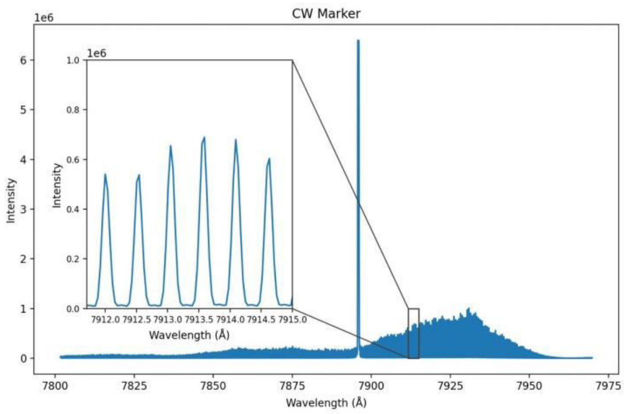
- Installed the comb enclosure to provide protection from dust and also to improve the thermal stability of the comb.

- Totally revamped the room to make the comb lab a safer and more ergonomic environment to work in.

- Tidied up and organised the cupboard that houses all the comb-related equipment.

- Took various HRS frames to check the performance of the system as it stands and then had Daniel Holdsworth analyse them.





The plan is for the LFC hardware to be ready for acceptance testing by the end of the June campaign; on-sky commissioning will follow after that.

Lisa Crause.--

Making progress on the LFC is hard work.

AfAS meeting

A recent workshop at the African Astronomical Society (AfAS) 2026 meeting in Kasane, Botswana, brought together students and researchers to explore the essential tools for planning observations with SALT. The session focused on effectively preparing for observing time through the application of practical skills. The facilitators were Drs Itumeleng Monageng, David Buckley amd John Menzies.

The workshop began with an overview of SALT's unique design and operational constraints, which is crucial for anyone looking to apply for observing time. Participants were introduced to key planning tools, including the visibility calculator, RSS simulator, HRS simulator, and PIPT. Attendees learned how to determine when a target can be observed, how long it remains accessible, and how observing tracks are scheduled. These tools highlight the importance of aligning scientific goals with the telescope's geometric and operational limitations.

The workshop included several projects that used various SALT instruments, allowing participants to engage with real-world scenarios. They explored how to estimate the exposure time needed to achieve desired signal-to-noise ratios, considering instrument configurations and observing conditions. This hands-on exercise emphasised the need for careful planning to ensure that observations are both feasible and scientifically productive.

This collaborative environment helped clarify the planning process and instilled confidence in attendees as they navigated SALT's requirements with the goal to design observations that maximise the facility's potential and to increase their chances of success in future proposal cycles.

Itu Monageng.—

MEET THE TEAM: Chrey Sookha

Head of Software Engineering

Hello everyone,

My name is Chrey Sookha, and I'm the Head of Software Engineering for SALT at the SAAO, having joined the team over the past year. I enjoy building software that helps make complex systems more reliable, usable, and easier to understand.

Before SALT, I spent over a decade at Transnet Engineering, developing software for locomotives, port equipment, and fuel pipeline systems, with a focus on diagnostics, control systems, and using data to solve real operational challenges.

At SALT, I lead the software engineering team, working closely with scientists and engineers to modernise systems and support cutting-edge research. I was drawn to this role by the opportunity to contribute to something meaningful while solving interesting technical problems.

Outside of work, I enjoy hands-on projects involving electronics and mechanical systems, and exploring new technologies.

Regards, Chrey

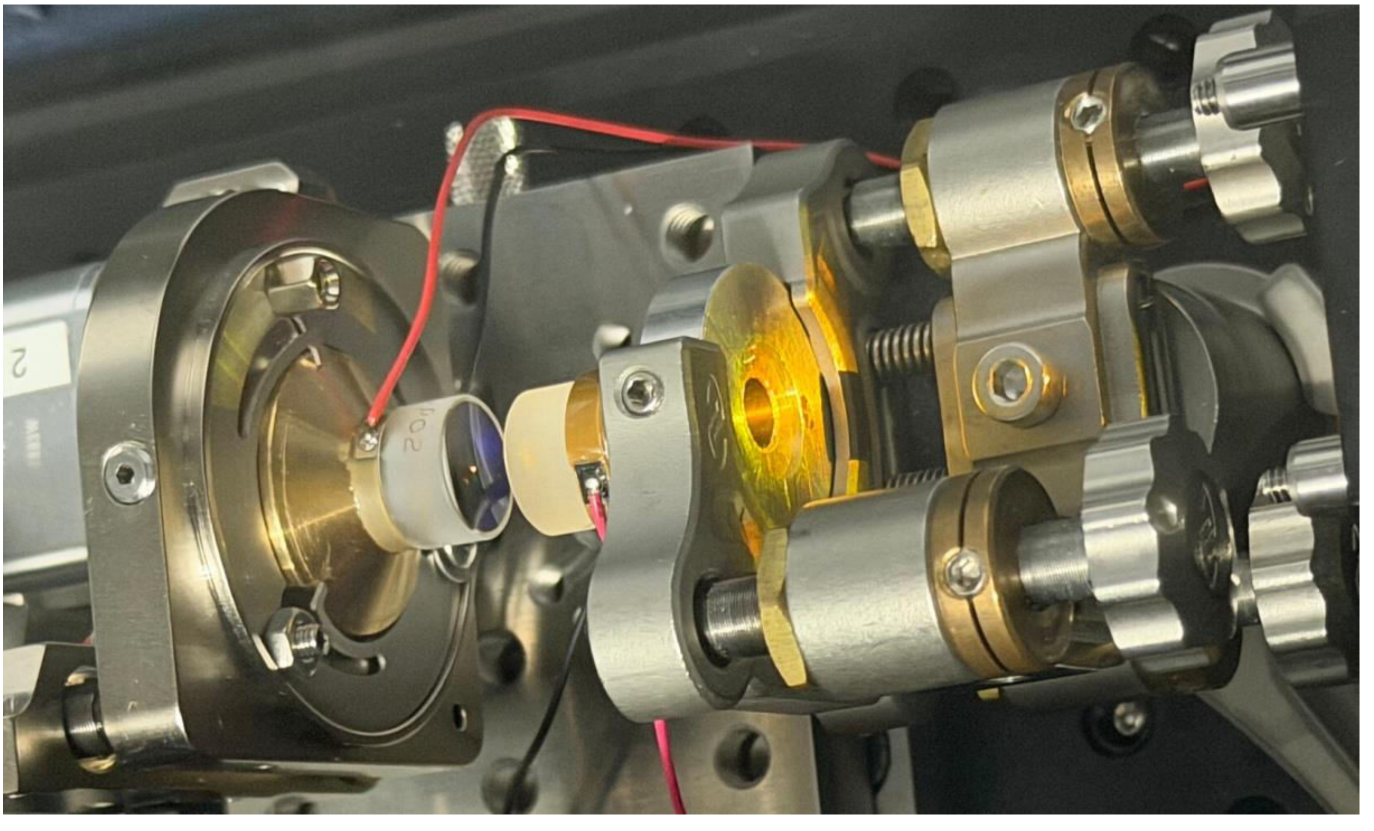
SALT SCIENCE PAPERS

December 2025 – March 2026

Below is the list of SALT publications since our last newsletter (for our full list of publications, please visit http://astronomers.salt.ac.za/data/publications/). We encourage SALT users to inform us of any papers making use of SALT data, and to double check the link above after publication.

- Van Bemmel, N., Zhang, J., Cooke, J., et al. 03/2026: An extremely fast fading population II dwarf nova candidate: caught spectroscopically on the rise, MNRAS 547, stag309 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.547ag309V
- Craig, P., Aydi, E., Chomiuk, L., et al. 03/2026: What determines the γ-ray luminosities of classical novae?, MNRAS 546, staf2270 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546f2270C
- Coe, M. J., Gaudin, T. M., Monageng, I. M., et al. 03/2026: SXP 31.0 – the 2025 near-Eddington double X-ray outburst after 26 years of quiescence, MNRAS 546, stag265 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546ag265C
- Szegedi, H., Charles, P. A., Buckley, D. A. H., et al. 03/2026: [HP99] 159 – Properties of the first supersoft X-ray source with a helium star donor, MNRAS 546, stag189 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546ag189S
- Philip Monai, A., & Jeffery, C. S. 03/2026: The SALT survey of helium-rich hot subdwarfs: unsupervised classification and kinematic analysis, MNRAS 546, stag020 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546ag020P
- Tzanidakis, A., & Davenport, J. R. A. 03/2026: Gaia-GIC-1: An Evolving Catastrophic Planetesimal Collision Candidate, ApJL 1000, L5 -- https://ui.adsabs.harvard.edu/abs/2026ApJ..1000L...5T
- Schaefer, B. E., Pearce, A., Love, T., et al. 03/2026: FQ Circini: An Ordinary Nova with a High-mass B1 V(n)(e) Companion Whose Decretion Disk Transfers Mass to the White Dwarf via Roche–Lobe Overflow, ApJ 1000, 125 -- https://ui.adsabs.harvard.edu/abs/2026ApJ..1000..125S
- Singh, M., Kwok, L. A., Jha, S. W., et al. 03/2026: Photometry and Spectroscopy of SN 2024pxl: A Luminosity Link among Type Iax Supernovae, ApJ 999, 227 -- https://ui.adsabs.harvard.edu/abs/2026ApJ...999..227S
- Kaltenbrunner, D., Maitra, C., Haberl, F., et al. 03/2026: A comprehensive catalogue of high-mass X-ray binaries in the Large Magellanic Cloud detected during the first eROSITA all-sky survey, A&A 707, A225 -- https://ui.adsabs.harvard.edu/abs/2026A&A...707A.225K
- Jeffery, C. S., Dorsch, M., Philip Monai, A., et al. 02/2026: The SALT survey of helium-rich hot subdwarfs: final sample and classification, MNRAS 546, staf2202 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546f2202J
- van Loon, J. T., & Ohnaka, K. 02/2026: A phoenix rises from the ashes: WOH G64 is still a red supergiant, for now, MNRAS 546, stag012 -- https://ui.adsabs.harvard.edu/abs/2026MNRAS.546ag012V
- Brink, J., Buckley, D. A. H., Veresvarska, M., et al. 02/2026: The optical photometric and spectroscopic periodicities of the cataclysmic variable SRGt 062340.2-265751, A&A 707, A25 -- https://ui.adsabs.harvard.edu/abs/2026A&A...707A..25B
- LeBaron, N., Margutti, R., Chornock, R., et al. 01/2026: The Most Luminous Known Fast Blue Optical Transient AT 2024wpp: Unprecedented Evolution and Properties in the Ultraviolet to the Near-infrared, ApJL 997, L10 -- https://ui.adsabs.harvard.edu/abs/2026ApJ...997L..10L

- Fragkou, V., Parker, Q. A., & Gonçalves, D. R. 01/2026: PHR J1724-3859: A Bipolar Planetary Nebula in Open Cluster Trumpler 25, ApJ 996, 90 -- https://ui.adsabs.harvard.edu/abs/2026ApJ...996...90F
- Rajput, B., Goldoni, P., Max-Moerbeck, W., et al. 12/2025: Optical spectroscopy of blazars for the Cherenkov Telescope Array Observatory – IV, A&A 704, A190 -- https://ui.adsabs.harvard.edu/abs/2025A&A...704A.190R
- de Wet, S., Leloudas, G., Buckley, D. A. H., et al. 12/2025: A low mass, binary-stripped envelope for the Type IIb SN 2024abfo, A&A 704, A89 -- https://ui.adsabs.harvard.edu/abs/2025A&A...704A..89D



Optics and opto-mechanics within the Fabry-Pérot cavity of the LFC.