N49

Data from a long observation from NASA's Chandra X-ray Observatory, shown in blue, reveal evidence for a bullet-shaped object being blown out of N49, the aftermath of a supernova explosion in the Large Magellanic Cloud. The bullet is traveling at a high speed of about 5 million miles an hour away from a bright point source in the upper left part of N49. This bright source may be a so-called soft gamma ray repeater, an object that emits bursts of gamma rays and X-rays. Optical data from the Hubble Space Telescope (yellow and purple) show bright filaments where a shock wave generated by the supernova is interacting with the densest regions in nearby clouds of cool, molecular gas.

January 2011

S	M	T	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February 2011

NGC 1068

This composite image of NGC 1068, one of the nearest and brightest galaxies containing a rapidly growing supermassive black hole, contains X-rays from Chandra (pink), optical data from Hubble (blue), and radio data from the Very Large Array (gold). Spectra—the distribution of low and high energy X-rays—reveal that a strong wind is being driven away from the black hole at the center of NGC 1068 at a rate of about a million miles per hour. This wind is likely produced as surrounding gas is accelerated and heated as it swirls toward the black hole. Other information—such as the amount of material being deposited by this wind and how far it extends—was obtained using the Chandra data.

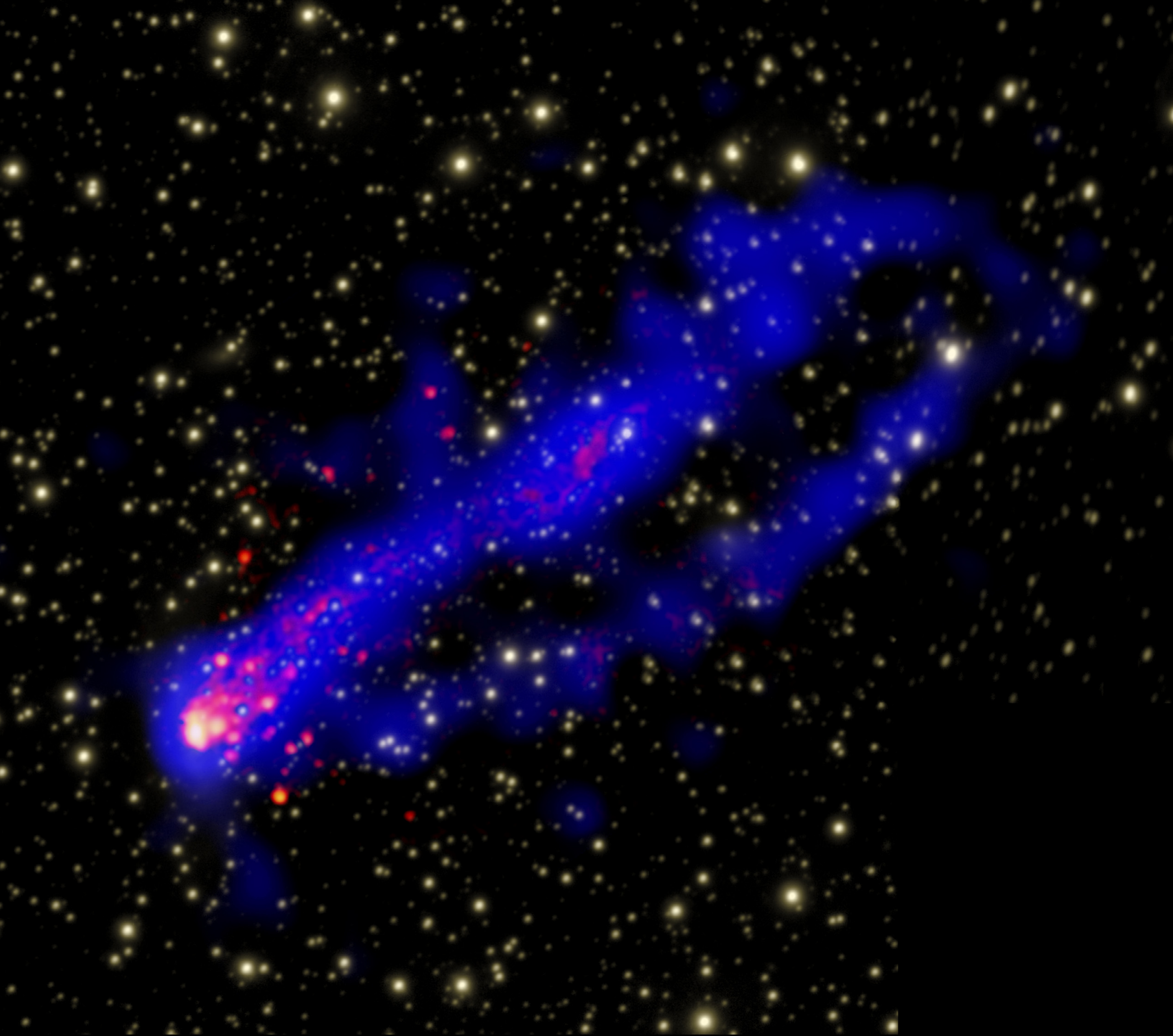
S	M	T	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

March 2011

G54.1+0.3

Dust is flying past and engulfing a family of stars nearby this remnant of a collapsed star. Scientists think the stars in the image are part of a stellar cluster into which the supernova exploded. This composite image of G54.1+0.3 shows X-rays from Chandra in blue, and infrared data from Spitzer in green (shorter wavelength) and red-yellow (longer wavelength). The white source near the center of the image is a rapidly rotating neutron star, or "pulsar," left behind after the star exploded. The pulsar generates a wind of high-energy particles—seen in the Chandra data—that expands into the surrounding environment, illuminating the material ejected in the supernova.

S	M	T	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



April 2011

ESO 137-001

Two spectacular tails of X-ray emission have been found trailing behind the galaxy ESO 137-001 as it plunges into a cluster of galaxies. The brighter of the two tails has been seen before in Chandra data (shown in blue), and extends for about 260,000 light years behind the galaxy. The detection of the second, fainter tail, however, was a surprise to the scientists who used Chandra for a subsequent longer observation of this system. The two-pronged tail may have formed because gas in the galaxy has been stripped from two of its major spiral arms. Also shown in this image are optical data in yellow and emission from hydrogen atoms ("H-alpha") in red.

S	M	T	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May 2011

NGC 7793

A powerful microquasar has been discovered in a nearby galaxy using X-ray observations from Chandra (red, green, blue), along with optical (light blue) and H-alpha data (yellow). The microquasar, outlined in the box to the upper left, is a system that contains a stellar-mass black hole pulling material from a companion star. Gas swirling toward the black hole forms a disk around it. Twisted magnetic fields in the disk generate strong electromagnetic forces that propel some of the gas away from the disk at high speeds in jets, creating a huge bubble of hot gas about 1,000 light years across. At just 12.7 million light years away from Earth, NGC 7793 is relatively nearby, giving astronomers an excellent view of this system.

S	M	T	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June 2011

Sagittarius A*

Astronomers have long known that the supermassive black hole at the center of the Milky Way galaxy, known as Sagittarius A* (or Sgr A* for short), is a particularly poor eater. However, it now appears that Sgr A* consumes even less than expected—ingesting only about one hundredth of one percent of the material apparently available to it. Why does it consume so little? A new theoretical model based on data from nearly two weeks of Chandra observation time may help explain. This deep data set—shown here with different energy ranges colored red, green, and blue—has also been used to probe supernova remnants and lobes of hot gas extending away from the black hole.

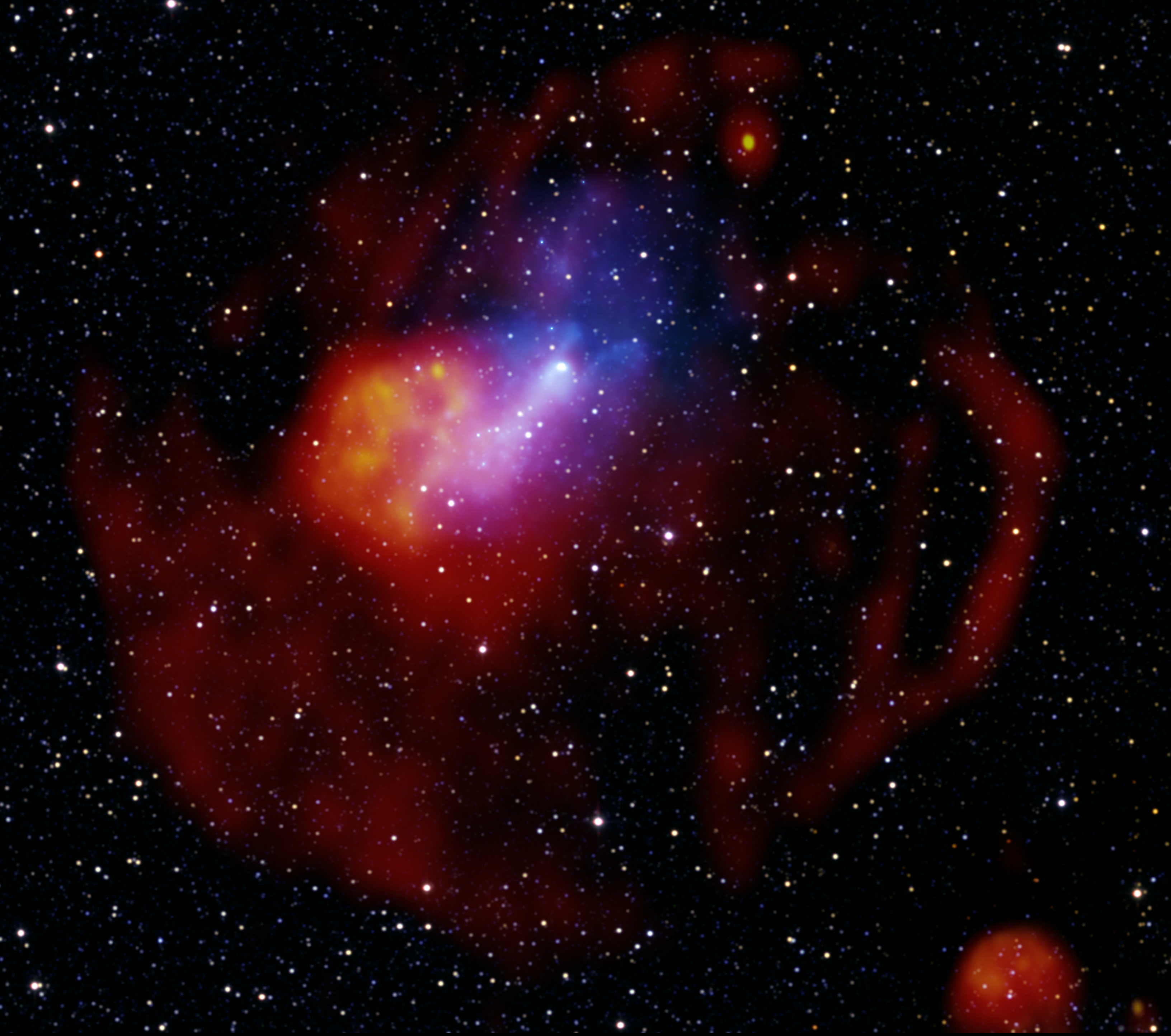
S	M	T	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Antennae

Two colliding galaxies are on display here in an image featuring data from NASA's Great Observatories. The Antennae galaxies, located about 62 million light years from Earth, are shown in this composite image from Chandra (blue), Hubble (gold and brown), and Spitzer (red). Chandra's X-ray data reveal huge clouds of hot, interstellar gas that have been injected with rich deposits of elements from supernova explosions. This enriched gas, which includes elements such as oxygen, iron, magnesium and silicon, will be incorporated into new generations of stars and planets. The bright, point-like sources in the X-ray image are produced by material falling onto black holes and neutron stars that are remnants of the massive stars.

July 2011

S	M	T	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						



G327

G327.1-1.1 is the aftermath of a massive star that exploded in the Milky Way galaxy. The highly magnetic, rapidly spinning neutron star left behind after the explosion is producing a wind of relativistic particles, seen in X-rays by Chandra and XMM-Newton (blue) as well as in the radio data (red and yellow). The X-ray observations allow scientists to estimate the energy released during the supernova explosion and the age of the remnant, as well as the amount of material being swept up as the blast wave from the explosion expands. The large red circular feature is produced by radio emission from the blast wave. This composite image also contains infrared data from the 2MASS survey showing stars in the field.

August 2011

S	M	T	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2011

NGC 6872

Astronomers think that supermassive black holes exist at the center of most galaxies and that they are apparently inextricably linked in their evolution, including the two seen here. This composite image of a collision between two galaxies contains X-rays from Chandra (purple), infrared data from Spitzer (red), and optical data from the Very Large Telescope (red, green and blue.) As these two galaxies merge, IC 4970, the small galaxy at the top of the image, is feeding its supermassive black hole by drawing cold gas from its partner galaxy, the spiral NGC 6872. This system and others like it are studied to understand how rapidly growing black holes are affected by their galactic environment.

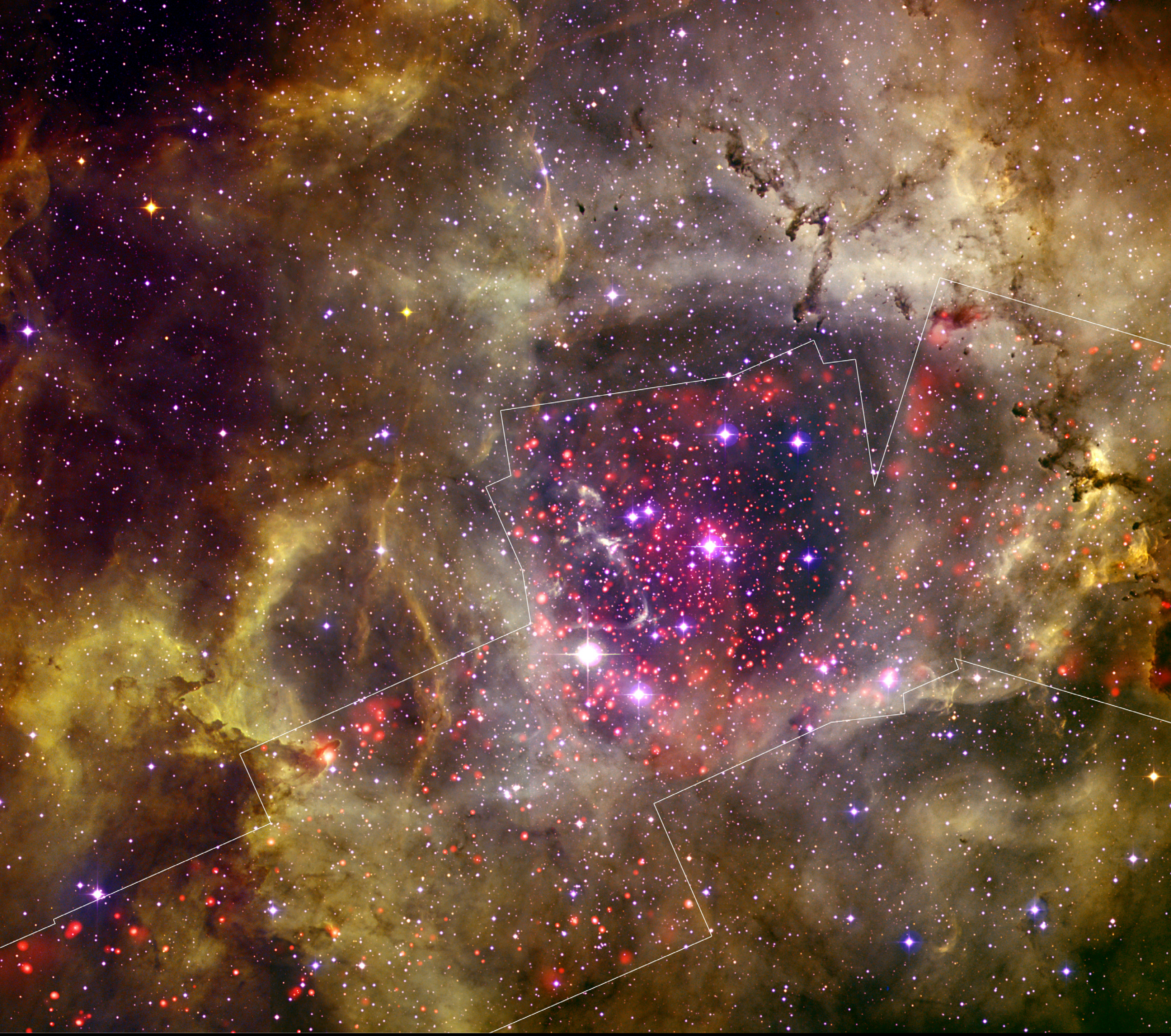
S	M	T	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

October 2011

Abell 3376

This X-ray image shows the galaxy cluster known as Abell 3376 as seen by Chandra and the now-retired German satellite ROSAT. The "bullet-like" appearance of the X-ray data is caused by a merger of this cluster with material flowing into it from the right side of the image. Scientists used this cluster and similar ones to study the properties of gravity on cosmic scales and test Einstein's theory of General Relativity. No deviations from Einstein's theory were seen. Such studies are crucial for understanding the evolution of the Universe—both in its past and its future—and for probing the nature of dark energy, one of the biggest mysteries in science.

S	M	T	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					



Rosette Nebula

This optical and X-ray image shows the Rosette star formation region, located about 5000 light years from Earth. The Chandra X-ray data (red) show hundreds of young stars in the central cluster and fainter clusters on either side as outlined in the white lines. The central cluster appears to have formed first, producing a burst of radiation and stellar winds that caused the surrounding nebula to expand, triggering formation of two neighboring clusters. The optical data reveal large areas of gas and dust, including giant pillars that remain behind after intense radiation from massive stars has eroded the more diffuse gas. The presence of several X-ray emitting stars around the pillars shows star formation is continuing in the region.

November 2011

S	M	T	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

M87

This image shows the eruption of a galactic "super-volcano" in the massive galaxy M87. The cluster surrounding M87 is filled with hot gas glowing in X-ray light (shown in blue) that is detected by Chandra. As this gas cools, it can fall toward the galaxy's center where it should continue to cool even faster and form new stars. However, radio observations with the VLA (red-orange) suggest that in M87 jets of very energetic particles produced by the black hole interrupt this process. These jets lift up the relatively cool gas near the center of the galaxy and produce shock waves in the galaxy's atmosphere because of their supersonic speed.

December 2011

S	M	T	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31