
DISCOVERY
AWAITS
CHANDRA SCIENCE
COMING IN 2026
PRODUCED BY THE CHANDRA X-RAY CENTER
Image: X-ray: NASA/CXC/SAO; NASA/JPL/Caltech/NuSTAR; Optical: NASA/STScI/HST; IR: NASA/STScI/JWST, NASA/JPL/CalTech/SST; Image Proc: NASA/CXC/SAO/J. Schmidt, N. Wolk, and K. Arcand

The **Chandra X-ray Observatory launched on July 23, 1999**. In the intervening **twenty-six years**, Chandra has revealed many secrets of the Universe, ranging from

- the nature of dark matter
- to the nurseries of stars
- to powerful particle jets
- to the glows of our Solar system's planets
- to powerful supernovae and their remnants
- to black holes at the dawn of time.

On **December 19, 2024**, the Chandra X-ray Center released a Call for Proposals, soliciting targets and programs for **Cycle 27 Science**.

The worldwide community responded over the next ninety days, submitting **299 proposals.** These proposals were reviewed by **233 distributed reviewers**, **13 target of opportunity panel reviewers**, and an **11-member big project panel**.

Their recommendations led to a final program consisting of...

200 unique scientific targets,

99 unique principal investigators,

619 unique co-investigators,

29 Target of Opportunity proposals,

9 Large and Very Large programs, and

40 Joint programs.

There is still so much more to discover.

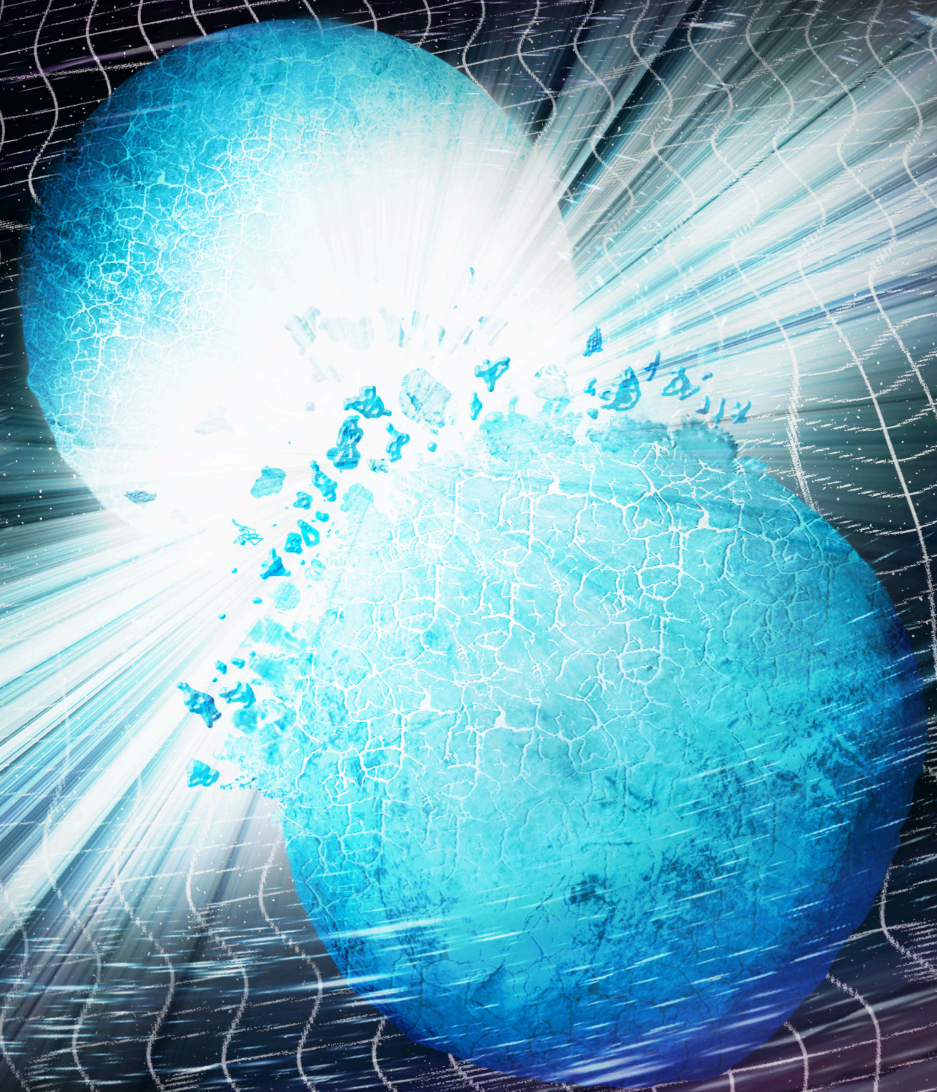
A selection of the awaiting discoveries follows.

Photo NASA

Transients

Supernovae | Gamma-ray Bursts | Novae | Outbursts | Flares

As the Universe changes, Chandra remains ready to observe—capturing new supernovae, tidal disruption events, and gamma ray bursts; localizing exotic new sources discovered by all-sky surveys; and tracking the short- and long-term evolution of stellar and X-ray binaries, supernova remnants, and black holes. With the approved Target of Opportunity program, Chandra will pursue a broad range of exciting transient science that the Universe may unveil in 2026.



Community Discovery Program: Panchromatic CXO/VLA/HST Observations of a NS Merger

Gravitational Wave X-ray Consortium, including Northwestern University, UC Berkeley, McGill University, & INAF/OA - Brera - Merate

In August 2017, the simultaneous detection of gravitational waves and gamma rays from GRB170817, along with the subsequent detection of an EM counterpart, opened a new frontier in the study of compact objects and nucleosynthesis. Yet for the Chandra observations of that source, the real highlight came over the following hundred days, as the X-ray source slowly brightened. The interpretation of that event—a decaying relativistic jet becoming less impacted by relativistic beaming—has revolutionized our understanding of gamma-ray bursts. The late-time afterglow from GW170817 remains detectable only in deep Chandra observations, yet it continues to reshape our understanding of jet dynamics.

Over the past decade, the infrastructure of gravitational wave detection has dramatically improved, with the combined LIGO/Virgo/KAGRA facilities currently engaged in the O4 observing run. Through this program, Chandra is prepared to follow up on O4 detections, utilizing the Very Large Array and the Hubble Space Telescope to characterize the diversity of emissions from neutron star mergers, model and constrain the physical parameters of associated jets, and enable further breakthrough science in the study of mass-gap or neutron star–black hole mergers.

Chandra Grating Observations of the Next Outburst of the Naked-Eye Recurrent Nova T Corona Borealis

Tekeba Olbemo, Washington University in St. Louis

T Corona Borealis is a binary star system and a recurrent nova, going into outburst every ~80 years, with the past two occurrences in 1866 and 1946. Both outbursts caused the 10th magnitude star to become naked-eye visible, and the next such eruption is predicted to occur in 2026. Triggered observations with Chandra's High Energy Transmission Grating will probe both the white dwarf and the shocked ejecta, from early emissions through to the later super-soft source phase of this once-in-most-lifetimes astrophysical event.

Light Echoes from X-ray Transients as Probes of Interstellar Dust and Galactic Structure

Sebastian Heinz, University of Wisconsin-Madison

Bright flares from X-ray transients illuminate their surroundings, which are then seen as light echoes. If 2026 brings a suitable target, Chandra is primed to follow the evolution of the echoes, enabling a panoply of results, including parsec-scale accurate mapping of interstellar dust, the characterization of the composition and dust grain size distribution of that dust, the velocity dispersion of nearby molecular clouds, and an independent distance measurement of the X-ray transient.

Additional Highlights

Following a Black Hole X-Ray Transient into Quiescence
Richard Plotkin, University of Nevada, Reno

Crustal Cooling in Accretion-Heated Neutron Stars
Edward Cackett, Wayne State University

High Energy Gratings Spectroscopy of Novae
Kirill Sokolovsky, University of Illinois Urbana-Champaign

Awakening the Beast: How are X-ray Binary Outbursts Triggered?
David Russell, New York University Abu Dhabi

A Hunt for X-ray Emission from New Long Period Transients Discovered by ASKAP/VAST
David Kaplan, University of Wisconsin-Milwaukee

Probing the First Gamma-ray Bursts with Chandra
Tanmoy Laskar, University of Utah

X-Ray Characterization of Extreme Optical Transients in Dwarf Galaxies
Jean Somalwar, California Institute of Technology

Even More to Discover

Not every transient phenomenon and new discovery can be predicted in advance. For that reason, five hundred thousand seconds are available in reserve as Director's Discretionary Time, available to observe any unexpected target and expand the limits of discovery in 2026.

Illustration Credit: NASA/CXC/SAO/M. Weiss;

(Exo)planets

Disintegrating Planets | Protoplanetary Disks | Jupiter

From planets in our own solar system to distant planets around other stars, its remarkable spatial resolution and sensitivity allow Chandra to peer into planet-star interactions in an unprecedented fashion. This cycle's proposals aim to address the impact of stellar activity on potentially habitable planets in other star systems while also taking a deep look at the brilliant X-ray emitting aurora our own familiar giant planet, Jupiter.

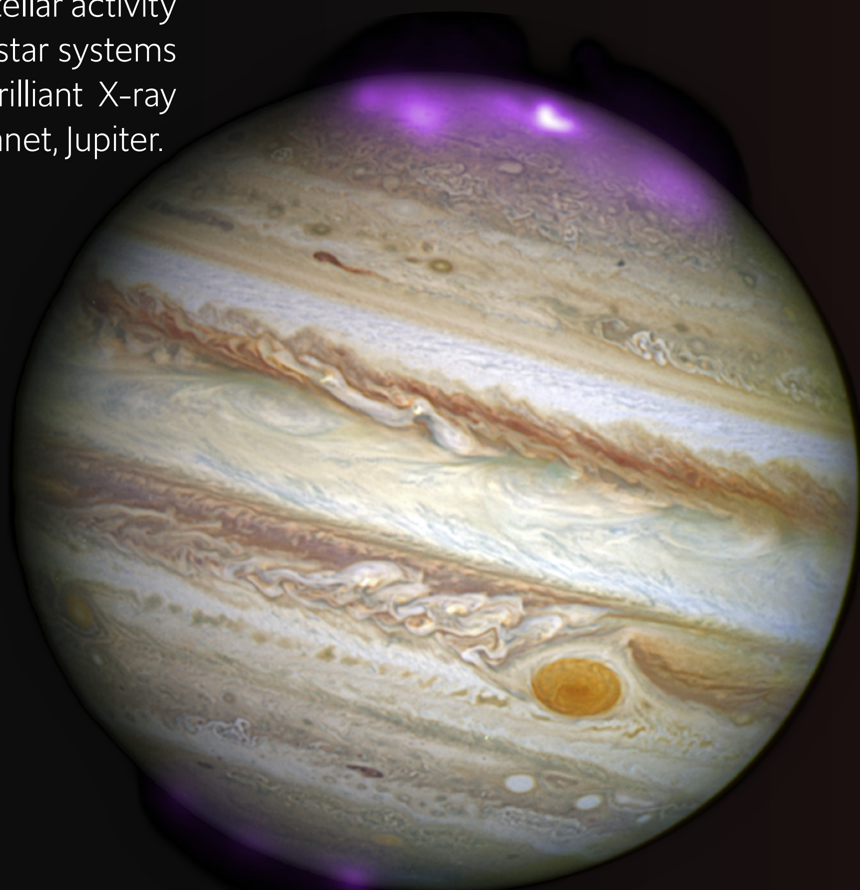


Image Credit: X-ray: NASA/CXC/UCL/W.Dunn et al; Optical: NASA/STScI

A Long Term Study of Low Energy X-Rays and Charge Exchange Processes in Jupiter's Aurorae

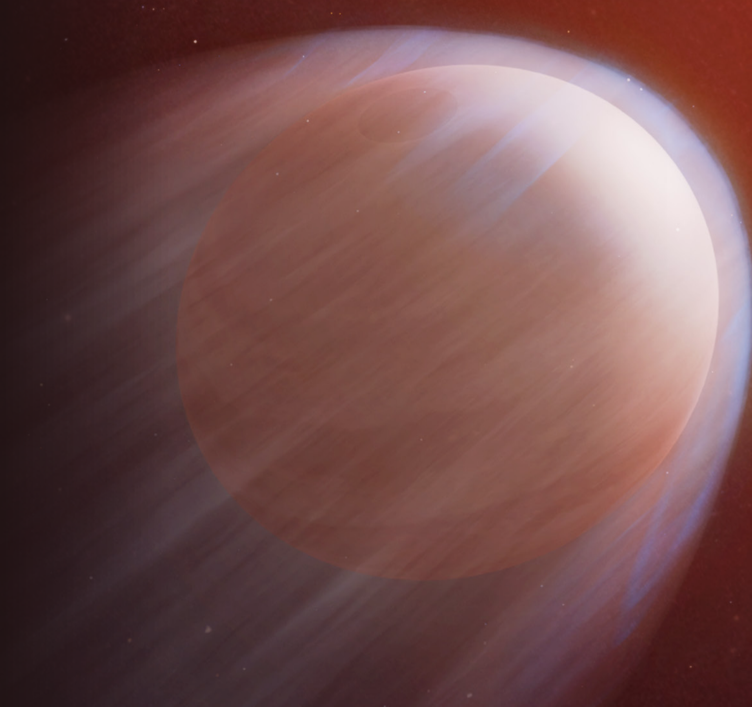
Bryn Parry, University College London

Jupiter, like Earth, has polar aurorae previously observed by Chandra. However, there are still open questions: What is the ion species composition powering these features? What process is producing the aurorae? Is Jupiter's magnetosphere open or closed to the solar wind? This one million second observation using Chandra's Low Energy Transmission Grating will answer these questions and more about the Solar System's most massive planet.

Revealing the Origins of a Disintegrating Exoplanet

Saul Rappaport, Massachusetts Institute of Technology

Since the launch of Chandra in 1999, the number of known exoplanets has exploded from ~30 to ~6000. Yet only four exoplanets are known to be disintegrating, and the mechanism for producing such a planet is still uncertain. This year, Chandra will observe the host K star of the brightest of these planets, TIC 466376085b; measurements of the X-ray luminosity will discriminate between scenarios in which the sub-Mercury-sized planet is the remnant of a gas giant stripped to its core or simply a small, rocky body that migrated too far inward.



Additional Highlights

Resolving the GL 783 Binary, a Potential Habitable Worlds Observatory Target
Breanna Binder, Cal Poly Pomona

How Large Stellar Flares Influence the Chemistry of Protoplanetary Disks
Konstantin Getman, Pennsylvania State University

The High-Energy Environment of a Unique Exoplanet-Disk-Hosting Young Star
Attila Varga, Rochester Institute of Technology

Illustration Credit: NASA/CXC/SAO/M. Weiss;

Stars

Active Stars | Colliding Winds | Mass Loss | Magnetic Activity

The early stage of a star's life is often bright in X-rays as the star's magnetic field is at its strongest and leads to hot corona emission, like that seen from our Sun. Meanwhile, stars that are many times more massive than our Sun, and live relatively shorter lives, launch powerful stellar winds that form X-ray emitting shocks and bubbles. Amongst this year's Chandra program are studies of coronal emission from stars to better understand physical processes and evolution of stellar activity and a study to leverage Chandra's spatial resolution to identify a mysterious cosmic accelerator.

Unveiling a Powerful High-Energy Accelerator in the Heart of the Vulpecula OB Association

Wenjuan Zhong, Deutsches Elektronen-Synchrotron

Vulpecula OB1 is a stellar nursery with almost 100 OB stars and over 800 young stellar objects. Vul OB1 also hosts an extended gamma-ray source, which is detected up to 100 TeV and which has structures seen in infrared observations including pillars and a bubble. Leveraging Chandra's excellent angular resolution, this program will disentangle the various components of the region to determine the origins of the high-energy accelerator and to search for traces of previous events that formed the complex structures seen in infrared.

Characterizing Stellar Magnetic Activity from JWST Observed Protostars in OMC-2/3

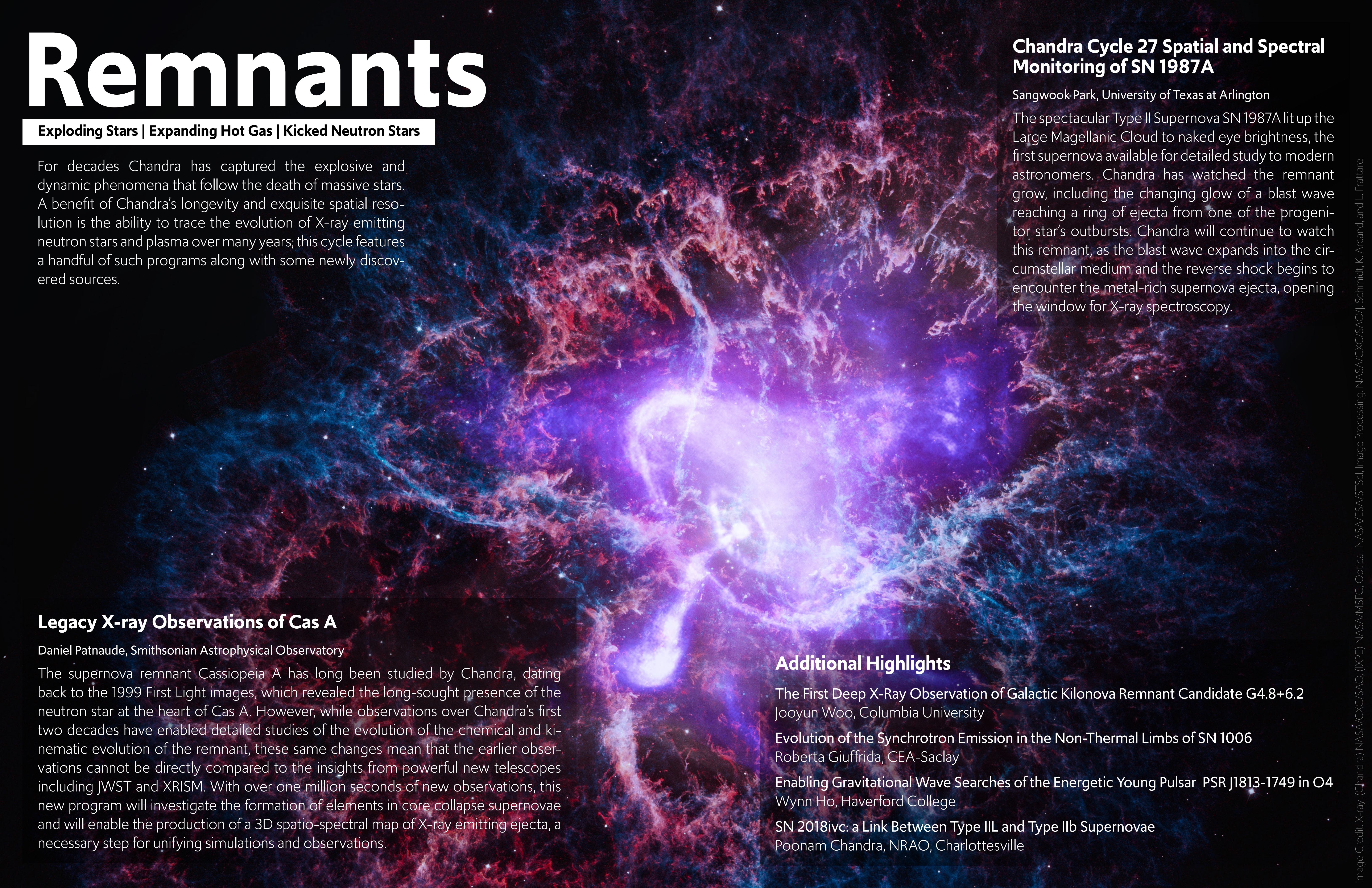
Scott Wolk, Smithsonian Astrophysical Observatory

In the protostellar environment, magnetic fields can affect rates of accretion and outflow, thereby acting as a regulator of a star's initial mass. Targeted JWST observations of two of the Orion Molecular Clouds will measure outflow positions, accretion rates, and ice compositions with sub-arcsecond resolution. With this program, targeted Chandra observations will identify new protostars in these fields, detect and measure flaring activity, and confirm and characterize already known sources, with the final aims of revealing how magnetic fields evolve over the protostellar phase and to observe outflow shocks in X-rays.

Additional Highlights

Completing the Hyades High-Energy Main Sequence
Thomas Ayres, University of Colorado Boulder

Mapping the Most Extreme Mass-Loss Events from Massive Stars with Chandra+NuSTAR
Raffaella Margutti, University of California, Berkeley



Remnants

Exploding Stars | Expanding Hot Gas | Kicked Neutron Stars

For decades Chandra has captured the explosive and dynamic phenomena that follow the death of massive stars. A benefit of Chandra's longevity and exquisite spatial resolution is the ability to trace the evolution of X-ray emitting neutron stars and plasma over many years; this cycle features a handful of such programs along with some newly discovered sources.

Chandra Cycle 27 Spatial and Spectral Monitoring of SN 1987A

Sangwook Park, University of Texas at Arlington

The spectacular Type II Supernova SN 1987A lit up the Large Magellanic Cloud to naked eye brightness, the first supernova available for detailed study to modern astronomers. Chandra has watched the remnant grow, including the changing glow of a blast wave reaching a ring of ejecta from one of the progenitor star's outbursts. Chandra will continue to watch this remnant, as the blast wave expands into the circumstellar medium and the reverse shock begins to encounter the metal-rich supernova ejecta, opening the window for X-ray spectroscopy.

Legacy X-ray Observations of Cas A

Daniel Patnaude, Smithsonian Astrophysical Observatory

The supernova remnant Cassiopeia A has long been studied by Chandra, dating back to the 1999 First Light images, which revealed the long-sought presence of the neutron star at the heart of Cas A. However, while observations over Chandra's first two decades have enabled detailed studies of the evolution of the chemical and kinematic evolution of the remnant, these same changes mean that the earlier observations cannot be directly compared to the insights from powerful new telescopes including JWST and XRISM. With over one million seconds of new observations, this new program will investigate the formation of elements in core collapse supernovae and will enable the production of a 3D spatio-spectral map of X-ray emitting ejecta, a necessary step for unifying simulations and observations.

Additional Highlights

The First Deep X-Ray Observation of Galactic Kilonova Remnant Candidate G4.8+6.2
Jooyun Woo, Columbia University

Evolution of the Synchrotron Emission in the Non-Thermal Limbs of SN 1006
Roberta Giuffrida, CEA-Saclay

Enabling Gravitational Wave Searches of the Energetic Young Pulsar PSR J1813-1749 in O4
Wynn Ho, Haverford College

SN 2018ivc: a Link Between Type IIL and Type IIb Supernovae
Poonam Chandra, NRAO, Charlottesville

Image Credit: X-ray: (Chandra) NASA/CXC/SAO, (IXPE) NASA/MSFC; Optical: NASA/ESA/STScI; Image Processing: NASA/CXC/SAO/J. Schmidt, K. Arcand, and L. Frattare

Galaxies

Pulsars | X-ray Binaries | Microquasars | Quiescence

Whether illuminated by X-ray binaries and pulsars scattered throughout their disks or by the glow of hot gas circulating through stages of feedback and infall, galaxies are a common source of X-ray photons. With Chandra's unparalleled angular resolution, scientists have long studied the individual populations of point sources alongside the diffuse structures of galaxies, and 2026 will be no different, with planned observations studying everything from quiescent black holes and accretion disks to Fermi bubbles and globular clusters.

Cosmic Rays from the Fermi Bubble in an External Galaxy

Rui Huang, University of Michigan

In the Milky Way, the Fermi Bubbles are a matched pair of plasma lobes extending multiple kpc from the Galactic core. Nuclear superbubbles such as these are potentially production sites for cosmic rays, and the hard X-ray detection from a bubble from NGC 3079 can be explained in this way, with X-ray emission arising from synchrotron emission from the cosmic ray population producing the radio continuum. With this deep observation, Chandra will probe the origin of this X-ray emission, resolving contamination from stellar sources and AGN, while also measuring the energy budget and pressure balance of the inflated plasma.

X-ray the Einstein Ring of a Strongly Lensed HyLIRG

Q. Daniel Wang, University of Massachusetts Amherst

Hyperluminous infrared galaxies (HyLIRGs) exist at the extremes of galaxy distributions, with infrared luminosities in excess of $10^{13}\ L_{\odot}$. Unlike their less-luminous counterparts, HyLIRGs are only found in the distant universe ($z > 1$), which may relate to their extreme star formation. One of the brightest HyLIRGs seen by the Planck All-Sky Survey is PJ0116 ($z=2.12$), which is lensed into an Einstein ring with diameter 6". Owing to this brightness and to the angular stretching of the galaxy produced by the lensing, deep Chandra observations will enable a spatially-resolved measurement of X-ray sources and the potential presence of a suspected AGN.

Additional Highlights

Are Wake Trails Ubiquitous in WR+BH HMXBs?
Silas Laycock, University of Massachusetts Lowell

The Quiescent Luminosity of the Black Hole MAXI J1820+070
Mark Reynolds, Ohio State University

Is the ULX pulsar NGC-300 ULX-1 Dead or Alive?
André-Nicolas Chené, NOIRLab

AGN

Hyper-Eddington Growth | Jets | High-Redshift | Obscuration

Active Galactic Nuclei (AGN) and the Supermassive Black Holes (SMBHs) that power them have long been a fixture of Chandra science, dating back to the observatory's first focusing observations. AGN and SMBHs remain an exciting topic of study this year, as in 2026 Chandra will map the Epoch of Reionization, reveal the power of relativistic jets, discover new intermediate mass black holes, isolate the signatures of dual AGN, and trace the extremes of accretion.

Investigating the Correlation Between Late-Time X-Rays and Radio Emission in the TDE ASASSN-14ae

Yvette Cendes, University of Oregon

Tidal disruption events (TDEs) are energetic transient phenomena in which a star passing close to an SMBH is tidally ripped apart. Some TDEs have X-ray+Radio flares delayed years after optical emission has faded away. In the case of ASASSN-14ae, a flare started more than five years after optical discovery; this joint Chandra and VLA program will distinguish the origin scenarios for this puzzling emission.

Compton-Thick AGN: The Hunt is On

Indrani Pal, Clemson University

Compton-thick AGN are predicted to make up a sizable fraction of all AGN, but their obscuration makes them difficult to detect. As such, they make up a much smaller portion of the population of known AGN than theory predicts. To reconcile observation and theory, this program will observe ten nearby candidate Compton-thick AGN as part of the creation of a complete volume-limited census of all AGN.

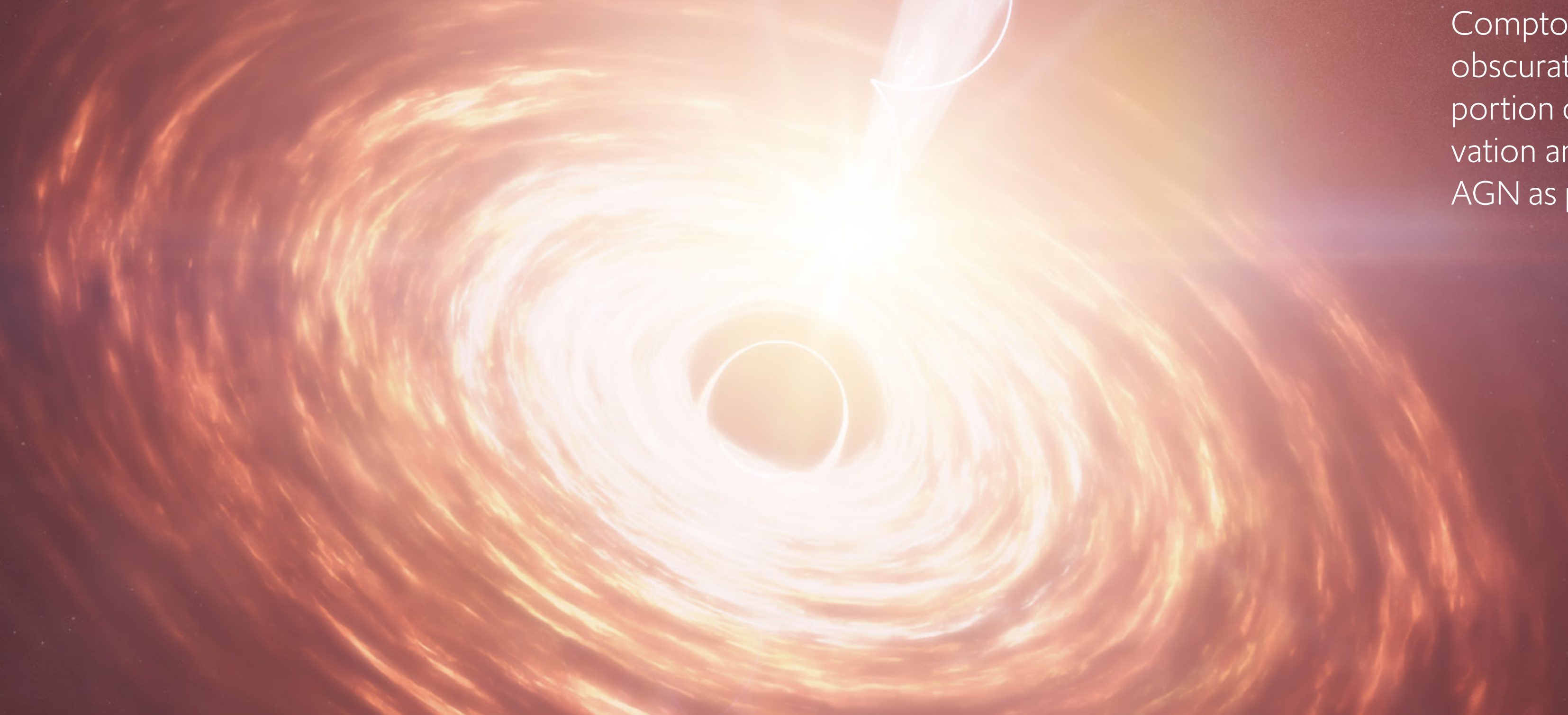


Illustration Credit: NASA/CXC/SAO/M. Weiss

Searching for Dust-Obscured Black Hole Growth in a Spectacular Proto-Cluster in the Early Universe

Anna-Christina Eilers, Massachusetts Institute of Technology

Deep JWST observations have uncovered a spectacular protocluster around a powerful z~6 quasar, J0148+0600. With nearly 50 close companion galaxies discovered with JWST, this field is an ideal location to study the interplay between supermassive black holes in the Epoch of Reionization and their environments—how environment shapes black hole growth and how AGN feedback from powerful quasars affects nearby galaxies—as well as to search for completely dust-obscured AGN in the same environments. Having already been observed by JWST, the field is home to three "little red dots," and the new Chandra data will provide sensitive constraints on their X-ray emission.

Additional Highlights

X-rays from Strongly-Lensed Star-Forming Galaxies at Cosmic Noon
Megan Donahue, Michigan State University

Nano-arcsecond Tomography of the Central Regions of the Quasar in SDSS J0924+0219
David Pooley, Trinity University

Unsolved Mysteries in the 3CR Extragalactic Catalog
Francesco Massaro, University of Turin

Pinpointing the Supermassive Black Hole of the LMC
Jesse Han, Harvard University

Clusters

AGN Feedback | High-Redshift | Groups | BCGs | Cooling

From the dynamics of the hot intracluster medium to the power of central supermassive black holes, X-rays have long been a critical tool for studying clusters and their role in the Cosmic Web. In 2026, Chandra will push forward the frontier by studying distant clusters, mapping extreme brightest cluster galaxies, and tracing cluster feedback across large cosmic scales.

Mapping Nuclear Activity in Massive Large-Scale Structures at z~2.2

Marika Lepore, INAF/OA - Arcetri

The trio of BOSS1244, BOSS1441, and BOSS0210 comprise the most overdense galaxy protocluster known at z>2, with Hα and Lyα emitters discovered over a scale of tens of Mpc. Probing intrinsic luminosities down to $2{\times}10^{43}$ erg/s, this program will measure the enhancement of AGN in protoclusters at this epoch to reveal the growth and evolution of galaxies and SMBHs in dense environments.

Resolving the ICM, AGN, and Star Formation in a z=0.8 Brightest Cluster Galaxy with an Asymmetric and Extended Dust Tail

Allison Noble, Arizona State University

This joint program leverages Chandra, the Hubble Space Telescope, and NRAO's Very Large Array to study a remarkable z=0.81 brightest cluster galaxy. Previous ALMA imaging of SpARCS 0333 revealed an asymmetric dust tail 30 kpc in length; these new observations will reveal the formation mechanisms of this feature, building new understanding of how the complex balance of cooling flows, gas-rich mergers, and AGN feedback shape and grow brightest cluster galaxies.

Additional Highlights

Breaking Up a Cooling Flow: Is ICM Cooling Still Fuelling the AGN in A1668?
Myriam Gitti, Università di Bologna

Multiwavelength Observations of the Highest-Redshift Dynamically Relaxed Galaxy Cluster
Anthony Flores, Stanford University

Image Credit: X-ray: NASA/CXC/Univ. Observ. Munich/T. Preibisch et al.; IR: NASA/ESA/CSA/STScI

Joint Programs

JWST Hubble XMM NOIRLab NRAO Swift NuSTAR

Some challenges require more insights than Chandra alone can provide. The flux monitoring capabilities of Swift guide the triggering of detailed Chandra observations of microlensing events, while NuSTAR's broad bandpass complements Chandra's exquisite angular resolution to study a Galactic Pevatron. Likewise, the joint spectral coverage of VLA and Chandra are needed to confirm a quiescent Galactic black hole, and the paired X-ray and near-infrared imaging of Chandra and Hubble work in tandem to study a possible dual AGN revealed by [Ne V] emission and its host galaxy. For these programs and many others, the synergies of Joint Programs multiply the science that will be achieved in 2026.

A Movie Campaign on M87: Chandra, NuSTAR, Hubble, and the EHT

Joey Neilsen, Villanova University

Chandra Hubble NuSTAR EHT NOIRLab

The jets of M87 were the first astrophysical jets ever discovered, and the M87 black hole was the first scientific release of the Event Horizon Telescope (EHT). Yet, exactly what powers these jets remains unclear. One possibility, that the jet is powered by the spin of the black hole, should manifest through a direct connection between the black hole ring and the jet evolution. Chandra, Hubble, and NuSTAR will work in tandem to produce a movie of the turbulent near-horizon plasma, testing the ring/jet connection and thus the origin of what powers the relativistic jet.

Progenitor Properties of the Magnetar-Hosting SNR Kes 73

Tea Temim, Princeton University

Chandra JWST

Magnetars are a rare class of highly-magnetic neutron stars. The Galactic supernova remnant Kes 73 hosts a magnetar, and past studies have measured ejecta abundances consistent with a low-mass progenitor (<15 $M_{\odot}$), setting constraints on magnetar formation. However, that result may be biased low, owing to emission from the shocked ambient medium. This program will allow JWST and Chandra to fully characterize the ejecta and swept-up circumstellar medium to constrain the mass of the magnetar progenitor.

A Comprehensive Diagnostic of Tau Ceti's Active Outer Layers

Carl Melis, University of California San Diego

Chandra Hubble XMM

Tau Ceti should be an excellent analog for the Sun, being spectrally similar, similarly aged, a single star, and nearby (3.7 pc). Tau Ceti, however, is significantly less active. This program will use Chandra, Hubble, and XMM-Newton to study Tau Ceti's coronal, EUV, and chromospheric emissions to understand the interconnections between layers to determine why the coronal activity shows dramatic variability.

Additional Highlights

Accretion-Induced X-ray Emission from the Closest Candidate Polar — Chandra JWST

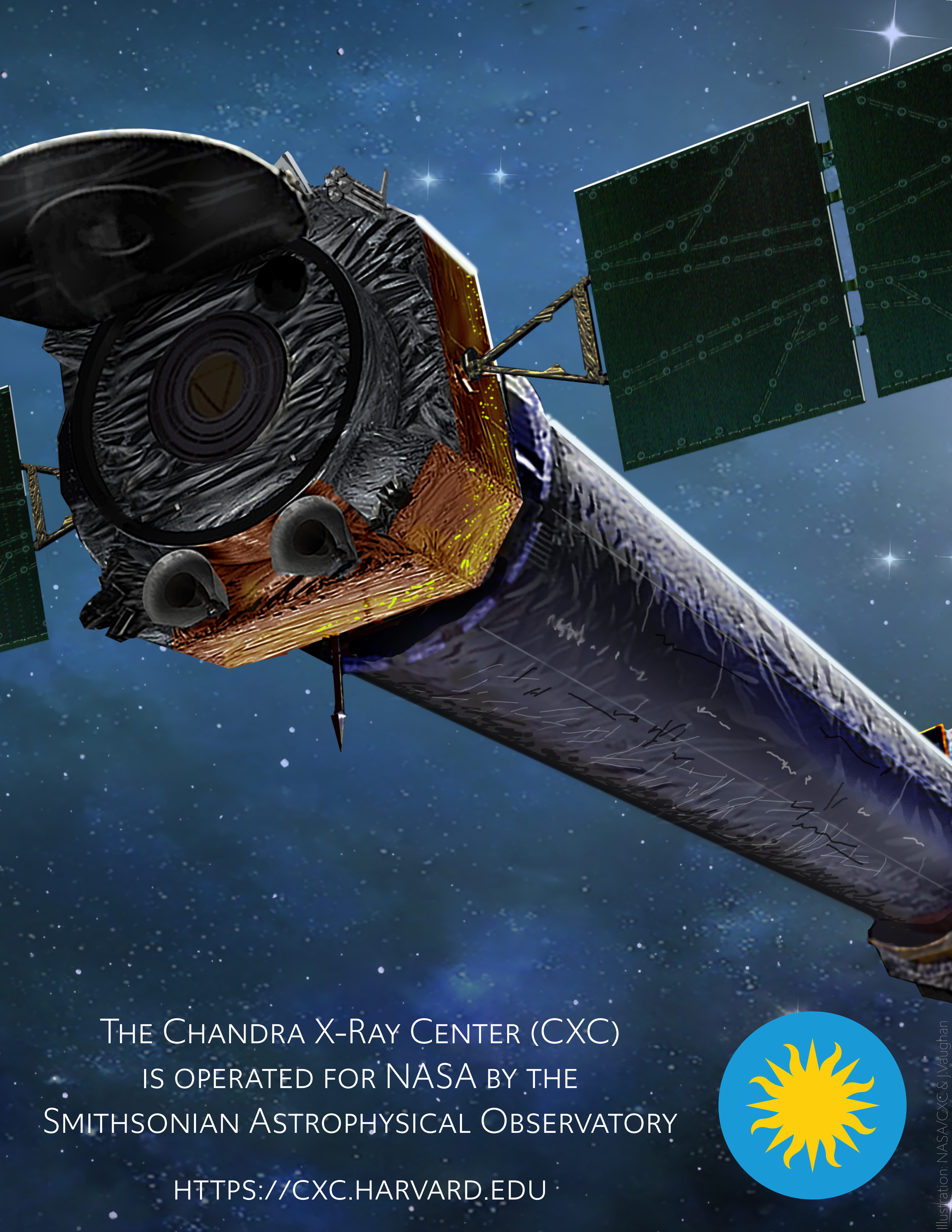
Tim Cunningham, Harvard University

Unveiling the Nature of an Unidentified Galactic PeVatron: 1LHAASO J0343+5254 — Chandra NuSTAR

Kaya Mori, Columbia University

X-Ray Jets in Microquasars — Chandra Swift Hubble NRAO

Stéphane Corbel, CEA-Saclay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