May 2025

The High Energy Astrophysics Division Semi-annual Newsletter

Editors: Renee M. Ludlam (Wayne State University) and Drew M. Miles (The California Institute of Technology)

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Composite image of the Helix Nebula using X-rays from Chandra (magenta), optical light data from Hubble (orange, light blue), infrared data from ESO (gold, dark blue), and ultraviolet data from GALEX (purple). X-ray: NASA/CXC/SAO/Univ Mexico/S. Estrada-Dorado et al.; Ultraviolet: NASA/JPL; Optical: NASA/ESA/STScI (M. Meixner)/NRAO (T.A. Rector); Infrared: ESO/VISTA/J. Emerson; Image Processing: NASA/CXC/SAO/K. Arcand; Illustration: NASA/CXC/SAO/M. Weiss

The View from the Chair

KRISTIN K. MADSEN (NASA GSFC)

As we face uncertain times, a potentially dire future for astrophysics, and an attack on the progress of social equality for all, I would like to assure you that the HEAD remains committed to our membership and to adhering to our high standards of tolerance and inclusion. There will be no changes to our code of conduct at our upcoming meeting in St. Louis, and we will continue to strive towards a balanced and equitable program. The AAS likewise remains strongly committed to their core tenants of diversity and inclusion, and I encourage you to reach out to their Advisory Committees dedicated to these tasks. The AAS also provides guidance and resources on how to engage with the science staffers of your congressional office. Recently, they hosted a "week of action", and although that week is past, the information and instructions are still applicable.

Looking towards our upcoming HEAD meeting in St. Louis, we have, in response to the current travel restrictions and changing grants, sent out a survey to get a sense of the number of participants. We anticipate that attendance may be lower than usual, and will be working with the AAS to adjust to a potentially reduced scope. This involves negotiating with the hotel, and fortunately they are willing to work with us. That being said, we hope to see many of you there this year! Importantly, I want to remind you that we will NOT be hosting a meeting in 2026, and the next HEAD meeting will be fall 2027 in Providence, RI, together with DPS.

We continue to engage with students and early career members to connect with our community through the Frontiers Seminars. The cadence is approximately every 2-3 months. You can sign up or propose for a talk at the HEAD webpages.

Finally, I am happy to report that the bylaw changes we introduced in December 2024 and voted for in February 2025, had a majority vote, and we now have a deputy secretary elected. Please welcome Drew Miles, who will become secretary after Renee Ludlam's term ends.

News from the HEAD

MEGAN WATZKE, THE HEAD PRESS OFFICER (CFA)

Results from HEAD missions have been featured in many popular and social media outlets in recent months. These articles include prominent outlets such as The New York Times, Washington Post, Scientific American, and many more.

The current news cycle is largely being dominated by budget issues surrounding the direction of the government in the United States, including many spots where our science results would typically appear.

However, HEAD missions continue to produce results that are distributed to the media and public, demonstrating that the topics provide wonder and awe to those far beyond the professional realm of the astrophysical community.

Here is a sample of some of the releases connected to HEAD missions in the past half year:

November 13, 2025: "NASA's Swift Studies Gas-Churning Monster Black Holes"

January 8, 2025: "Astronauts Set to Patch NASA's X-ray Telescope Aboard Space Station"

January 14, 2025: "Extreme Variability at the Edge of the Universe"

January 16, 2025: "Exoplanets Need to be Prepared for Extreme Space Weather, Chandra Finds"

March 4, 2025: "X-ray Signal from Helix Nebula Points to Planet Destroyed by White Dwarf"

April 16, 2025: "NASA's Chandra Releases New 3D Models of Cosmic Objects"

May 1, 2025: "NASA's Chandra Diagnoses Cause of Fracture in Galactic 'Bone'"

XRISM

BRIAN J. WILLIAMS & RICHARD L. KELLEY (NASA GSFC)

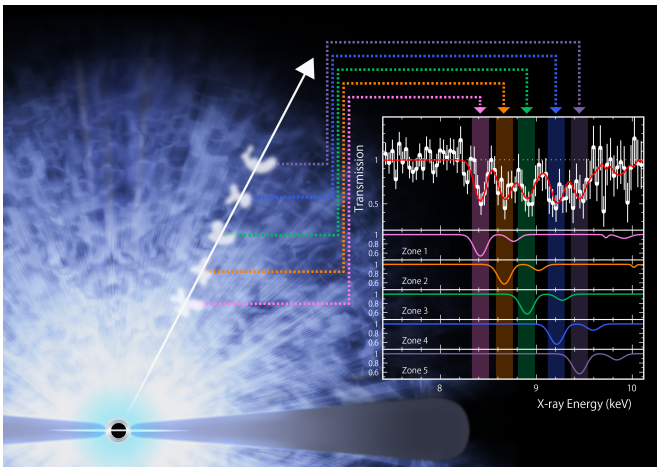
The X-ray Imaging and Spectroscopy Mission (XRISM), is an international JAXA/NASA collaboration with participation from ESA. XRISM began science operations in February of 2024 and in September 2024, completed the Performance Verification (PV) phase of the mission. All observations taken in the PV phase will go public one year after the conclusion of the phase, in the late summer of 2025.

XRISM is now in the General Observer phase of the mission, and is currently observing targets approved as part of the Cycle 1 solicitation. The deadline for observations in Cycle 2 was May 15th, 2025, and we received 300 proposals worldwide (via three parallel solicitations from the U.S., Japan, and Europe). The estimated oversubscription rate is ≈9.5:1, and the Cycle 2 peer review will be held later this summer.

XRISM is performing exceptionally and already conducting exciting science despite an issue with the aperture door covering its detector. The door, designed to protect the detector before launch, has not opened as planned after several attempts. The door blocks lower-energy X-rays, effectively cutting the mission off at 1.7 keV compared to the planned 0.3 keV. The XRISM team will continue to explore the anomaly and is investigating different approaches to opening the door. The Xtend instrument is unaffected. There have been three attempts thus far to open the door. A fourth attempt will be evaluated for feasibility after the conclusion of the Cycle 1 observing program in the summer of 2025. To accommodate the uncertainty in the state of the mission, Cycle 2

will be a shorter than normal cycle, with a duration of 6 months. The Cycle 3 solicitation will be released this fall with a likely due date in early 2026.

In the meantime, the results above 1.7 keV are spectacular. Below, we show a spectrum of the quasar PDS 456. The XRISM/Resolve spectrum of this object is the most detailed yet made. What appears to be a broad absorption line at CCD resolution is clearly resolved into multiple absorption components outflowing at 20–30% of the speed of light. This demonstrates that the wind structure is highly inhomogeneous, which likely consists of up to a million clumps. The mass outflow rate is estimated to be 60–300 solar masses per year, with the wind kinetic power exceeding the Eddington luminosity limit. The paper reporting this remarkable result can be found in the May 14th edition of Nature.



X-ray absorption spectrum of PDS 456 obtained by XRISM. Top panel shows the overall observed spectrum. The five lower panels illustrate how gas moving at different speeds produces absorption lines at slightly different energies due to the Doppler effect. These distinct absorption features reveal at least five bullet-like wind components. (Credit: JAXA/XRISM)

The 1st International XRISM Symposium is planned for October 20-24th, 2025, in Kyoto, Japan. This will be open to the general astronomical community and will feature science results from both the PV and the GO phase. Registration and abstract submission are now open. October is a particularly pleasant time to visit Kyoto, so we hope to see you there!

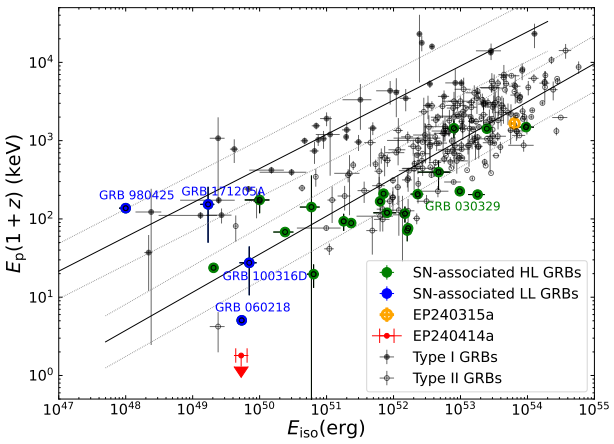
The Einstein Probe (Tianguan)

HUI SUN, CONGYING BAO, WEIMIN YUAN(NAO,CAS), ON BEHALF OF THE EP TEAM

The Einstein Probe (EP) is a time-domain X-ray astronomy mission led by the Chinese Academy of Sciences (CAS) and participated in by the European Space Agency (ESA), the Max Planck Institute for Extraterrestrial Physics (MPE) and the French National Centre for Space Studies (CNES). EP was launched in January 2024 and commenced science operations in July 2024. The spacecraft and both instruments onboard, the Lobster-eye Wide-field X-ray Telescope (WXT) and the Follow-up X-ray Telescope (FXT), are operating in exceptional condition.

EP has started to produce exciting discoveries. As of April 2025, EP has detected over 120 X-ray transients at high significance and about 1000 stellar flares, along with many fainter candidates. Furthermore, EP has detected X-ray outbursts from a number of known sources, including CVs, X-ray binaries, AGNs, and stars. A total of 150 GCN and ATEL astronomical alerts have been disseminated.

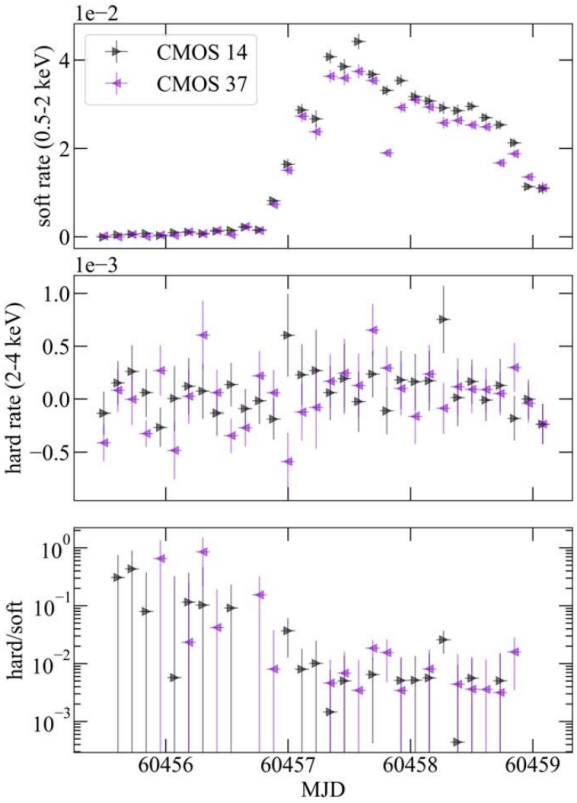
About 75% of EP-detected transients are fast transients. Of particular interest, about one-third of these fast transients lack bright gamma-ray counterparts, despite having gamma-ray detector coverage in their fields during EP detections. At least three of these were found to be associated with supernovae, suggesting a possible connection to the core collapse of massive stars. Although X-ray flashes, discovered by the BeppoSAX satellite and thought to be GRB with weak or absent gamma-ray emission, are a very promising candidate, it is not clear whether they can account for all the fast transients detected by EP. The physical origins of these GRB-less X-ray transients remain an open question.



EP240414a in the correlation of the rest-frame peak energy versus isotropic energy (Amati relation). The transient EP240414a exhibits an exceptionally soft spectrum, positioning it as a clear outlier compared with classical GRBs and some low-luminosity GRBs. (Credit: Sun et al. 2025, EPSC/CAS)

A notable example among these fast X-ray transients is EP240414a, discovered by EP on April 14, 2024, and associated with a Type Ic-BL supernova SN 2024gsa. The X-ray emission is characterized by a short duration of 150 seconds, and an unusually softer spectrum peaking at < 1.3 keV, which makes it distinct from known LGRBs, X-ray flashes, or low-luminosity GRBs (see figure above). Follow-up observations at optical and radio bands revealed the existence of a weak relativistic jet that inter-

acts with an extended shell surrounding the progenitor star (Sun et al. to appear in Nature Astronomy). This discovery highlights a previously unrecognized diversity in the emission properties associated with the stellar deaths and suggests the existence of unknown Wolf-Rayet star explosion mechanisms.



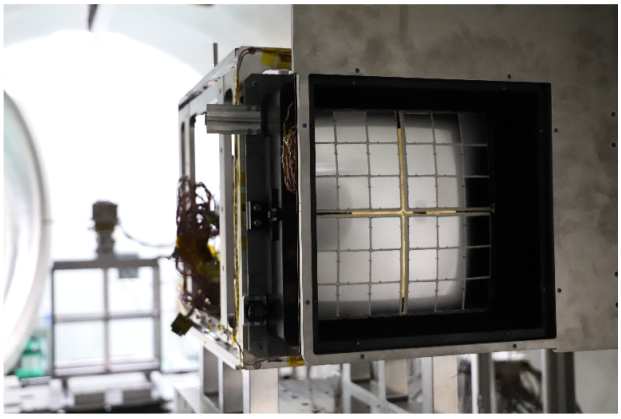
EP/WXT light curves of EP J005245.1-722843 around the epoch of the outburst detection in the soft (0.5–2 keV; top) and hard (2–4 keV; middle) energy bands. The drop in the middle of the light curve of CMOS 37 is caused by instrumental effects. The time evolution of the hardness ratio is also plotted (bottom). (Credit: Marino et al. 2025, EPSC/CAS)

Apart from fast X-ray transients, EP has also detected several new sources characteristic of X-ray binaries and a number of outbursts from previously known objects in our Galaxy and the neighboring galaxies. Most of these are still under investigation. One good example of such is a remarkable X-ray flare, EP J005245.1-722843, from a faint Chandra source in the Small Magellanic Cloud, detected by EP-WXT (also by Swift/XRT in its S-CUBED SMC survey) on May 27, 2024 (see above figure). Prompt follow-up with EP-FXT, Swift/XRT, and NICER revealed a very soft, thermally emitting source ($kT \approx 0.1$ keV at the outburst peak) with an X-ray luminosity of $L \approx 4 \times 10^{38}$ erg s^{-1}. The supersoft outburst suggests that this source is a Be+WD X-ray binary (Marino et al. 2025, ApJL). Only a handful of these systems have been found so far. This is the first time scientists could track the X-ray light coming from such a curious pair from its initial sudden flare-up to its fading away. This discovery was announced in the ESA's news release in February 2025.

Recently, the EP team published the EP Science White Paper online in "Science China: Physics, Mechanics & Astronomy". This comprehensive white paper details the mission's scientific capabilities, observational methodologies, and primary science objectives.

The ending of the LEIA experiment

On February 19, 2025, the SATech-01 satellite entered the Earth's atmosphere, marking the end of the short yet stunning life of the LEIA experiment onboard. As a pathfinder of EP-WXT, a qualification model of one WXT module (see figure below) was launched piggybacking on SATech-01 on July 27, 2022. This experiment was named Lobster Eye Imager for Astronomy (LEIA). Its primary mission was to demonstrate lobster-eye micro-pore optics (MPO) and CMOS X-ray detector that are the two novel technologies from which the EP-WXT was built. LEIA has the same specifications as EP-WXT (having 12 moduels) except for a smaller FoV of only $18.6° \times 18.6°$ (1/12 of WXT).



The LEIA instrument undergoing on-ground X-ray calibration. (Credit: Zhang et al. 2022, EPSC/CAS)

On August 8, 2022, LEIA achieved its first light by observing the Galactic center region, marking the very first wide-FoV X-ray observations achieved by a lobster-eye focusing telescope in orbit (Zhang et al. 2022, ApJL). Afterwards, LEIA successfully tested the in-orbit calibration procedure, as well as the data reduction and transient search pipeline designed for EP-WXT. The results of these tests successfully verified the performance of lobster-eye MPO and CMOS technologies, paving the way for the launch of the EP mission one and a half years later. Despite its short operational life span and short instrument switch-on duration (about 10 minutes during each of its 90-minute orbits), LEIA had surveyed the entire sky and monitored the LMC at a roughly daily cadence. LEIA stopped collecting data about two years after launch.

Remarkably, LEIA also achieved some interesting scientific results, beyond the expectations of a technology pathfinder. LEIA detected more than 10 X-ray transients and outbursts from a number of known sources. Here are two examples:

- On November 7, 2022, a superflare event occurring on a nearby K-type giant star HD 251108 was detected by LEIA. The flare lasted for about 40 days in soft X-ray observations, reaching a peak luminosity of $\approx 1.1 \times 10^{34}$ erg s^{-1} in 0.5–4.0 keV, which is roughly 60 times the quiescent luminosity. The X-ray light curve reveals the cooling process of a loop arcade structure formed subsequent to the initial large loop with a half-length of $\approx 1.9 \times 10^{12}$ cm. The estimated energy released in the LEIA band is $\approx 3 \times 10^{39}$ erg, suggesting that this is probably the most energetic X-ray stellar flare with the longest duration detected to date (Mao et al. 2025, ApJ).

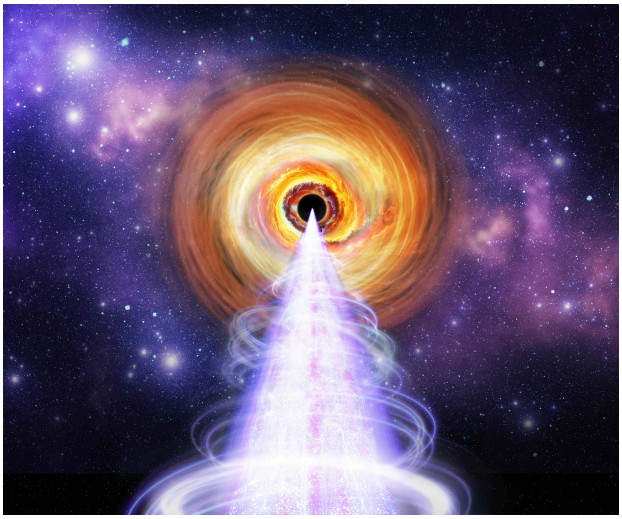
- On March 7, 2023, LEIA captured the prompt soft X-ray emission of the gamma-ray burst GRB 230307A. In combination with the gamma-ray data obtained from GECAM, the analysis revealed that the features of the prompt emission are consistent with those of a binary compact-star merger, which are also consistent with the findings of a kilonova associated with this event. Intriguingly, an extended X-ray emission component appears as the $\gamma-$ray emission dies out, signifying the likely emergence of a magnetar central engine. This discovery provides the first observational evidence from the prompt emission that GRBs can be powered by magnetar central engines (Sun et al. 2025, National Science Review).

More information on the EP mission can be found here.

Imaging X-ray Polarimetry Explorer (IXPE)

PHILIP KAARET & STEVE O'DELL (NASA/MSFC)

IXPE was featured during "Black Hole week" in an item highlighting the blazar BL Lacertae. An IXPE-led multiwavelength campaign obtained unprecedented polarimetric coverage from radio to X-ray wavelengths, catching an extraordinary event when the optical emission reached a record 47.5% linear polarization (Agudo, Liodakis, et al. 2025, ApJL, 985, L15). In stark contrast, IXPE showed that the X-ray polarization was less than 7.4% in the same time interval. While the optical emission is electron synchrotron radiation, the nature of the X-ray emission is debated and may be Compton scattering on leptons or hadron-induced. The large contrast between the high optical polarization versus the low X-ray polarization strongly favors a leptonic (Compton scattering) origin for the X-ray emission, thereby breaking the degeneracy between hadronic and leptonic emission models for BL Lac and demonstrating the power of multiwavelength polarimetry.



Depiction of BL Lacertae showing the jet/helical magnetic fields and the accretion disk. (Image credit: NASA/Pablo Garcia)

IXPE is currently in General Observer (GO) Cycle 2. We greatly appreciate the efforts of those of you who served on the GO review. A total of 141 proposals were received requesting 91 Ms of IXPE time for an oversubscription factor of 6:1. The proposals included source classes not considered for the prime mission. Abstracts of accepted proposals are posted at the IXPE GOF site. The large number of proposed targets and high oversubscription suggest that IXPE will continue to produce scientifically compelling results for many future cycles.

IXPE is currently awaiting the results of the NASA Astrophysics Division 2025 Senior Review of Operating Missions. In the event of mission extension (*fingers crossed*), the IXPE GO Cycle 3 deadline will likely be in September 2025. There are several changes for this cycle. IXPE and XRISM have established a joint program and up to 200 ks of XRISM time may be awarded through IXPE Cycle 3. Also, NASA and the National Radio Astronomy Observatory (NRAO) have established a joint program. IXPE Cycle 3 may award up to 5% of the scientific observing time on the VLA, GBT, and VLBA, or up to 200–300 hours per year on each telescope. Time on ALMA is not covered by this agreement. Up to 300 ks of IXPE time will be awarded by NRAO. The first NRAO call awarding IXPE time was 2025B with proposals due 29 January 2025. The next call will be 2026A with proposals likely due in late July 2025. Finally, we remind the user community that while IXPE data have by default no exclusive-use period, it is possible to request an exclusive-use period of up to 6 months in GO proposals. Request of an exclusive-use period has no bearing on proposal evaluation.

To help with proposal preparation, we plan to hold a virtual workshop in June or July. We shall present on IXPE status, the GO proposal process, observation feasibility estimates, and data analysis including new scripts intended to facilitate the process for new users. Please look for an announcement in mid-June via the HEAD and IXPE mailing lists.

The next meeting of the IXPE Users Committee (IUC) will be in late June 2025. We encourage input from the user community in advance of the meeting via the contact form or an e-mail to the Chair at meyer@umbc.edu. We thank outgoing committee members Alan Marscher (Boston University) and Roger Romani (Stanford), and welcome incoming IUC members Herman Marshall (MIT) and George Younes (GSFC/UMBC).

Martin Weisskopf and Paolo Soffitta gave invited talks at the 2025 AAS Winter meeting in the award session for the 2024 HEAD Bruno Rossi Prize. Martin Weisskopf, Enrico Costa, and Ronaldo Bellazzini have been awarded the 2025 Antonio Feltrinelli International Prize in Astronomy by the Accademia Nazionale dei Lincei. The Feltrinelli Prizes are considered Italy's highest scientific and cultural awards and are awarded in astronomy once every ≈10 years. The Accademia is the oldest European scientific academy: it was founded in 1603 in Rome, with Galileo joining in 1611.

The Chandra X-ray Observatory

EDWARD MATTISON & MARK WEBER (SAO); STEVEN EHLERT & STEVE O'DELL (NASA/MSFC)

The Chandra X-ray Observatory marked its 25th year of operations on July 23, 2024. Now in its 26th year, Chandra continues its highly successful science mission. With its unique capability for sub-arcsecond X-ray imaging, Chandra provides essential information for accomplishing many X-ray and multi-wavelength investigations in current astrophysical research.

Chandra observing time continues to be highly sought after. Scientists worldwide responded to Chandra's Cycle 27 call for proposals with 299 observing proposals requesting 66.1 Ms of telescope time, an oversubscription factor of 4.6:1.

Composite image of the Helix Nebula using X-rays from Chandra (magenta), optical light data from Hubble (orange, light blue), infrared data from ESO (gold, dark blue), and ultraviolet data from GALEX (purple). X-ray: NASA/CXC/SAO/Univ Mexico/S. Estrada-Dorado et al.; Ultraviolet: NASA/JPL; Optical: NASA/ESA/STScI (M. Meixner)/NRAO (T.A. Rector); Infrared: ESO/VISTA/J. Emerson; Image Processing: NASA/CXC/SAO/K. Arcand; Illustration: NASA/CXC/SAO/M. Weiss

The outstanding angular resolution of Chandra has recently played a major role in understanding the origin of X-ray ($> 1\,\mathrm{keV}$) emission from the white dwarf WD 2226-210, at the center of the Helix nebula. A recent study by Estrada-Dorado et al. (2025) revisited early Chandra, XMM-Newton, Einstein, and ROSAT data of this white dwarf to show that there was no evidence of variability in its X-ray light curve or spectral properties over ≈10 years, with only weak evidence for variability on time scales of a few hours. This lack of variability, when combined with the absence of any extended emission as observed by Chandra, suggest that this X-ray emission may be powered by the accretion of material originating from a close planet disrupted via tidal interactions with the white dwarf.

Chandra observations have also been used to understand better the extent to which red dwarf stars may impact the atmospheres and sustainability of life on exoplanets. A Chandra and XMM-Newton study of nearby red dwarf stars such as Wolf 359 show that planets orbiting these stars are often bombarded with ultraviolet and X-radiation that can greatly affect the survival and evolution of atmospheres bound to any planets orbiting these stars. Quantifying the ultraviolet radiation from these stars was accomplished by observing them at various locations on the HRC instrument, utilizing the spatial dependence of the transmission resulting from the segmented structure of the UV/Ion shield (UVIS). Along with these ultraviolet measurements, 18 X-ray flares by Wolf 359 were observed over less than 4 days. Observations of stars in the context of exoplanet evolution has become a larger fraction of Chandra's long-term science plan, especially as new and unusual planet systems continue to be discovered.

The Chandra Observatory continues to function at or near pre-launch expectations. Incremental changes in the performance of some components continue, generally in line with pre-launch predictions and without hindering operations. The performance of the spacecraft's thermal insulation continues to decline gradually; however, this trend has been mitigated by careful mission scheduling, aided by increasingly sophisticated software scheduling tools. The gradual accumulation of molecular contamination on the UV filter that protects the ACIS detector reduces ACIS's sensitivity to low-energy (below ≈1.5 keV) X-rays. Chandra maintains its mission-long observing efficiency of ≈70%, close to the maximum time possible for collecting data on science targets. (To protect its instruments, Chandra cannot observe during passages through Earth's radiation belts; in addition, spacecraft maneuvers, instrument setup and other procedures necessarily take up a small portion of the available time.)

The robustness of Chandra operations was demonstrated when NASA's Deep Space Network swapped to their Emergency Control Center for operations in January in response to the Eaton Wildfire. Chandra operated seamlessly through the various DSN configuration

changes with no impact to science.

The Chandra program took part in the most recent Senior Review of NASA operating missions. The Chandra team submitted our proposal in December and met with the Review panel in February. We look forward to receiving the panel's assessment.

The Chandra program continues to have very active and successful engagement with the public. In addition to a strong presence on social media and mainstream media, a documentary on Chandra's sonifications of astrophysical data has won several film festival awards and is a very popular item on NASA+ ("Listen to the Universe").

The scientific community celebrated Chandra's 25th anniversary in 2024 with a variety of events across the country. A silver-anniversary science symposium was held in Boston in December. The symposium included an international panel of invited speakers and several of the NASA astronauts who deployed Chandra to orbit from the Space Shuttle. The Chandra program looks forward to many more years of productive scientific discovery.

XMM-Newton

LYNNE VALENCIC (JHU/NASA) & KIM WEAVER (NASA)

Successful submissions from the Twenty-fourth Call for Proposals for XMM-Newton were announced in December 2024, and observations will begin in May. Unfortunately, due to ongoing uncertainty regarding the federal budget, the AO-24 Budget Proposal Cycle has been postponed to a date that has yet to be determined. Updates will be posted on our website and emailed to successful science proposers as soon as we have them.

The continuing uncertainty has also forced us to cancel the XMM-Newton 25th Anniversary Conference that had been scheduled for May 19-22 in Baltimore. We are currently examining our options for postponement. As we make decisions, we will update our GOF website and conference website, and email the HEAD community to keep everyone informed.

In positive news, the SAS virtual Data Analysis Workshop (April 1-3) was a resounding success! It focused on introducing pySAS to the user community and demonstrated how to use it to do basic XMM data analysis in the cloud via SciServer and Datalabs (the ESA counterpart to SciServer). About 200 people attended on the first day and 100 people on the second. More than 60% were students (graduate and undergraduate) or postdocs, highlighting the interest that early-career scientists have in the mission. Videos of the presentations will be available through links at the GOF website. In light of its popularity, we plan to make it a regular event, and will continue to keep the community informed.

SRG/eROSITA/ART-XC

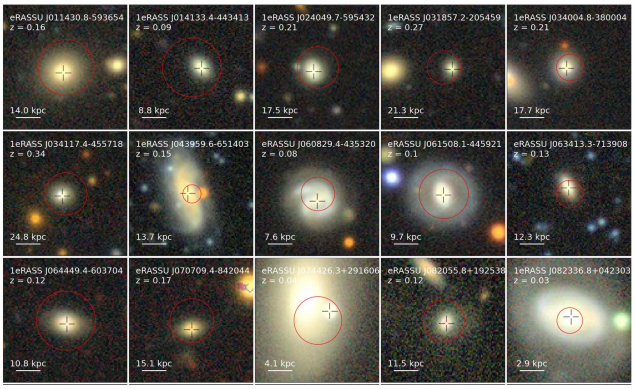
A. MERLONI (MPE), A. LUTOVINOV (IKI), P. PREDEHL (MPE), S. SAZONOV (IKI)

The eROSITA all-sky survey marked a major step forward in time-domain X-ray astronomy. Among the most unique phenomena, eROSITA enables us to study tidal disruption events (TDEs), which occur when a star passes too close to an SMBH leading to its tidal disruption by gravitational forces. eROSITA has opened the data-rich era allowing progress from individual TDE studies to population studies of tens of events (see, e.g., Sazonov et al. 2021, MNRAS).

The paper *The Population of Tidal Disruption Events Discovered with eROSITA* by Grotova et al. (2025b, A&A) presents the first systematic study of X-ray-selected canonical TDEs discovered in the Western Galactic hemisphere during the first two eROSITA all-sky surveys. The sample is based on the catalog of eROSITA's extragalactic transients and variables, eRO-ExTra (Grotova et al. 2025a, A&A), which includes 304 X-ray sources not associated with known AGN. By carefully selecting candidates based on their soft X-ray spectra, characteristic flaring or decaying X-ray light curves, and host galaxy properties, the study identified a robust sample of 31 TDE candidates (see figure below for some examples), including 30 canonical TDEs and one intriguing off-nuclear candidate, potentially associated with an intermediate-mass black hole.

This work nearly doubled the known population of X-ray-selected TDEs, and represents the largest systematically selected sample of its kind to date. The statistical power of this dataset allowed for a reliable estimate of the TDE X-ray luminosity function (XLF) yielding a volumetric rate of $(2.3^{+1.2}_{-0.9}) \times 10^{-7}\,\mathrm{Mpc^{-3}yr^{-1}}$ ($\approx 1.2 \times 10^{-5}$ events per galaxy per year). The derived X-ray luminosity function is well described by a double power-law model, with a luminosity break at 10^{44} erg/s, corresponding to the Eddington-limiting prediction. The host galaxies of the sample exhibit a noticeable 'green-valley' overdensity, which is associated with galaxies between star-forming and passive states. Interestingly, only about 20%, 30%, and 15% of the X-ray-selected events showed flares in the archival optical, mid-infrared, and radio data, respectively. This diversity may reflect differences in the circumnuclear environment or debris structure and is consistent with both obscuring envelope and stream-stream collision models, either of which can reproduce the observed multiwavelength behavior.

The exploration of TDEs with eROSITA is ongoing and will be extended with data from eRASS3 to eRASS5, along with the inclusion of non-canonical TDEs. These efforts will further improve our understanding of the TDE luminosity function, refine event rates, and shed light on the demographics of TDE host galaxies and their multiwavelength characteristics.



LS10 griz-color images (100×100 pixels) of the host galaxies of a sub-set of the the X-ray TDE sample from Grotova et al. (2025b). Black crosses denote the LS10 counterpart positions, and the red circles show the eROSITA X-ray positions with their 3σ errors. (Credit: Grotova et al. 2025b)

As of May 2025, the public distribution of the eROSITA Scientific Analysis Software System 'eSASS4DR1' has been updated with Patch no.1, which upgrades the `erolib` library from version 2.70.3 to 2.70.4. This update addresses a memory leak identified in version 2.70.3 that impeded the execution of specific tasks, for example, the use of the `evtool` utility to generate images with particular task options. Furthermore, the distribution of eSASS4DR1 via Docker containers has been officially discontinued. For detailed installation instructions and further updates, please refer to the eSASS4DR1 installation webpage.

The Mikhail Pavlinsky ART-XC telescope aboard the SRG observatory is continuing its all-sky survey in the 4–12 keV energy band. The current scan is to be finished on June 6, 2025. Then, after a short period devoted to pointing observations of a number of interesting astrophysical sources, another all-sky scan will begin, which is expected to be completed by mid-January 2026. As a result, the entire sky will have been scanned by ART-XC at least 8 times over a period of approximately six years, just as was planned before the launch of SRG. The ART-XC team will then proceed to constructing an updated catalog of X-ray sources detected during the all-sky survey.

NICER

KEITH GENDREAU & ZAVEN ARZOUMANIAN (NASA/GSFC)

The NICER team is pleased to report that, after many eventful months of planning and effort, the NICER payload on the International Space Station has regained a substantial amount of data-collection capability during orbit day.

Orbital-debris damage sustained by the X-ray Timing Instrument (XTI) in May 2023 significantly limited NICER's ability to collect viable data in sunlit conditions. A plan was developed to patch the largest (a few cm^2 in area) visible holes in a handful of the thin, fragile thermal shields that cover the X-ray concentrator optics, in hopes of restoring darkness to the XTI's interior. This repair task was performed flawlessly by a spacewalking astronaut (see image below) on January 16, 2025, and resulted in a substantial reduction in optical loading of the XTI's detectors. Although not the hoped-for complete solution to the "light leak," the repair effort enabled additional mitigation approaches including reconfiguration of the detector readout system to minimize internal telemetry saturation during orbit day. These upgrades were fully implemented by April 1, with beneficial impacts for NICER data that include much smaller file sizes, faster processing times, and reduced deadtime/higher throughput rates for bright targets. An imminent release of the NICER data-analysis system (NICERDAS) within the HEASoft package will include tools and calibration products that accommodate the new configuration and content of data files, take into account the ≈ 3% reduction in the XTI's effective area resulting from the installation of patches, and improve filtering of orbit-day data (from both before and after the repair) to recover as much scientific utility as possible.

A remarkable NICER "selfie" captured by ISS crew member Nick Hague on January 16, 2025, upon completion of the NICER repair spacewalk task. Reflected in the helmet visor, NICER's 56 circular sunshades are visible, including nine pie-piece patches installed to cover holes in some of the reflective optical-blocking filters damaged by orbital debris in May 2023. (Photo credit: NASA/Nick Hague)

Cycle 7 of NICER's General Observer (GO) program is underway; observations for targets approved in the NuSTAR Cycle 11 and National Radio Astronomy Observatory 25A opportunities through our joint programs will begin soon. NICER time is also available through similar joint GO programs with the Swift, TESS, and IXPE missions.

The NICER near-term observing schedule is always available on NICER's website at the HEASARC. NICER's agility enables observations of a large number of ToOs—which may be proposed through the NICER Target of Opportunity/Discretionary Time Request form—including coordination with many other telescopes. Visibility windows for a given target are complicated by occultation from structures (such as the large solar arrays) on the ISS; an online Enhanced Visibility Calculator provides accurate start-stop visible times for any specified target coordinates within a 14-day horizon. Additional capabili-

ties for responsiveness to transients include automated grid searches of localization uncertainty regions for new sources, such as those detected by JAXA's Monitor of All-sky X-ray Image (MAXI, also an ISS payload). In partnership with JAXA, the NICER team operates the Orbiting High-energy Monitor Alert Network (OHMAN): software running on an ISS laptop that implements automated triggering between MAXI and NICER. Through OHMAN, NICER can respond to MAXI-detected transients on timescales, in the best cases, of a few minutes. A newly developed capability, currently in testing, will extend the OHMAN infrastructure to enable automated rapid-response NICER observations triggered by ground-based alerts from a variety of sources, including potentially GCN.

The NICER Users Group (NUG) continues to provide the mission with expert input on data-analysis capabilities, calibration, and other user support functions. The NUG meets, independently of NICER mission leadership, in the spring and fall of each year. The community is encouraged to communicate with the NUG; contact information, the NUG Charter, and meeting details are provided at the website above. Expressions of interest to serve on the NUG are also welcome.

Recent NICER science highlights include:

- The discovery (Hernández-García) and characterization (Chakraborty et al. 2025) of quasi-periodic eruptions (QPEs) from a galaxy believed to have recently "reawakened" accretion onto the supermassive black hole at its core. Named "Ansky," the new QPE system is the most energetic yet discovered, with the longest recurrence time and longest duration eruptions. Separately, the recent discovery of QPEs in a second confirmed tidal-disruption event also hints strongly at a connection to extreme coronal-line emitters (Chakraborty et al. 2025). High-cadence (every 90 minutes) soft X-ray monitoring with NICER is a game-changing capability for the new field of QPE science, with likely implications for the highly anticipated "extreme mass-ratio inspiral" class of gravitational-wave sources detectable by LISA.
- Spectral-timing studies of the "changing look," soft excess, and rapid variability phenomena associated with AGN (e.g., Lawther et al. 2025, Partington et al. 2024, Partington et al. 2025). With spectroscopic monitoring on day timescales, NICER serves as a partner—most notably with Swift for UV coverage—in multi-wavelength campaigns that offer insights through cross-correlation and reverberation mapping analyses to discern the arrangements and roles of coronae, disks, and other accretion structures around supermassive black holes.
- A target-of-opportunity request received by NICER on February 11, to follow up on INTEGRAL's detection of a likely outburst onset from the known accreting millisecond pulsar IGR J17511−3057, yielded an Astronomer's Telegram (confirming detection of pulsations, Ng et al. 2025) 5 hrs and 42 min later, beating NICER's previous record of 6 hrs 13 min from notification to publication. NICER's responsiveness to the sky and to the community is the foundation of the important role the mission plays in time-domain astronomy.

Neil Gehrels Swift Observatory

S. Bradley Cenko (NASA/GSFC)

The Neil Gehrels *Swift* Observatory continues to operate exceptionally well. The mission supports five Target-of-Opportunity (ToO) requests per day from the community, in addition to observing gamma-ray bursts (GRBs) and Guest Investigator (GI) targets. Swift is by far the most active mission in terms of number of ToOs accepted and different sources observed.

In March, Swifties around the world celebrated the satellite's 20th launch anniversary with a conference in Florence, Italy. The conference began with historical talks on the how the mission came together, and some of the key personnel involved (Neil Gehrels, Guido Chincarini). Topics covered included the full breadth of Swift science, including GRBs, supernovae, AGN, tidal disruption events, and Galactic transients. A full program listing, as well a conference photo, can be found here.

On April 1, 2025, Cycle 21 GI observations began. 51 proposals from the community were recommended for implementation – a full listing is available here.

Swift participated in the 2025 Senior Review of Operating Missions. We are eagerly awaiting the results from this review.

NuSTAR

Daniel Stern (JPL), Hannah Earnshaw (Caltech), & Karl Forster (Caltech)

The NuSTAR project received a record-breaking 208 proposals for the Cycle-11 solicitation, 77 of which were for target-of-opportunity (ToO) observations. The overall oversubscription rate remains healthy at 3.6:1, and despite increasing the time allocated to ToO observations from 1 Ms to 1.5 Ms for this cycle, ToO observations were oversubscribed by over 5:1. The Los Angeles fires caused a delay of three weeks in the peer review process, but the project is on track for Cycle-11 observations to begin in June as scheduled, thanks to the hard work of the GOF and time allocation committees. The list of approved targets was released on May 6.

At the 245th meeting of the American Astronomical Society, multiple press releases featured NuSTAR science,

including a release on the NuSTAR Local AGN $N_{\rm H}$ Distribution Survey (NuLANDS; Boorman et al. 2025). This study combined archival infrared data taken using IRAS, used to identify AGN independent of their obscuration, with NuSTAR data, used to measure the column density $N_{\rm H}$ of the obscuring material. In this way, the authors found a Compton-thick AGN fraction of $35 \pm 9\%$ in the nearby Universe, in line with other recent estimates that consider biases against highly-obscured AGN, as well as theoretical predictions of a high fraction of Compton-thick AGNs. This study formed the basis of a public outreach video on hunting for hidden supermassive black holes with NuSTAR, presented by lead author Peter Boorman.

A graphic illustrating the obscuration of an AGN caused by a dusty torus, with an inset showing a screen capture from Dr. Peter Boorman in the NASA video "Using X-Ray Eyes to Find Hidden Black Holes — NASA's NuSTAR Mission" (Credit: NASA/JPL-Caltech; P. Boorman).

In other calibration news, recent updates to the temperature model have led to slight improvements in the fortnightly NuSTAR clock correction file release. These updates are expected to improve the reliability of the clock file for very recent observations, although the fit will likely further improve using subsequent clock file released more than two weeks after an observation.

Finally, we encourage users to subscribe to the NuSTAR users list by sending an email with "subscribe" in the subject to nustargo-join@lists.nasa.gov. Note that if you change institutions, you should sign up again with your new address.

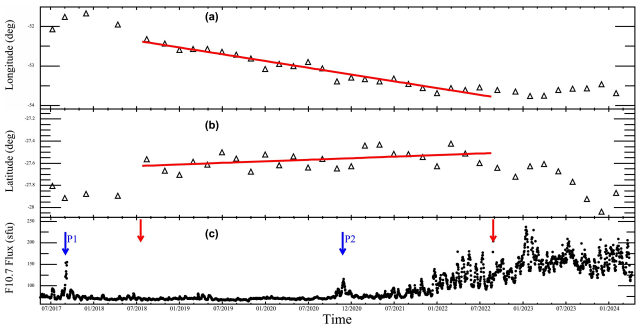
Insight-HXMT

SHIJIE ZHENG & SHUANG-NAN ZHANG (IHEP, CAS)

Insight-Hard X-ray Modulation Telescope (*Insight*-HXMT) continued observations of black holes, neutron stars in 1–250 keV and GRBs in 80–2000 keV. Data out of proprietary period can be downloaded freely from the *Insight*-HXMT official website. The *Insight*-HXMT Data Analysis Software (HXMTDAS) and the CALDB have been regularly updated and the latest versions are V2.06 and V2.07, respectively. More information about the progress, user support and results of *Insight*-HXMT can be found here (in English and Chinese).

Some new important results have been published recently with *Insight*-HXMT data. These include a broadband X-ray spectral and timing properties of the accreting millisecond X-ray pulsar IGR J17498-2921 (Li et al, A&A, 2024), revised spin for the black hole in GRS 1716-249 (Zhao et al, A&A, 2024), and correlated spectro-polarimetric study along the Z track in XTE J1701–462 (Yu, et al, A&A, 2025). In addition, we have investigate the drift of the South Atlantic Anomaly using particle monitors onboard *Insight*-HXMT (Zhao, et al, JHEAp, 2024). All of these data have been made publicly available (located here), and we encourage in-depth investigations with these data. Please visit *Insight*-HXMT's publication list for more details.

AO-07 of *Insight*-HXMT will be finished on August 31, 2025, and the cycle-8 guest observation program is open completely to the whole international scientific community; the call for proposals will be closed on June 15, 2025. Please see the AO-08 white book of *Insight*-HXMT for more information on the program. Until March 31st, a total of 22 non-ToO observations, 18 ToO observations, and the Galactic plane scan of ≈1.9 Ms have been performed. In addition, many joint observations have been carried out with EP. See the long-term and short-term plans, and list of observed sources for more information.



The evolution of identified longitude and latitude values of the SAA position from 2017 June to 2024 March. (Credit: Zhao et al. 2024, JHEAp)

GECAM

CE CAI (HEBTU), SHENG-LUN XIE, JIA-CONG LIU, SHAO-LIN XIONG, SHI-JIE ZHENG (IHEP, CAS)

Recently, there are some major updates on the operation of GECAM series missions. While GECAM-B have been operating as before, GECAM-A has recovered its second solar panel in April, 2025, after more than four years of in-flight operation. With the recovered energy supply, GECAM-A could observe for about 20 hours per day. After initial check of the data, GECAM-A works as expected. The GECAM team has been working on detector performance optimization and calibration.

On the other hand, GECAM-C (i.e. SATech-01/HEBS) ceased operation on February 13, 2025 as the satellite reentered the atmosphere. One of the most important discoveries of GECAM-C is the accurate measurement of the ever brightest gamma-ray burst GRB 221009A.

However, GECAM-D (i.e. DRO/GTM) has been operating in the Distant Retrograde Orbit (DRO), which is about 310,000 to 450,000 kilometers from Earth and 70,000 to 100,000 kilometers from the Moon, resulting in very little obstruction by the Earth and Moon. GECAM-D carries 5 gamma-ray detectors, and the detection energy spans from 10 to 1000 keV. Although the observation time is limited, GECAM-D has been triggered by more than 30 gamma-ray bursts and magnetar bursts as well as hundreds of solar flares.

Looking ahead, we anticipate to finally achieve the full-time full-sky coverage, as originally designed, with these gamma-ray monitors of GECAM series missions.

There are also many progress on the research of GECAM mission. The burst catalog of the famous Galactic Magnetar SGR J1935+2154 is published with the GECAM-B and GECAM-C observation data during 2021 and 2022 (Xie et al. 2025, ApJS). There 159 bursts detected by GECAM-B while 97 bursts are detected by GECAM-C, including the X-ray burst associated with a bright radio burst. With this burst sample, we find that the periodicity of burst activity is 134 ± 20 days, confirming our previous finding (Xie et al. 2022, MNRAS).

To improve the detection of gamma-ray transients beyond the limitations of in-flight trigger software, the GECAM team developed a ground search system with advanced algorithms and high-performance computing resources (Cai et al. 2025, SCPMA). This system supports both automatic and manual search modes, allowing efficient and flexible follow-up of faint gamma-ray transients. Based on this system, the team further developed the pipeline called ETJASMIN (Cai et al. 2025, ApJS), a joint analysis pipeline that integrates data from multiple instruments such as GECAM-B, GECAM-C, and Fermi/GBM. Using a coherent search strategy, ETJASMIN significantly enhances the detection and classification of weak bursts, which has been validated through simulations and real observations. We hope these tools would not only extend the capability of GECAM but also facilitate the gamma-ray transients study in the multi-messenger and multi-wavelength astronomy era.

GECAM data out of proprietary period can be downloaded from the here. The GECAM data analysis tool (GECAMTools) and the CALDB have been regularly updated, respectively. More information about GECAM can be found at the GECAM official website (in both English and Chinese).

The Fermi Gamma-ray Space Telescope

ELIZABETH HAYS, ANDREA PRESTWICH, JUDY RACUSIN, DAVE THOMPSON (GSFC), LYNN COMINSKY (SONOMA STATE U.)

The *Fermi* scientific instruments, Gamma-ray Burst Monitor (GBM) and Large Area Telescope (LAT), continue to survey the entire gamma-ray sky. Operations have remained largely routine. Fermi conducted the 3rd collision avoidance maneuver of the mission on February 19, 2025.

For the LIGO/Virgo/KAGRA O4 runs, given the wide fields-of-view of both instruments and their sensitivity to gamma-ray burst counterparts, the instruments have emphasized maintaining high uptime and are alerting the community about possible counterparts. Both the GBM and LAT teams put out GCN Notices and Circulars for gravitational wave counterparts or for constraining upper limits. The LAT team reports automatic follow-ups to alerts here.

Fermi scientists, along with many multiwavelength observers, are preparing for the expected outburst of the T CrB nova.

Researchers using LAT data found for the first time evidence that microquasars containing a low-mass star are efficient particle accelerators, which leads to a significant impact on the interpretation of the abundance of gamma-rays in the universe. The news article with more information can be found here.

A multiwavelength campaign as part of the Event Horizon Telescope's 2018 study of M87 revealed a gamma-ray flare seen by *Fermi* LAT and ground-based gamma-ray observatories.

The 2025 *Fermi* Summer school will be held from May 27 to June 6, 2025.

Fermi software and documentation are available through the Fermi Science Support Center. Fermitools v2.4.0 was released in April. For instructions on how to install the tools, release notes, troubleshooting, error reporting, and other related documentation see the Fermitools Wiki. The latest release of the GBM Data Tools is available on GitHub as a package in the Gamma-ray Data Tools.

Find details about the Guest Investigator program at the Fermi Science Support Center. The Cycle 18 Guest Investigator proposal deadline was March 5, shifted due to California fires. There was a 20 percent increase in the number of proposals received in Cycle 18 relative to Cycle 17. The review was in April and the awards will be announced this summer.

If you have job/research/degree opportunities relevant to the gamma-ray community, the LAT Collaboration has an Opportunity Board where those can be posted.

INTEGRAL

JAN-UWE NESS (ESA-ESAC), STEVEN STURNER (UMBC & NASA/GSFC)

First public release of the INTEGRAL Science Legacy Archive (ISLA): During the 22 years of science operations, the INTEGRAL science data were managed by the Integral Science Data Centre (ISDC) at the Astronomy Department of the University of Geneva, which will continue to assure their access in the forseable future. A mirror to the ISDC archive can be found at the NASA/GSFC HEASARC archive. ISDC has prepared a gallery of high-level data products that are populating the legacy archive at the European Space Agency (ESA) at the ESA Science Data Centre (ESDC). The transfer of all data plus reprocessing is the main activity during the post-operations phase that is scheduled to be finished by the end of 2026. The ISLA also allows scientists to contribute to a Community Portal to promote and make accessible their own science products. There has been great progress with a first public release already announced on 27 March 2025 which can be visited here.
For any questions, the INTEGRAL helpdesk can be contacted at integral.helpdesk@cosmos.esa.int.

Recent INTEGRAL science highlights include:

- **Discovery of r-process element production in Magnetars:** Based on 2004 INTEGRAL observations of the magnetar burst SGR 1806-20, a new model published by Patel et al. (2025, ApJL, 984, L29) has revealed the strong possibility of producing substantial amounts of trans-iron elements via r-process nuclear fusion reactions during an MeV flare delayed by 10 minutes after the prompt gamma-ray spike detected with the SPI/ACS. This result was covered by a NASA press release.

- **Progress on distinguishing jet and coronal emission in black hole binaries:** During the long lifetime of INTEGRAL, extensive monitoring of the Galactic Center and Bulge was performed. Rodi et al. (2025, ApJ, 982, 145) studied two persistent black hole binaries in the Galactic Center region focusing on the temporal and spectral evolution in the 30–610 keV energy range from March 2003 through April 2022. Both sources possess a radio jet with double-lobe detections, showing interactions between the jets and the Interstellar Medium (ISM). The deep INTEGRAL observations have revealed a hard tail (high-energy excess) up to 600 keV which may be originating from either synchrotron emission from the jet or Comptonization in a hybrid thermal/nonthermal plasma in the corona. A possible way to differentiate between the corona and jet interpretations is to investigate the correlations between the hard X-rays and the soft gamma-rays. Rodi et al. found no strong correlation between the hard X-rays (30–50 keV) and the soft gamma-rays (300–600 keV), favoring the jet interpretation over the corona interpretation for the origin of the high-energy excess.

IceCube

ALISA KING-KLEMPERER (UW-MADISON)

Since 2016, the IceCube Neutrino Observatory—a detector buried in a cubic kilometer of Antarctic ice—has been issuing real-time alerts sent to the public within minutes of the detection of astrophysical, ghostlike particles called neutrinos. IceCube's prompt observations are key in the emerging field of multimessenger astronomy where the combined measurements across the electromagnetic spectrum are used to probe the nature of astrophysical phenomena.

Real-time alerts are followed up by different ground- and space-based telescopes that can point in the direction of the neutrino in the sky in order to identify a probable transient source of the neutrino. One such coincident detection of neutrinos and gamma-rays led to the breakthrough discovery of the blazar TXS 0506+056 as a potential astrophysical source of neutrinos in 2018. Now, IceCube has produced a catalog of real-time neutrino events that will help with future multiwavelength follow-up observations.

In a report published in *The Astrophysical Journal Supplement*, the IceCube Collaboration presented the first IceCube Event Catalog of Alert Tracks (ICECAT-1), consisting of 275 neutrino events of likely astrophysical origin from 2011 to 2020.

In 2019, several improvements were introduced to the real-time alert program, including increased signal purity and an expanded alert selection. Namely, two new alert categories for signal purity were introduced, called "gold" and "bronze" alerts, for neutrino events that leave a "track" signature in the detector. The gold events are, on average, more likely to be astrophysical in origin than bronze events. The new event selection thereby increased the total number of real-time alerts sent per year while also reducing the number of events with poor reconstruction.

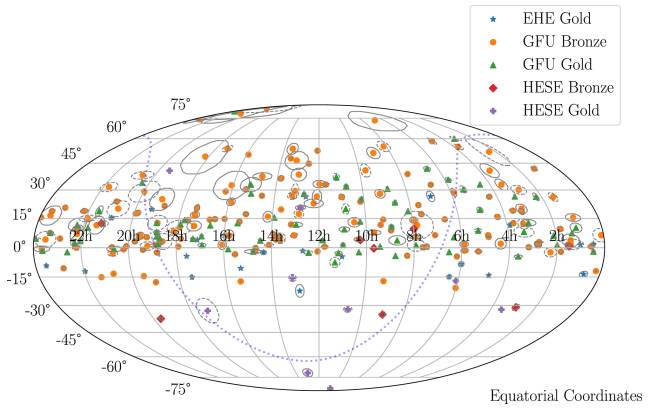
"To compile this catalog, we applied the same stringent criteria that we have been applying in real time since 2019 to all our archival data going back to 2011," says Mehr Un Nisa, a postdoctoral researcher at Michigan State University. "We then obtained the directions and energies of these events based on our best current understanding of the detector."

ICECAT-1 is also accompanied by an online database of all alert events, allowing the community to access key quantities for each alert and visualize its most likely position in the sky. Both ICECAT-1 and the database are now

publicly available and will be updated periodically in the future.

"The sources of the astrophysical neutrinos observed by IceCube is still an open question," says Erik Blaufuss, a research scientist at the University of Maryland. "By sharing these alerts with the community, both for our historical catalog and future alerts, we can search for correlations in signals across multiple wavelengths and messengers."

An upcoming data release detailing improved reconstruction of IceCube's historical alerts is currently in progress.



The all-sky distribution of the alerts in the catalog in equatorial coordinates. The blue stars denote extremely high energy gold alerts, the orange circles show gamma-ray follow-up (GFU) bronze, the green triangles show GFU gold, the red diamonds show high-energy starting event (HESE) bronze, and the purple plus signs show HESE gold alerts. The 90% uncertainty contours at the location of each alert are shown by the dashed ellipses. (Image credit: IceCube Collaboration)

VERITAS

WYSTAN BENBOW (SAO)

The VERITAS collaboration strives to recognize early-career scientists for outstanding work. During the past semester, Dr. Ruo-Yu Shang (Columbia University) and Dr. Tobias Kleiner (DESY) received the 2024 Trevor Weekes (post-doctoral) and Simon Swordy (graduate student) Outstanding VERITAS Contribution Awards, respectively. Both winners were recognized for a variety of service tasks performed for the collaboration that are summarized on the Collaboration website.

The aforementioned VERITAS awards were presented at the semi-annual VERITAS collaboration meeting held in Tucson, AZ in January 2025. Approximately 60 scientists attended this face-to-face meeting (a hybrid-format event), hosted by the Project Office near the observatory. This well-attended conference included more than 50 oral presentations, a poster session, lightning talks, hands-on small-group working sessions, and a joint CTAO workshop. During the meeting Amy Furniss (University of California, Santa Cruz) and Manel Errando (Washington University) were re-elected as VERITAS Spokesperson and Deputy Spokesperson, respectively, and each will serve another two-year term.

As of May 2025, VERITAS has completed ≈80% of its eighteenth season of full-scale operations. This season's observing yields are the strongest since 2017-18. This is partly because the hardware systems continue to perform very well, and is also partly due to a La Nina event which caused warm, dry conditions in AZ. The continued success of VERITAS operations enables a suite of Galactic and extragalactic gamma-ray studies, pathfinding intensity interferometry studies, and significant multi-messenger collaboration. One highlight of these recent observations is the VERITAS detection of a flare from the most distant VHE (very high energy; E>100 GeV) emitter known, OP 313 (see ATel #16993); these observations were triggered by Fermi-LAT. Another notable result is the VERITAS detection of enhanced VHE emission from the blazar 1ES 1727+502 (see ATel #17099); these observations were triggered by the LHAASO gamma-ray all-sky monitor.

Observatory operations are currently funded through Summer 2025, and the Project Office is working to secure the necessary financial support to extend VERITAS site operations.

Since Fall 2024, the VERITAS Collaboration has published four journal articles. The first article describes a multi-wavelength study of a flare of the radio galaxy M 87 during the second Event Horizon Telescope (EHT) observing campaign (arXiv:2404.17623). The second manuscript reports an in-depth study of gamma-rays from the starburst galaxy M 82 with VERITAS (arXiv:2501.09998). The third article provides VERITAS limits and NuSTAR, Swift, and Fermi-LAT observations of the blazar B3 2247+381 taken in response to an IceCube neutrino alert (arXiv:2502.03853). The fourth manuscript details constraints on the emission from the supernova remnant W 44 leveraging new XMM-Newton and VERITAS observations (arXiv:2503.09778).

HEASARC

L.ANGELINI (NASA/GSFC) AND A. PTAK (NASA/GSFC)

HEASARC has a new web design that embraces many of the principle of the NASA web modernization aimed to be user-friendly, accessible, and performant. The new design adapts seamlessly the viewport resizing to fit properly on desktop or phone or tablet platform, the navigation uses the *hamburger* menu approach to facilitate navigation on different platforms and consolidates the front page tab categories. This new look has been placed online in April 2025 and currently includes to top two layers of the HEASARC webpages. These changes will be grad-

ually applied to all the website together with reorganization of the material. Your feedback is welcome.

HEASARC continues to sustain data ingest of CALET, Chandra, FERMI, INTEGRAL, IXPE, MAXI, NICER, NuSTAR, Swift, XRISM operating missions. INTEGRAL ended the science operation end of February 2025 and there is plan for reprocessing data for the entire mission in the upcoming year that HEASARC will ingest when completed. BurstCube calibration data has been released in CALDB on February 26, 2025, and the science data are in the process to be delivered to archive.

HEASARC released on March 14, 2025 the HEASoft package version 6.35 and a patch on March 27, 2025 version 6.35.1. The release includes a new suite of software tools to analyze the event data from CALET soon to be included in the archive, the XRISM package version 2 with updates and new tools, several updates of the IXPE software as well as changes/fixes/upgrades for the NICER, NuSTAR, MAXI, RXTE, Swift mission packages and multi-mission packages. An additional software patch 6.35.2 is planned for early June.

Starting with HEASoft version 6.35, HEASoft and XSPEC are also distributed as conda packages. The packages are available from a custom channel hosted by the HEASARC and are built from the same source code available via the HEASoft standard download webpage. Installation guide and suggestions to how install HEASoft using conda are available from the HEASARC website. This distribution is experimental and feedback is welcome. The next main HEASoft release is planned for summer 2025.

Last, the search for the HEASARC director position has been halted due to the current government hiring freeze.

Cherenkov Telescope Array Observatory (CTAO)

DAVID WILLIAMS (UCSC) AND ALBA FERNÁNDEZ-BARRAL (CTAO)

On January 7, 2025, the European Commission established the Cherenkov Telescope Array Observatory (CTAO) as a European Research Infrastructure Consortium (ERIC), furthering its mission to become the world's largest and most powerful observatory for gamma-ray astrophysics.

Established with the international support of more than 10 countries and one intergovernmental organisation, the ERIC status provides the CTAO with the legal stability and administrative advantages it needs to be sustainable in its worldwide operations and impact. Negotiations have begun for the United States to become a contributing party to the CTAO ERIC. The ERIC not only provides the Central Organisation with a formal framework to accept and operate the current telescope prototypes, but it also allows for the immediate start of construction for the full array of more than 60 telescopes across both telescope sites in Spain and Chile. On the CTAO-North site, where the Large-Sized Telescope prototype (LST-1) is under commissioning, three additional LSTs and one Medium-Sized Telescope (MST) are expected to be built in the next 1-2 years. Meanwhile, on the CTAO-South site, the first five Small-Sized Telescopes (SSTs) and two MSTs are expected to be delivered by early 2026. Thus, with the aid of the ERIC, the Observatory is expected to be able to operate intermediate array configurations as early as 2026. These sub-sets of the final arrays will already be more sensitive than any existing instrument, bringing the Observatory's early science within reach.

Named in honor of Prof. Werner Hofmann, a founding figure of the Observatory, the CTAO Central Organisation launched the Werner Hofmann Scientific Award in May to recognize PhD fellows for significant contributions to very high-energy gamma-ray astrophysics. The nomination period for the Fall 2025 Award will be announced soon on the dedicated webpage.

Following the successful transition to its final legal entity, the CTAO ERIC participated in the ERIC Forum Annual Meeting in January, where CTAO ERIC Director General, Stuart McMuldroch, signed the Memorandum of Understanding (MoU) to make the CTAO the Forum's newest member. Additionally, on February 12, 2025, the CTAO ERIC Council was formally established during its inaugural meeting in Bologna, Italy. As the Observatory's governing body, the Council brings together delegates from all governing parties that form the CTAO ERIC to oversee strategy and decision-making in pursuit of CTAO's mission and objectives.

Delegates from the CTAO ERIC Council in the inaugural meeting. (Credit: CTAO)

Moreover, the CTAO Central Organisation has continued the rigorous recruitment campaign it launched last year, resulting in a significant increase in new hires and career opportunities across the organisation. In the first quarter of 2025, the Observatory has already welcomed 10 new team members, onboarding, on average, three to four people each month. The expertise of the professionals hired span many of the technical and operational demands needed to make the CTAO a reality: computing, IT, project coordination, science, system engineering, and

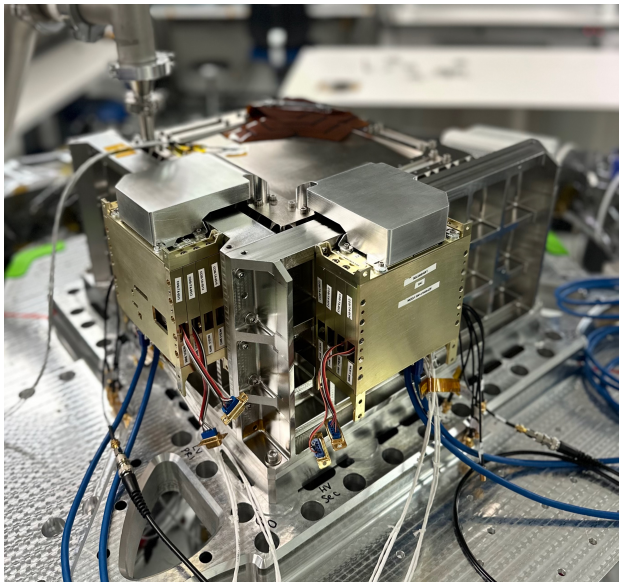
telescope construction and operations. The new recruits, with nationalities from Bangladesh, Germany, Hungary, India, Italy, Spain, Sweden, UK and USA, reflect the Observatory's international reach.

Finally, on November 17, 2024, the Executive Board of the International Virtual Observatory Alliance (IVOA) announced the founding of the High Energy Interest Group or HEIG during the IVOA Interoperability Meeting in Malta. The creation of this group is the result of an effort between multiple instruments and observatories, including the CTAO, to address current and future needs of high- and very high-energy astrophysics within IVOA.

COSI: The Compton Spectrometer and Imager

JOHN TOMSICK AND ANDREAS ZOGLAUER (UC BERKELEY/SPACE SCIENCES LABORATORY)

COSI is a NASA Small Explorer gamma-ray mission planned for launch into low-Earth orbit on a Falcon 9 in 2027. It covers the 0.2–5 MeV energy band with high spectral resolution along with wide-field imaging. These capabilities allow for advances in studies of the electron-positron annihilation line at 511 keV and nuclear lines across the Galaxy. In addition, COSI measures the polarization of gamma-rays from accreting black holes and will provide rapid reports of gamma-ray burst positions for time domain and multimessenger (TDAMM) science.



COSI engineering model cryostat. (Image credit: J. Tomsick)

The COSI team has built an engineering model of the instrument, consisting of a cryostat with a combination of 16 germanium and dummy detectors, two shield walls, and operational read out electronics (see figure above). The current status is that COSI completed Mission Critical Design Review in December 2024, and the project is now moving into the flight build phase. Also, the third public data challenge (DC3, DOI 10.5281/zenodo.15126188) was released on April 2, 2025, and the HEAD community is invited to participate.

NewAthena

KRISTIN MADSEN & ANDY PTAK (NASA/GSFC)

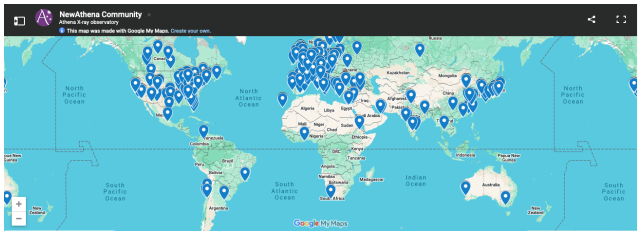
NewAthena, formerly known as Athena, is an ESA L-class mission selected for study in 2014 for the Cosmic Vision Program. After its redefinition phase in 2022-2023, the project is on track moving towards the ESA Mission Adoption Review (MAR) in 2027 and launch in 2037. Currently NewAthena is completing its Intermediate Review (IR). The IR will evaluate all subcomponents of the mission and is a critical gateway to ensure that everything is on track going toward the MAR.

The NewAthena mission consists of two main instruments: the Wide-Field Imager (WFI) and the X-ray Integral Field Unit (X-IFU). The WFI will simultaneously provide imaging over a wide field (40x40 arcmin) with time-resolved photon counting and moderate-resolution spectroscopy. The WFI sensor is a DEPFET (depleted p-channel field effect transistor) with a pixel size of 2.2 arcsec and an energy resolution of $\leq$170 eV at 7 keV. The X-IFU is an X-ray calorimeter that combines high spectral resolution with high-quality imaging. It has an approximate field of view of 4 arcmin, a pixel size of 5 arcsec, and an energy resolution at 7 keV of $\leq$4 eV. A mirror with a diameter of 2.3 m that is populated by Silicon Pore Optic (SPO) modules and capable of achieving more than 1 m^2 of effective area at 1 keV focuses at 12 meters onto one of the two instruments at a time. The mirror shifts between the two focal planes by a hexapod upon which it is mounted. The spatial resolution goal is 9" (HPD) with mirror technology development continuing.

The NewAthena Science Study Team (NASST; list of members) is tasked with confirming that the current instrument design meets these scientific requirements. It is also the responsibility of the NASST to compile the 'Red Book', which is the document that describes the science case to the ESA Science Program Committee during the MAR. The Athena Community Office (ACO) issued a call to the community on behalf of the NASST for members of the NewAthena Science Community (NASC), listing several Science Working Groups themes. Over 1000 people responded to the call (see figure for the geographic distribution) and SWG chairs have been selected by the NASST. The NASST will be issuing a call for a community-contributed special A&A issue to lay the foundations for the Red Book.

NASA is contributing the X-IFU sensor and readout and, since the redefinition, the cryocooler for X-IFU. For the WFI, NASA is contributing background analysis work and design consultation for the WFI ASIC. NASA is also

providing a vibration isolation system (VIS) for launch, and a demonstration model of the VIS was successfully tested at ESTEC. All NASA NewAthena contributions have been proceeding well and on schedule. The NASA NewAthena project science team is participating in planning for the NewAthena science ground segment (SGS), where NASA plans to compete an NASA NewAthena partner science center in the early 2030s. More information on the US contribution can be seen here.



Map showing the distribution of NewAthena Science Community (NASC) members. (Credit: AXO)

You can keep up-to-date with NewAthena via the NewAthena community website, or through the X handle @AthenaXobs and via Facebook. To find out more about the science enabled by the instruments and the technology, explore the NewAthena Science Nuggets and Tech Nuggets.

LIGO-Virgo-KAGRA Collaboration

S. Fairhurst (Cardiff University)

The two LIGO detectors, LIGO Hanford and LIGO Livingston, and the Virgo detector continue to participate in the fourth observing run (O4). The third part of the observing run (O4c) began on 28 January 2025. During April and May 2025, the detectors have been offline as upgrades to various systems have been performed. The observing run will continue on 4th June 2025 and is currently scheduled to run until 7 October 2025.

The two LIGO detectors have operated with a sensitivity of 140–180 Mpc in terms of binary-neutron-star range. The Virgo detector has operated with a sensitivity of up to 30-60 Mpc. In O4c, up to the commissioning break in April, the detector network had 40% triple coincidence observing time (with all three detectors observing) and 75% up-time with two or more detectors observing. The KAGRA team is continuing noise hunting and cooling the main mirrors. They expect to rejoin the observing run before the end of O4 with a target sensitivity of ≈10 Mpc.

As of April 2025, the LIGO-Virgo-KAGRA Collaboration (LVK) has identified over 200 gravitational wave candidate events during the fourth observing run with low latency searches, including 17 significant candidates during O4c. As offline analyses are completed with improved understanding of detector performance and noise background, the list of candidates is expected to change and their estimated source properties may also shift.

Although there are not yet any un-retracted binary neutron star event candidates during O4, the collaboration continues to run early-warning gravitational wave searches for binary neutron star mergers capable of issuing alerts ahead of merger times.

More information about public alerts, including instructions for subscribing to alert notifications, can be found in the LIGO-Virgo-KAGRA public alerts user guide. If you would like to keep track of the status of the observatories during the observing run, you can visit the Gravitational Wave Open Science Center's detector status page.

The LVK has recently published improved upper limits on gravitational-wave emission from known pulsars using data from the first part of the fourth observing run (O4a). This complements previous publications of a binary merger containing a component in the lower mass gap (3–5 $M_\odot$) and constraints on gravitational-wave emission from a nearby supernova, SN 2023ixf.

The data from O4a will be made public in late August 2025. The catalog of observed gravitational wave signals with binary black hole and/or neutron star progenitors will be published. In conjunction with the data release, papers describing results of searches for transient and continuous gravitational-wave signals, as well as a stochastic background, from astrophysical or cosmological origin, will be released.

The Collaboration's observing plans are also available. The LVK is reviewing the timetable for an expected O5 run at improved sensitivity.

Laser Interferometer Space Antenna

James Ira Thorpe (NASA/GSFC, for the LISA Science Team)

The *LISA* mission is now firmly engaged in its implementation phase. ESA completed its invitation to tender process for a spacecraft prime contractor with a recommendation by ESA's Industrial Policy Committee in December 2024. Contract negotiations with the selected vendor were concluded over the Spring and the contract will be formally signed in early Summer. This will mark the formal start of ESA's B2 phase. To support the contract negotiations, ESA hosted a series of "co-engineering" meetings in which engineers from the selected prime and ESA's hardware-providing partners could work together to iron out any remaining inconsistencies in the relevant requirements and interfaces. These interactions were very fruitful and should smooth the transition into the development of flight hardware.

The NASA LISA Project held it's first agency milestone review, a combined System Definition Review / System

Requirements Review (SDR/SRR), in January of 2025. In combining these reviews, NASA recognized the maturity of the LISA concept and architecture that was developed over the 7-year study phase. The project recieved a number of actions and advisories from the Standing Review Board and as of May 2025, have successfully responded to each of them. This clears the way for NASA to hold a Key Decision Point B (KDP-B) review in Summer of 2025 that will formally advance the NASA project into Phase B.

The ESA, NASA, and ESA Member State hardware teams are now shifting their focus towards preparing for flight production, with the next major milestone reviews being Preliminary Design Reviews (PDRs). The launch readiness date for LISA remains on target for 2035.

The LISA ground segment, which is also being implemented as a partnership between ESA, ESA Member States, and NASA, is also making progress. The goal of this combined team is the system which will convert LISA telemetry to a series of scientific data products suitable for conducting the full range of LISA science investigations. A major activity for 2025-2026 will be a coordinated analysis campaign using simulated low-level data to produce each of the successive layers of data products expected in the full mission. This campaign will allow all of the involved groups to develop and test prototype analysis codes against a common set of assumptions informed by the current best estimates of mission performance and a fairly simple, but diverse, model of the astrophysical environment.

On the science side, the joint ESA/NASA LISA Science Team (LST) has been working since its establishment in Summer of 2024. The LST will provide guidance to ESA and NASA on topics such as LISA's science capabilities in the context of the broader astrophysics landscape, detailed content of the data releases, and plans for community participation in LISA science under the terms of the LISA Science Management Plan. The LST holds monthly full-group meetings, ad-hoc working group meetings, and has held two face-to-face meetings - one at ESTEC and one at GSFC (shown below).

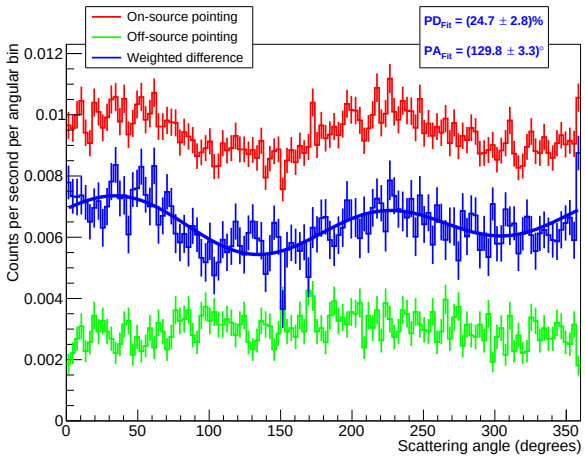
(A portion of) the LISA Science Team during a face-to-face meeting at NASA/GSFC in April 2025. (Image Credit: NASA/Dennis Henry)

The LISA Consortium is undergoing a reorganization to accommodate the needs of the flight project and the broader scientific community. Applications for the new consortium opened in Spring 2025. Further information, including how to apply, can be found on the LISA Consortium Website.

XL-Calibur

M. Kiss (KTH), E. Gau (WashU), S. Chun (WashU), K. Hu (WashU), H. Kuramoto (Osaka), L. Lisalda (WashU), N. Rodriguez Cavero (WashU), S. Spooner (UNH), H. Awaki (Ehime), S. Heatwole (WFF), M. Ishida (ISAS), F. Kislat (UNH), H. Krawczynski (WashU), J. Lanzi (WFF), Y. Maeda (ISAS), H. Matsumoto (Osaka), T. Okajima (Goddard), M. Pearce (KTH), H. Takahashi (Hiroshima), E. Wulff (NRL) on behalf of the *XL-Calibur* team

XL-Calibur is a balloon-borne experiment measuring the flux, polarization and energy spectra of astrophysical sources in the hard X-ray range (∼15-80 keV). The experiment uses a 12 m focal length optical bench pointed by the Wallops Arc Second Pointer, the spare hard X-ray mirror of the Hitomi mission, a scattering polarimeter with Cadmium Zinc Telluride (CZT) detectors, and a fully active anti-coincidence shield. The experiment flew on a ∼5.7-day flight from Esrange, Sweden to Canada in July 2024. The science team has now published the first results from this flight (Awaki et al. 2025, MNRAS, 540L, 34A).

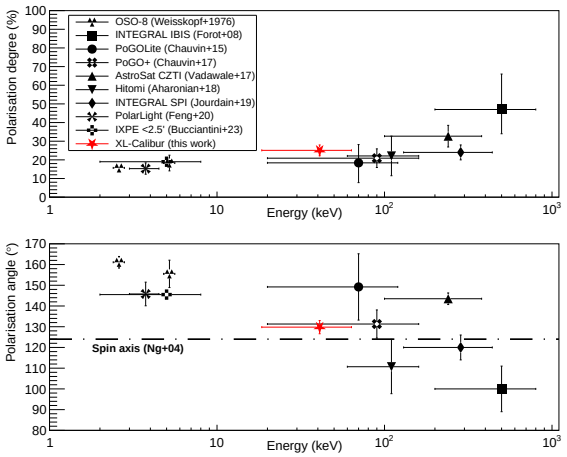


Azimuthal scattering-angle distributions of the XL-Calibur Crab observation, on-source (red), off-source (green), and background subtracted (blue). The sinusoidal modulation of the signal created by the polarization can clearly be seen. (Credit: Awaki et al. 2025)

Two sources were observed: the Crab system (pulsar and nebula) and Cygnus X-1 (X-ray binary system). Between ∼19-64 keV, X-rays from the Crab were found to be polarized with a Polarization Degree (PD) of (25.1± 2.9)%, at an electric field Polarization Angle (PA) of 129°.8±3°.2 east of north. The polarization was detected

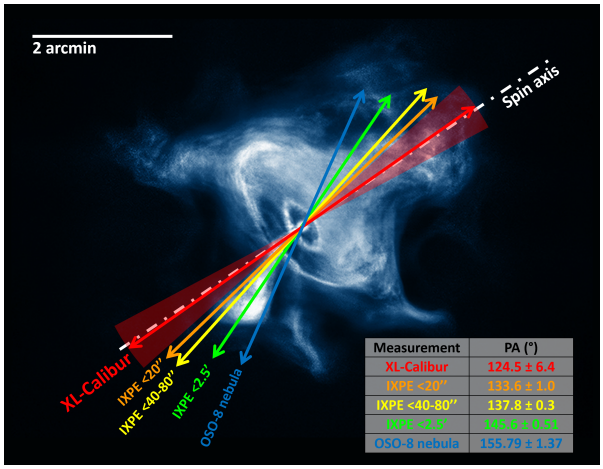
with $> 8.5\sigma$ significance.

In the off-pulse (nebula-dominated) phase range, the PD is measured with a statistical significance of 4.5σ. The ∼19–64 keV PA of the nebular emission aligns with that measured by IXPE in the 2–8 keV band for the toroidal inner region of the pulsar wind nebula, where the hard X-rays predominantly originate. Detailed modeling of the Chandra, NuSTAR, IXPE, and XL-Calibur results can be used to constrain the acceleration, transport, and radiative cooling of the particles in the pulsar wind nebula.



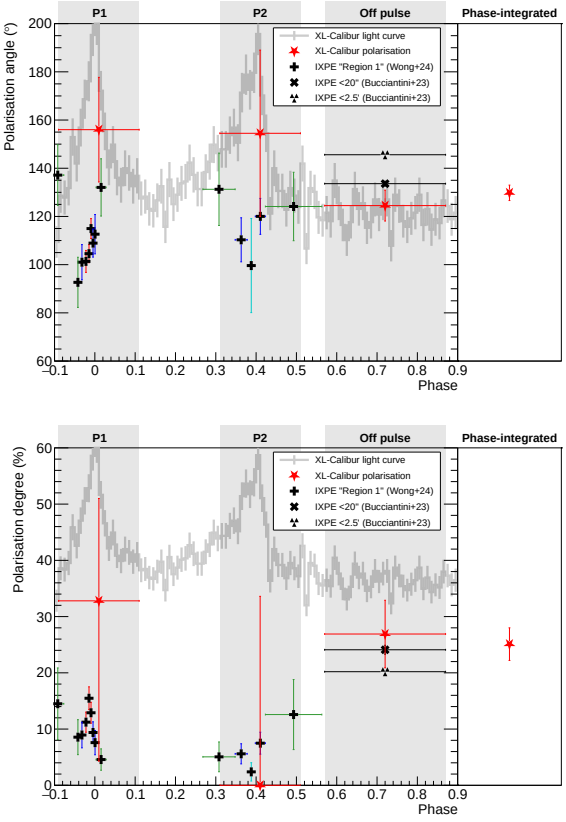
Compilation of X-ray polarization measurements of the Crab nebula and pulsar from soft X-rays to soft γ-rays. (Credit: Awaki et al. 2025)

For the main pulsar peak ("P1"), the polarization is constrained to a PD of $(32.8^{+18.2}_{-28.5})$% and a PA of $156°.0 \pm 21°.7$. For the second peak (inter-pulse, "P2"), the PD and PA are constrained to lie within the ranges of $(0.0^{+33.6}_{-0.0})$% and $154°.5 \pm 34°.5$, respectively, where uncertainties correspond to the 1σ confidence interval. A low level of polarization in the pulsar peaks disfavors emission originating from the inner regions of the pulsar magnetosphere.



Overlay of the IXPE (2–8 keV), OSO-8 (2.6 keV and 5.2 keV combined), and XL-Calibur (∼19–64 keV) polarization angle results atop the Chandra image of the Crab. (Credit: Awaki et al. 2025)

The science team is currently finalizing a second paper about the hard X-ray polarization of the stellar mass black hole X-ray binary Cyg X-1. Furthermore, the team anticipates making the data available through the HEASARC archive in the next couple of months.



Overlay of phase-resolved IXPE (black markers) and XL-Calibur (red markers) polarization results atop the phase-resolved XL-Calibur light curve. (Credit: Awaki et al. 2025)

The science team is now preparing a second Long Duration Balloon flight to be launched from McMurdo (Antarctica) at the end of 2026, 2027, or 2028, depending on the next available launch opportunity.

Physics of the COSMOS

FRANCESCA CIVANO, BRIAN HUMENSKY, BERNARD KELLY (NASA, GSFC)

NASA's Physics of the Cosmos (PhysCOS) is one of three thematic programs that encompass NASA Astrophysics, and seeks to answer the enduring question "How does our Universe work?". The PhysCOS Program Office, along with our counterparts in Cosmic Origins (COR) and Exoplanet Exploration (ExEP), will continue to engage with NASA HQ to implement Astro2020's broad vision of the next decade in astronomy.

The PhysCOS Program Analysis Group (PhysPAG) includes everyone interested in the PhysCOS program

via seven Science Interest Groups (SIGs); this probably means you! Many of the SIGs have activities ramping up, including the Cosmic Ray and Neutrino, Gamma Ray, Gravitational Wave, X-ray, Inflation Probe, Cosmic Structure, and TDAMM SIGs – please see their articles in this newsletter for details. The PhysPAG provides a way for the PhysCOS community to regularly engage with the Program Office. We have 12 members in the PhysPAG Executive Committee (EC). The EC provides insight and leadership, steering the PhysCOS community in support of NASA's mission. The EC organizes meetings, collects and summarizes community inputs, and reports to the NASA Astrophysics Division Director. We thank the members of the EC that rotated off at the end of 2024 – Eric Burns, Justin Finke, and Kristin Madsen – for their commitment and inputs provided. In addition, we welcome new co-chairs of the PhysPAG SIGs: Tsuguo Aramaki [CRN], Johannes U. Lange [CoS], Cori Fletcher [GR], Sylvain Guiriec [GR], Abigail T. Crites [IP], Christos Panagiotou [TDAMM], Fabio Pacucci [XR], Breanna Binder [XR], and Steven Ehlert [XR].

The Habitable World Observatory (HWO) Science Interest Group is currently being established as a cross-PAG SIG to work with the community at large and the HWO Technology Maturation Program Office to develop analyses to be carried out by Science Analysis Groups. A call for leadership for PhysCOS representing scientists has been issued and interested community members should fill in this form.

PhysCOS was active at several conferences during the winter and spring of 2025 including the 245th meeting of the American Astronomical Society (AAS) in National Harbor (MD) on January 12-16, 2025, and the American Physical Society's (APS) Global Physics Summit in Anaheim (CA) on March 16-21, 2025.

At AAS, PhysCOS scientists and PhysPAG EC members ran a table as part of the NASA Science Directorate booth throughout the meeting, as well as hosting a session on January 12, featuring a range of talks on PhysCOS-related science and activities, including Athena and LISA, as well as PhysCOS science with the Habitable Worlds Observatory (HWO). PhysCOS also participated in a Joint PAG session on January 12, and facilitated a splinter session for the FIG SAG (see below) on January 15. A full listing of our AAS activities can be found on our dedicated meeting webpage, including slides for all talks and a recording of the FIG SAG session.

At APS, PhysCOS scientists ran a table in the "Particles and Fields" meeting center, and participated in the Biological and Physical Sciences (BPS) booth, answering questions about the LISA mission. Slides from our PhysCOS Mini-Symposium, featuring news from FIG SAG, PUEO, LISA, and IXPE, can be found on its dedicated meeting webpage.

PhysCOS has also been working on ways to involve early-career scientists and provide them with insights about the fascinating work done in the Physics of the Cosmos Program, including exposing them to missions, opportunities, funding, and available tools for research. The culmination of this was the First Early Career Workshop, which was held virtually on November 19-21, 2024, with more than 120 attendees connected daily. We look forward to planning a new workshop in late 2025.

PhysCOS activity at the NASA SMD booth during AAS Winter Meeting. (Credit: NASA)

There are two PhysCOS Science Analysis Groups (SAGs) currently active and working on their findings: the cross-PAG New Great Observatories (focusing on the science case for simultaneous operations of the future Great Observatories) and Future Innovations in Gamma Rays (FIG) (focusing on identifying future science drivers, necessary capabilities, and priorities for the future of gamma-ray astronomy).

The PhysCOS program office is supporting the Astrophysics Cross-Observatory Science Support (ACROSS) pilot initiative, which will provide software infrastructure, communication channels, and a help desk to improve coordination between NASA missions (and eventually other ground- and space-based observatories) for responsiveness to time domain and multimessenger science observations. As part of this work, ACROSS is organizing the Fourth Time-Domain And Multi-Messenger Astrophysics (TDAMM) Workshop, to be held in Huntsville (AL) on October 27-30, 2025 on the theme of Advancing Community Observing Plans for Rapid Follow-Up of Explosive Transients. A first release of the ACROSS web portal and

API is targeted for the same time frame.

The PhysCOS program office is always eager to hear how we can assist the community in developing and carrying out your science. Feel free to reach out to the Chief Scientists by email, ask us about PhysCOS, and look for us at upcoming meetings.

We encourage anyone interested in PhysCOS science to join our email list, where we regularly highlight items of interest to the PhysCOS community, including workshop announcements and funding or employment/internship opportunities.

Time-Domain and Multimessenger Astronomy Science Interest Group

BRAD CENKO (NASA/GSFC), BRIAN GREFENSTETTE (CALTECH), REBEKAH HOUNSELL (UMBC/NASA GSFC), CHRISTOS PANAGIOTOU (MIT)

The Time-Domain And MultiMessenger (TDAMM) Science Interest Group (SIG) is a partnership across the NASA Astrophysics programs, being led by Physics of the Cosmos with involvement from Cosmic Origins and Exoplanet Exploration. The goals of the SIG include making the community aware of NASA missions and initiatives of relevance, and soliciting input from the community back to NASA for scientific, technical, or programmatic priorities in the TDAMM umbrella.

In our second year we presented the findings of the 3rd TDAMM Workshop at the winter AAS 245. During this AAS JointPAG session we had additional talks by John Tomsick (UC Berkley) and Brian Grefenstette (Caltech) on the Compton Spectrometer and Imager (COSI) and The Ultraviolet Explorer (UVEX).

The next TDAMM Workshop will be held October 27th-30th 2025 in Huntsville, Alabama on the topic of advancing community-driven observation plans for rapid follow-up of explosive transients. The workshop is being organized by NASA's new Astrophysics Cross-Observatory Science Support (ACROSS) initiative, with more information found at this website.

To learn more about the TDAMM SIG and be notified about upcoming talks please visit our webpage and get involved!

The Gravitational Wave Science Interest Group

ALESSANDRA CORSI (TTU) & CHIARA MINGARELLI (UCONN/YALE)

The Gravitational Wave Science Interest Group (GW SIG), co-chaired by Alessandra Corsi and Chiara Mingarelli, serves as the primary interface between the gravitational wave community and NASA's Physics of the Cosmos (PhyCOS) program. GW SIG promotes coordination across the full frequency spectrum of gravitational wave observations—from pulsar timing arrays to ground- and space-based detectors—and facilitates strategic planning and community input to maximize the scientific return of current and future missions.

As part of its ongoing efforts to engage the community and refine science priorities, GW SIG is launching a series of one-hour virtual discussion sessions focused on LISA. These meetings will feature short presentations followed by open Q&A. The goal is to gather input from the broader US gravitational wave community on key topics related to LISA's science, data products, and future funding opportunities. The times of the calls will be announced shortly, please visit the GW SIG website for connection information.

- **May 29, 2025** — LISA Project Update and the Role of the LISA Science Team (LST)
- **June 26, 2025** — The LISA Consortium: Vision Going Forward and How to Get Involved
- **July 24, 2025** — LISA Data and Alerts: What Should the Community Expect and What Do We Need?
- **August 21, 2025** — LISA Science Funding Opportunities for the US Community: From the LISA Preparatory Science (LPS) Program to Guest Investigator (GI) Programs

All members of the community are encouraged to attend, contribute questions, and contribute to the future of US participation in LISA and space-based gravitational wave science.

People interested in the activities of the GW SIG are also invited to join our mailing list; details can be found on the GW SIG website.

The X-ray Science Interest Group

DAVID POOLEY (TRINITY U., EUREKA SCI.), CHIEN-TING CHEN (USRA, NASA MSFC), BRIAN GREFENSTETTE (CALTECH), BREANNA BINDER (CAL POLY POMONA), STEVEN EHLERT (MSFC), FABIO PACUCCI (CFA)

The X-ray Science Interest Group (XR SIG) provides a platform for discussion between NASA PhysCOS and the X-ray Science community. Please join us in welcoming three new co-chairs of the XR SIG, Breanna Binder, Steven Ehlert, and Fabio Pacucci, who will replace Kristin Madsen as she rotates off and help existing co-chairs as Dave Pooley takes on responsibilities of the PhysPAG EC chair. We sincerely thank Kristin Madsen for all her contributions to XR SIG.

The XR SIG held a section at the PhysCOS special session during the 245th AAS meeting, with a presentation from the SuperHERO balloon mission by Nicholas Thomas, and a vibrant discussion on the future of X-ray astronomy and how to encourage early career scientists to break into the field in both astrophysical and instrumental science. The community also discussed briefly on the future of X-ray astronomy with inputs from NASA HQ for a potential flagship-class mission concept study for the 2030 Decadal Survey.

In anticipation of the next astrophysics decadal survey, the XR SIG leadership has been working on forming three Science Analysis Groups (SAGs) for the next X-ray Flagship concept study, which will build upon the tremendous foundation of Lynx as well as recent technological and scientific developments. We have envisioned three different SAGs. One SAG will examine the scientific impacts of possible augmentations to the Lynx concept. The other two SAGs will focus on the science achieved by (1) a mission with significantly higher angular resolution and (2) a mission that covers a significantly broader energy band than what would be feasible for a Lynx-like architecture. Please fill out this Google form if you would like to be involved with any or all of the SAG activities. More details on each SAG can also be found under the google form.

We are also planning a session for the upcoming HEAD meeting, as well as additional online seminars or workshops to facilitate fruitful discussions at the HEAD meeting. Please keep an eye out for further announcements from the XR SIG shortly on our mailing list (see below for how to join).

The XR SIG recently sent out a community engagement survey to ensure we reach a broad and diverse community. We encourage the broader high-energy community to participate in this survey. We also encourage the entire X-ray community to join the XR SIG mailing list to be informed of the progress of the Science Analysis Group and of future opportunities to present at XR SIG sessions at AAS or HEAD meetings. To subscribe, please send an email to XRSAG-join@lists.nasa.gov with "Join" as the subject line of the email.

The Gamma-ray Science Interest Group

MANEL ERRANDO (WASHU AT ST. LOUIS), CORI FLETCHER (MSFC/USRA), SYLVAIN GUIRIEC (GWU), AND JEREMY S. PERKINS (GSFC)

The Gamma-ray Science Interest Group (GR SIG) engages with the gamma-ray astrophysics community and provides a forum for discussions within and external to this community. We welcomed two new members to the leadership team this quarter!

- Cori Fletcher is a Scientist with USRA located at NASA MSFC working with the Fermi-GBM Team studying GRBs.
- Sylvain Guriec is a professor at George Washington University working in high-energy Astrophysics like Gamma-Ray Bursts, and Relativistic Jets.

The Future Innovations in Gamma-ray Science Study Analysis Group (FIG SAG) focuses on identifying future science drivers, necessary capabilities, and priorities for the future of gamma-ray astronomy. This group, led by co-chairs Chris Fryer, Michelle Hui, Paolo Coppi, Milena Crnogorčević, Tiffany Lewis, Marcos Santander, and Zorawar Wadiasingh held a splinter session (ID# 189) at the 245th AAS meeting which was well attended and prompted lively discussion. The FIG SAG report is being drafted right now and a pre-release is planned for October, 2025. The GR SIG organizes monthly webinars highlighting the exciting science that can be done in the gamma-ray regime and providing updates on missions and technology development. If you are interested in the GRSIG, please consider subscribing to the GRSIG mailing list. The SIG will continue organizing events at different national and international meetings and invites members of the gamma-ray community to contact the current chairs (Manel Errando, Cori Fletcher, Sylvain Guiriec and Jeremy Perkins) with any inquiries or feedback regarding the GRSIG program.

The Cosmic Ray and Neutrino Science Interest Group

ATHINA MELI (NC A&T STATE U.) & STEPHANIE WISSEL (PENNSYLVANIA STATE U.)

The Cosmic-Ray and Neutrino Science Interest Group (CR NSIG) aims to act as a forum to discuss the current status of cosmic-ray and high-energy neutrino science and to provide input for NASA regarding future goals for the field.

As such, the CRN SIG encourages members of the cosmic-ray and neutrino astrophysics community to provide comments, questions and updates, or express an interest to give a presentation, based on their present work and future plans for cosmic ray or neutrino related research, relevant to NASA's mission. In recent times, we have updated the name of the SIG to reflect increased interest in searches for neutrinos with NASA missions.

The CRN SIG hosted two webinars recently, one in January on the topic of UHECRs and Neutrinos and another one in April on Indirect Searches for Dark Matter with Antimatter. The recordings of the webinars can be found online at the NASA PhysCOS CRSIG website. Future events for the SIG are also available there. A mini-symposium on CRNSIG and GRSIG is being organized at the upcoming ICRC in Geneva, Switzerland.

The co-chairs (Athina Meli, Stephanie Wissel, and Tsuguo Aramaki) invite the members of the CR and neutrino community to contact them directly via email at ameli@ncat.edu, wissel@psu.edu, and t.aramaki@northeastern.edu with any inquiries or feedback regarding the NASA cosmic-ray and neutrino program.

People interested in the activities of the CRN SIG are also invited to join our mailing list, available in the NASA PhysCOS website.

HEAPoetry Corner

CURATED BY ADI FOORD (UMBC)

Stars (Excerpt)

....
And all the lonelier stars that have their place,
Calm lamps within the distant southern sky,
And planet-dust upon the edge of space,
Look down upon the fretful world, and I
Look up to outer vastness unafraid
And see the stars which sang when earth was made.
....

— Marjorie Pickthall