

*Thank you for your support. The open letter was delivered on March 19.
For the next steps in this effort, please visit www.savechandra.org.*

March 14, 2024

To: Dr. Nicola Fox, Associate Administrator for NASA SMD
To: Dr. Mark Clampin, APD Director, NASA SMD
Cc: Dr. Patrick Slane, Director, Chandra X-ray Center
Subject: U.S. X-ray Astrophysics

We write with urgency and purpose to request a reconsideration of the budget for the Chandra X-ray Observatory, in particular as it relates to the support of the community of X-ray astronomers in the U.S. through the Chandra General Observer (GO) program. We have many compelling and specific points we ask you to consider, which we describe below. In a larger sense, our concerns are about the health of U.S. astrophysics, and how Chandra is a unique and integral part of the astronomical endeavor.

We engage in astronomy because human nature compels us to explore, study, and understand our World, from the present-day Solar System to the farthest and earliest epochs of the Universe. All branches of science contribute to this imperative, but astronomy holds a special place. It excites the public and for centuries has instilled in humanity a wonder and fascination of the cosmos. As Charles Young wrote, “By the beauty and grandeur of the subjects it presents, it stimulates the imagination and gratifies the poetic sense” (1889, *Elements of Astronomy*). The public continually looks to astronomers to be the face of the physical and mathematical sciences. Chandra continues to play *the* leading role in engaging the public about high-energy physics and astrophysics.

On a pragmatic level, astronomy has been a driving force of mathematical development and technological progress throughout its history. The need for more powerful observational capabilities continues to lead to advances in engineering and technology. Both of you are right now trying to navigate a course to fund the development of the next technological breakthroughs while also maintaining the capabilities to make the next scientific breakthroughs with existing missions.

It is this last point which we wish to focus on. Chandra is the premier X-ray facility in the world. Its imaging capabilities and observing efficiency still exceed pre-launch requirements after 25 years of operations, and it is capable of many more years of operation and scientific discovery. These discoveries will be made by the next generation of astronomers, but only if they are given the opportunity to develop and grow into independently thinking scientists. One of the most effective paths towards this is the Chandra GO program, which teaches scientists critical skills, but also serves as a pathway towards developing their careers. Chandra GO funding has remained flat for over two decades, and the U.S. community has struggled. The recent cut of 30% to GO funding threatens the health of U.S. X-ray astrophysics, which plays a key role in almost every area of astrophysics. Unless GO funding is restored to previous levels, the X-ray astrophysics community in the U.S. will stagnate and struggle and will fail to attract new members. If that happens, who will

use the next generation of X-ray missions whose technologies are being developed now? With these cuts, there will be no vibrant, energetic community of U.S. X-ray astrophysicists to take advantage of NASA's current technology development and investment.

Like all wavelengths, X-rays play a vital role. Over the last decade, many of the most important breakthroughs in understanding the universe have relied on information across the electromagnetic spectrum, and Chandra has played a unique and crucial role in fitting together the pieces of the puzzle. It will still continue to do so with the next generation of space and ground-based facilities. Unlike other wavelengths, however, X-rays require a space-based mission for their study. While other communities in U.S. astronomy may have multiple avenues for support, X-ray astrophysics is nearly solely within the realm of NASA Astrophysics, and grants through the Chandra GO program are the main vehicle for funding U.S. X-ray astrophysics. Cuts to its General Observer funding cannot be compensated by other sources.

The loss to U.S. science will not be small. Throughout the mission, Chandra has engaged thousands of students in research, leading to more than 600 PhD theses to date. Chandra science has resulted in over 10,000 refereed publications.

Every X-ray mission in NASA's fleet provides needed capabilities and contributes to progress in multiple fields of astrophysics. But Chandra is our flagship. Chandra's superb angular resolution and sensitivity enable discoveries in nearly every area of astronomy, and there will be no X-ray mission that matches Chandra's sub-arcsecond resolution for at least another decade.

Chandra's discoveries have spanned the Universe, from scattered solar X-rays from the atmosphere of Venus to the presence of supermassive black holes at the dawn of time in galaxies identified by JWST. Chandra is uniquely capable of addressing key themes from the 2020 Decadal Survey, including connections between exoplanets and their host stars, the aftermath of gravitational wave events, the nature of dark matter and dark energy, and the broad study of cosmic ecosystems. A separate letter to Dr. Clampin specifically addressed crucial TDAMM science needs, which was a key theme of the 2020 Decadal Survey. So many current and important research areas in astrophysics, along with new NASA facilities to address them, rely on unique information from Chandra's unique capabilities.

Finally, we want to reiterate how Chandra's X-ray vision has excited the public and gratified their poetic sense. Chandra science has been extremely popular in the media and with the public. Its communications efforts have generated thousands of articles and reached billions of people around the world. Chandra is also a leader in developing diverse and inclusive methods for engaging the public in NASA science, ranging from 3D printing to sonification and much more. Activities like these help NASA maintain one of the highest favorability ratings of any government agency.

We realize that budgets are a zero-sum game, and we do not envy your job to balance this equation. But balance is what we need. An outsized reduction of the budget of our flagship X-ray mission will

have an outsized impact on both U.S. high-energy astrophysics research and the larger astronomy and astrophysics community.

Thank you for your time and consideration.

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