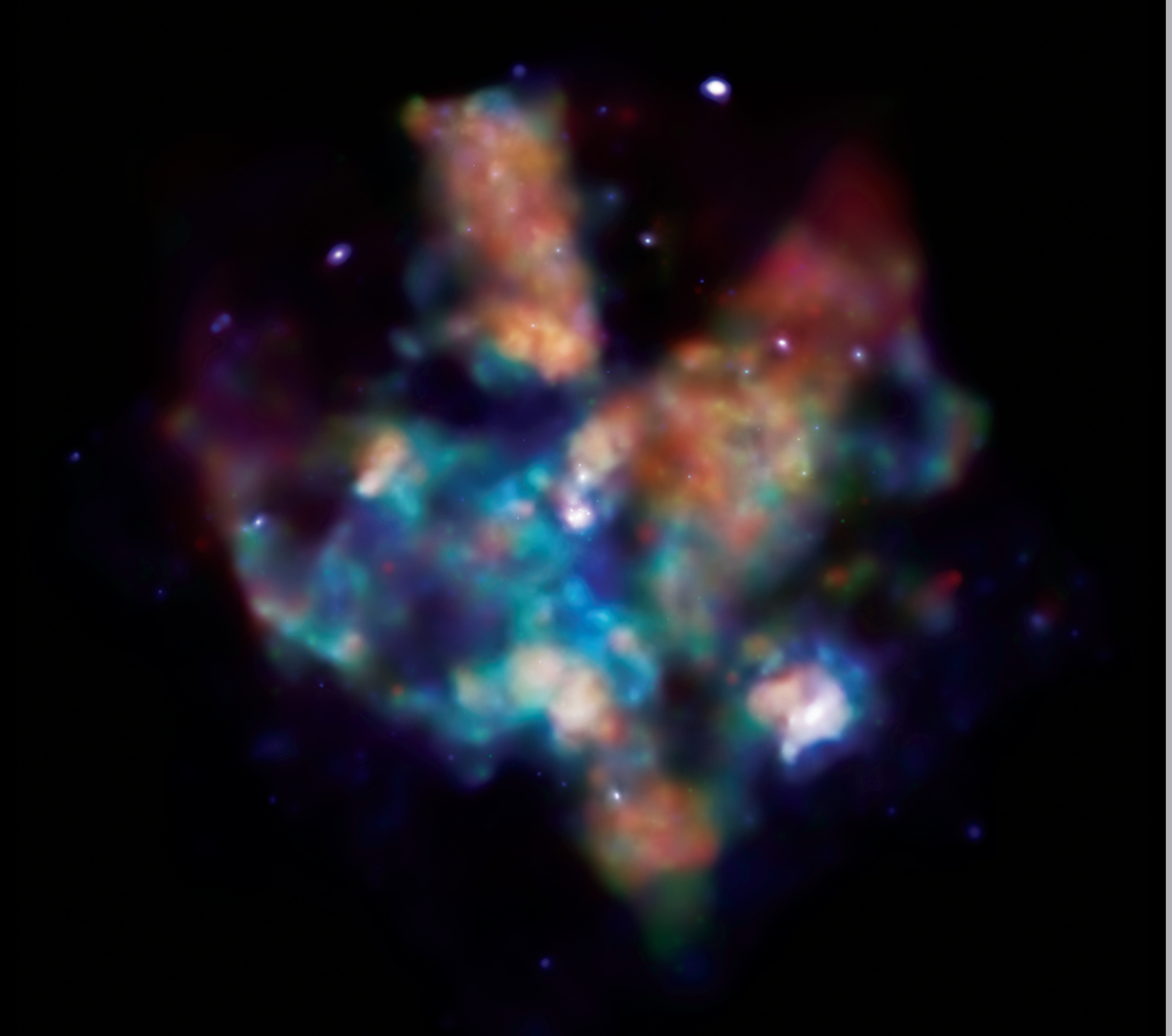

TARANTULA NEBULA

The Chandra image of the Tarantula Nebula gives scientists a close-up view of the drama of star formation and evolution. The Tarantula, also known as 30 Doradus, is in one of the most active star-forming regions in a galaxy close to the Milky Way. Massive stars in 30 Doradus are producing intense radiation and searing winds of multimillion-degree gas that carve out gigantic super-bubbles in the surrounding gas. Other massive stars have raced through their evolution and exploded catastrophically as supernovas, leaving behind pulsars and expanding remnants that trigger the collapse of giant clouds of dust and gas to form new generations of stars.

JANUARY2009

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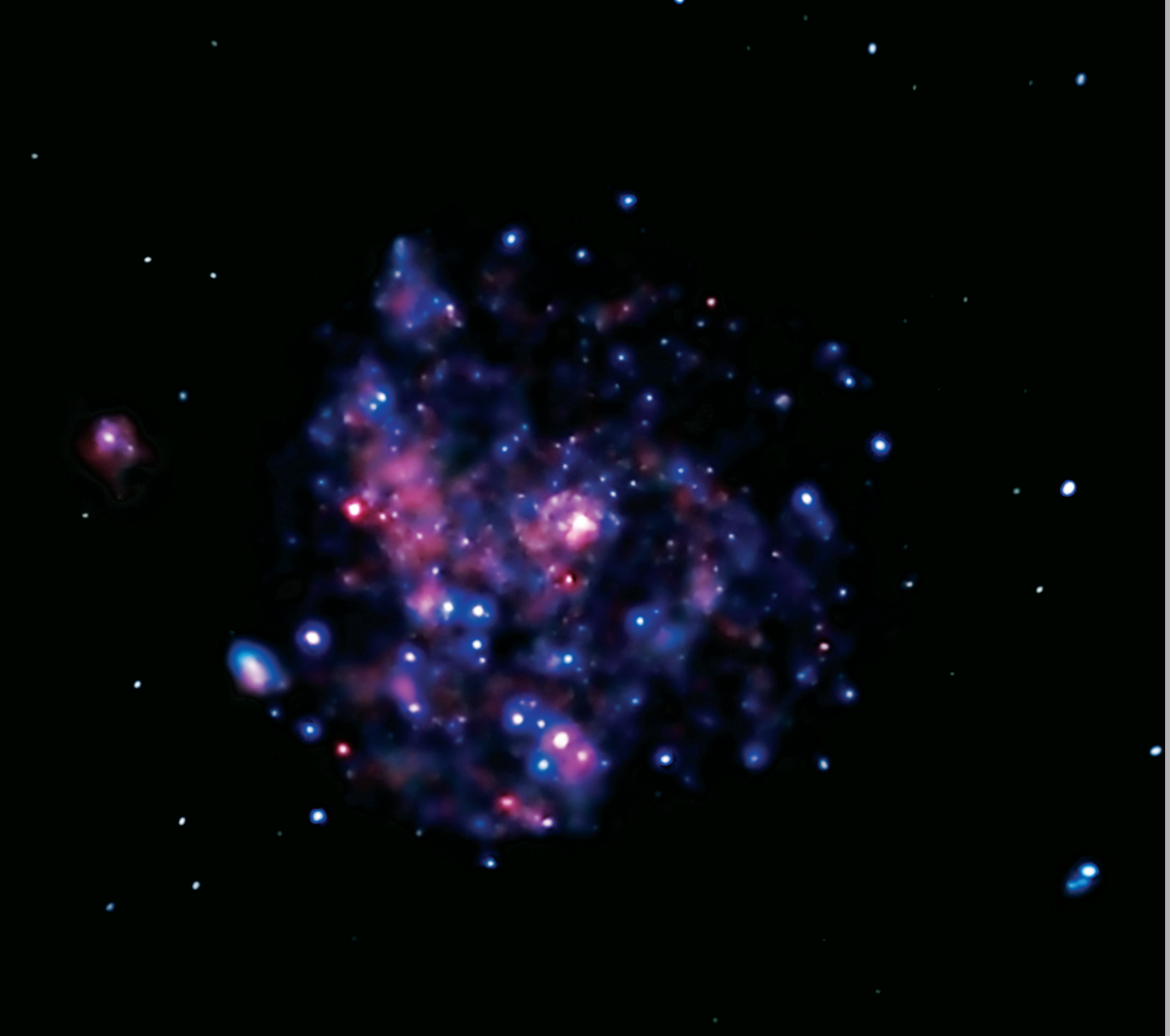

M101

This Chandra image of M101 is one of the longest exposures ever obtained of a spiral galaxy in X-rays. The point-like sources include binary star systems containing black holes and neutron stars, and the remains of supernova explosions. Other sources of X-rays include hot gas in the arms of the galaxy and clusters of massive stars. These X-ray observations of M101 will be used to establish a valuable X-ray profile of a galaxy similar to the Milky Way. This will help astronomers better understand the evolutionary paths that produce black holes, and provide a baseline for interpreting the observations of distant galaxies.

FEBRUARY2009

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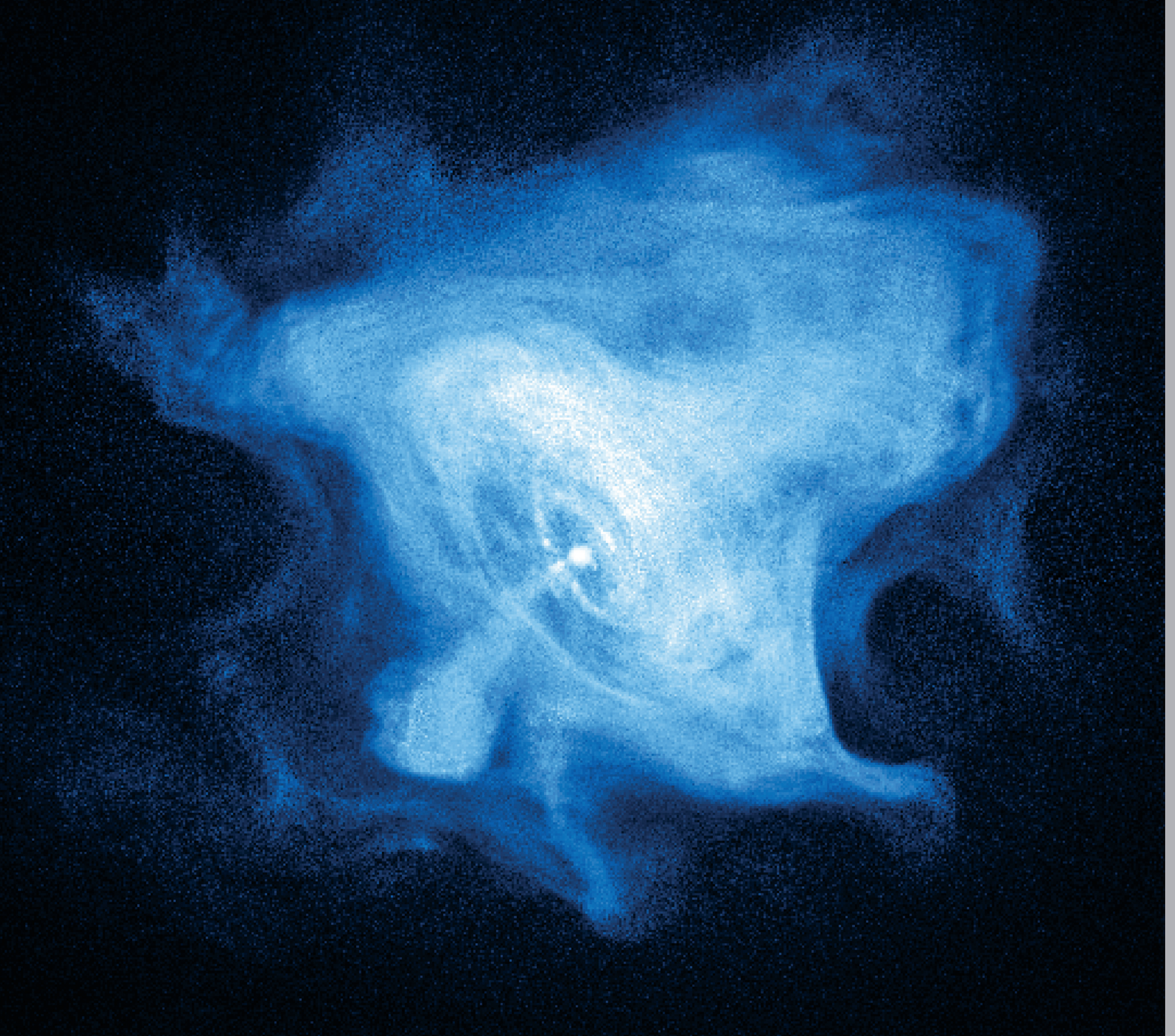

CRAB NEBULA

In the Crab Nebula, a rapidly rotating neutron star, or pulsar (white dot near the center), powers the dramatic activity seen by Chandra. The inner X-ray ring is thought to be a shock wave that marks the boundary between the surrounding nebula and the flow of matter and antimatter particles from the pulsar. Energetic particles move outward to brighten the outer ring and produce an extended X-ray glow. The jets perpendicular to the ring are due to matter and antimatter particles spewing out from the poles of the pulsar. The fingers, loops and bays visible on the outer boundary of the nebula are likely caused by confinement of the high-energy particles by magnetic forces.

MARCH2009

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NGC 6543

A composite image of data from NASA's Chandra X-ray Observatory (blue) and Hubble Space Telescope (red and purple) of NGC 6543 shows a phase that Sun-like stars undergo at the end of their lives. Material from the outer layers of the star in the Cat's Eye is flying away at about 4 million miles per hour. A hot core is left behind that eventually collapses to become a white dwarf star. The Chandra data reveal that the central star in NGC 6543 is surrounded by a cloud of multi-million-degree gas.

APRIL2009

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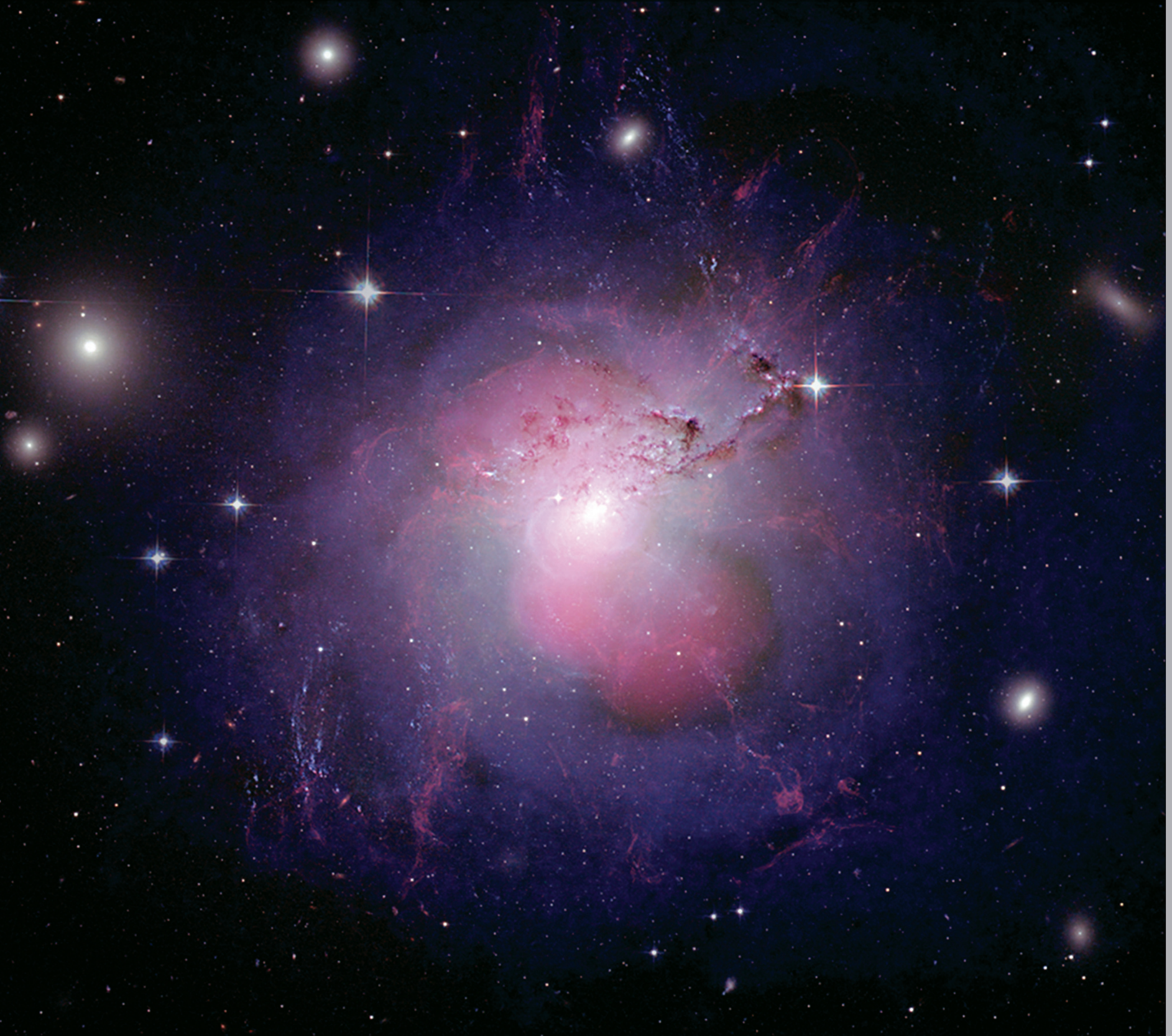

PERSEUS A

The active galaxy NGC 1275 lies at the center of the cluster of galaxies known as the Perseus Cluster. By combining multi-wavelength images into a single composite, the dynamics of the galaxy are more easily visible. In this composite image, X-rays from Chandra are shown in violet and reveal the presence of a black hole at the center of NGC 1275. Optical data from Hubble is depicted in red, green, and blue, and radio emission in pink traces the jets generated from the central black hole.

MAY2009

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G1.9+0.3

The expanding remains of a supernova explosion in the Milky Way are shown in this composite image of the supernova remnant G1.9+0.3. The Chandra image, obtained in early 2007, is shown in orange and the radio image from the Very Large Array from 1985 is in blue. The starfield in the image comes from infrared data from 2MASS. The difference in size between the two images gives clear evidence for expansion, and allowed astronomers to determine that the supernova occurred about 140 years ago. This makes G1.9+0.3 the most recent supernova in the Galaxy as measured in Earth's time-frame.

JUNE2009

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CENTAURUS A

In a long Chandra exposure lasting over seven days, Centaurus A reveals the effects of the supermassive black hole at its center. Opposing jets of high-energy particles are seen extending to the outer reaches of the galaxy, and numerous smaller black holes in binary star systems are also visible. In this image, low-energy X-rays are colored red, intermediate-energy X-rays are green, and the highest-energy X-rays detected by Chandra are blue. The dark green and blue bands running almost perpendicular to the jet are dust lanes that absorb X-rays, created when Centaurus A merged with another galaxy perhaps 100 million years ago.

JULY2009

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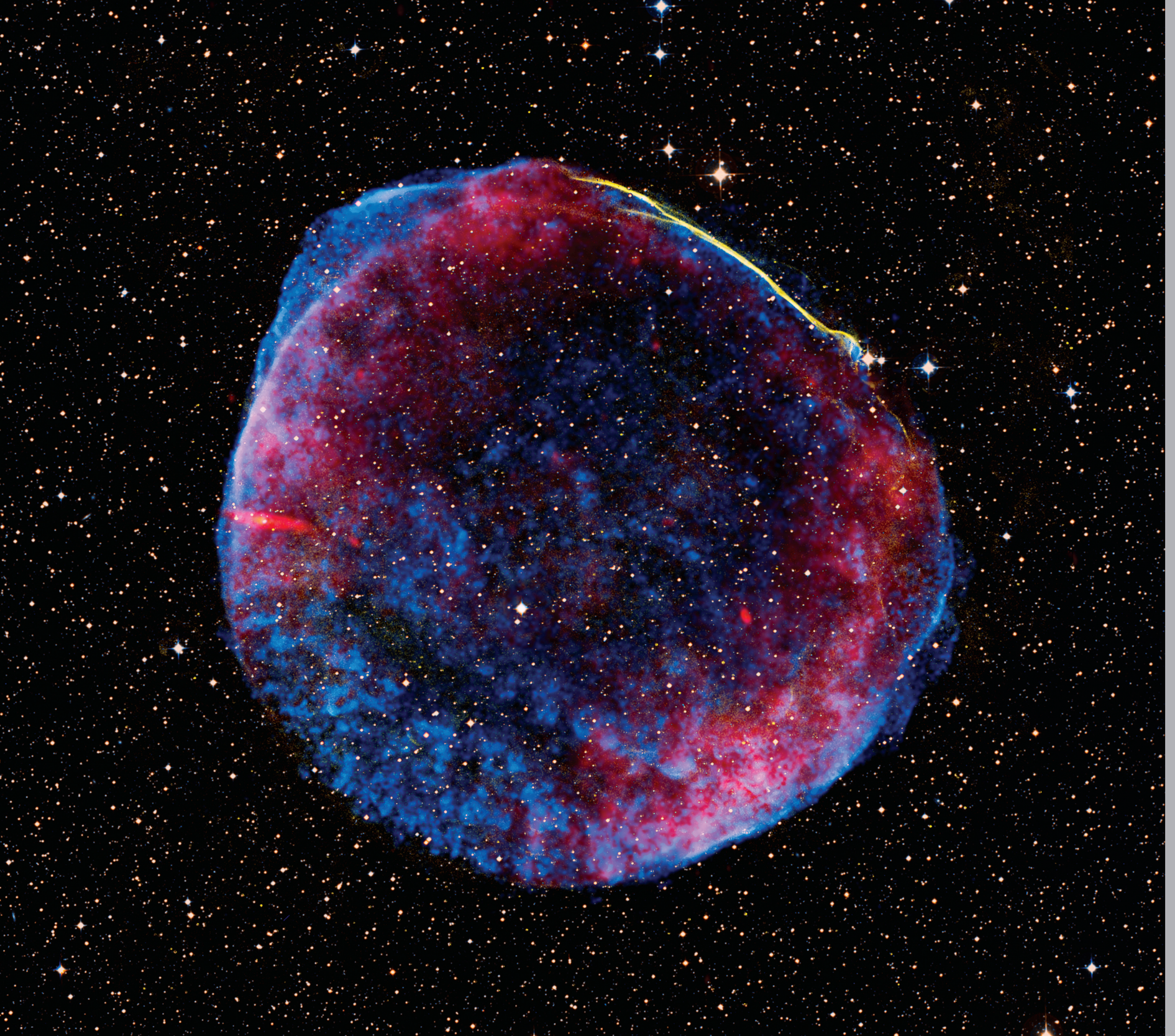

SN 1006

This is a composite image of the SN 1006 supernova remnant, which is located about 7000 light years from Earth. Shown here are X-ray data from NASA's Chandra X-ray Observatory (blue), optical data from the 0.9 meter Curtis Schmidt telescope at CTIO (yellow) and the DSS (orange), plus radio data from the NRAO's VLA and GBT (red). The original supernova explosion, caused by the destruction of a white dwarf star, was the brightest ever recorded on Earth. Elements such as iron that were previously locked up in the star were completely liberated by the supernova explosion. A combined study of its remnant, using Chandra, CTIO and VLA/GBT observations shows new evidence for the acceleration of charged particles to high energies in supernova shockwaves.

AUGUST2009

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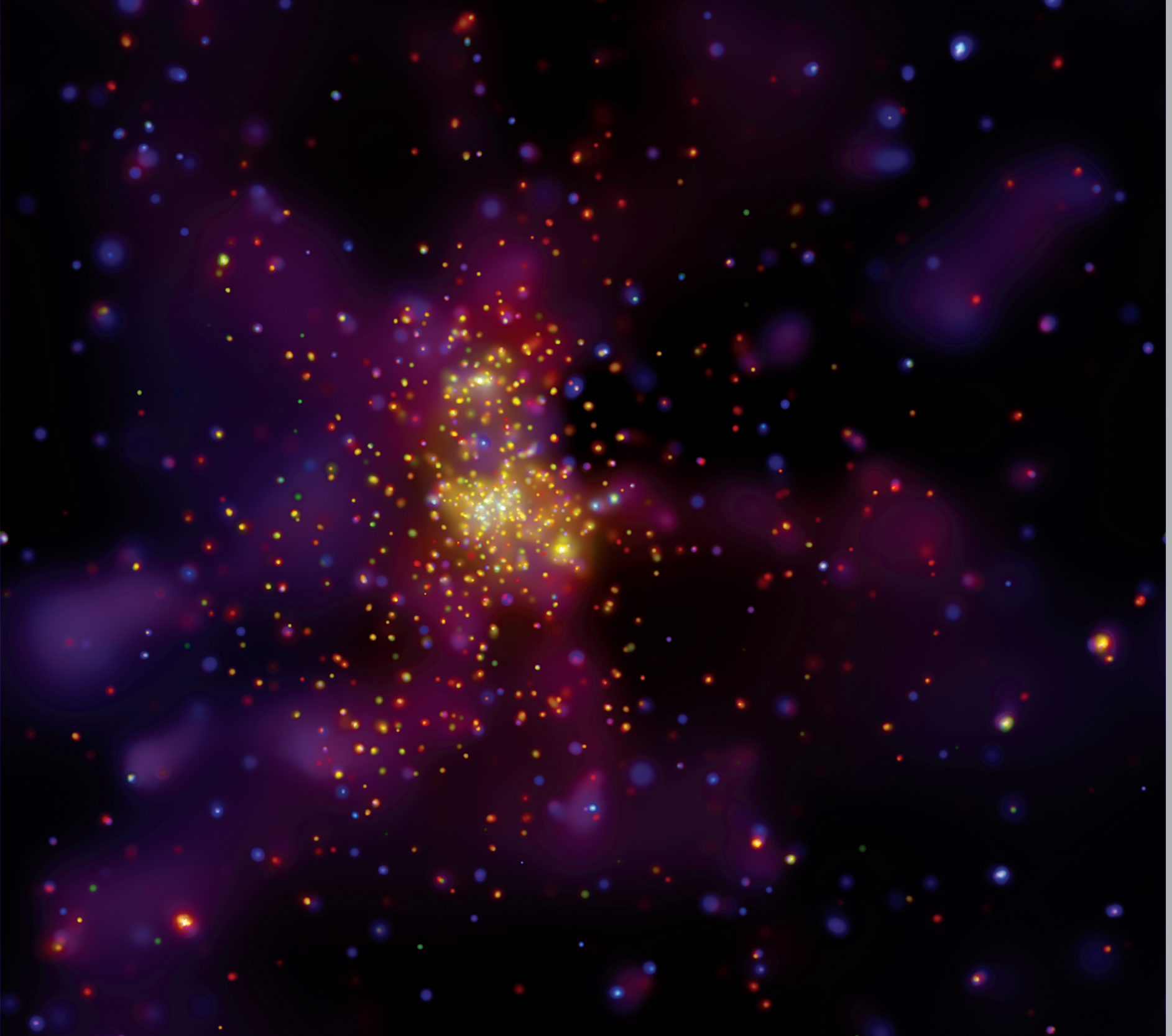

WESTERLUND 2

This Chandra X-ray Observatory image shows Westerlund 2, a young star cluster with an estimated age of about one or two million years that contains some of the hottest, brightest, and most massive stars known. In this image, low-energy X-rays are colored red, intermediate-energy X-rays in green, and high-energy X-rays in blue. The image shows a very high density of massive stars that are bright in X-rays, plus diffuse X-ray emission. An incredibly massive double star system called WR20a is visible as the bright yellow point just below and to the right of the cluster's center.

SEPTEMBER2009

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ABELL 85

This composite image shows galaxy cluster Abell 85, located about 740 million light years from Earth. The purple emission is multi-million degree gas detected in X-rays by Chandra and the other colors show galaxies in an optical image from the SDSS. This galaxy cluster is one of 86 observed by Chandra to trace how dark energy has stifled the growth of these massive structures over the last 7 billion years. Galaxy clusters are the largest collapsed objects in the Universe and are ideal for studying the properties of dark energy, the mysterious form of repulsive gravity that is driving the accelerated expansion of the Universe.

OCTOBER2009

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ABELL 1689

This image of Abell 1689 is a composite of data from the Chandra X-ray Observatory (purple) and the Hubble Space Telescope (yellow). Abell 1689 is a massive cluster of galaxies that shows signs of merging activity. The long arcs in the optical image, the largest system of such arcs ever found, are caused by gravitational lensing of the background galaxies by matter in the galaxy cluster. Further studies of this cluster are needed to explain the lack of agreement between mass estimates based on the X-ray data and on the gravitational lensing.

NOVEMBER2009

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MACS J0025.4-1222

This image shows a system where two massive galaxy clusters have collided and in doing so have forced the separation between dark and “normal” matter. X-rays from Chandra (pink) show where most of the normal, or baryonic, matter in the cluster resides. Optical data from Hubble (blue) is used to trace the mass. This result helps answer a crucial question about whether dark matter interacts with itself in ways other than via gravitational forces. It also shows that the Bullet Cluster, a similar system, was not an exception and that the earlier results were not the product of some unknown error.

DECEMBER2009

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