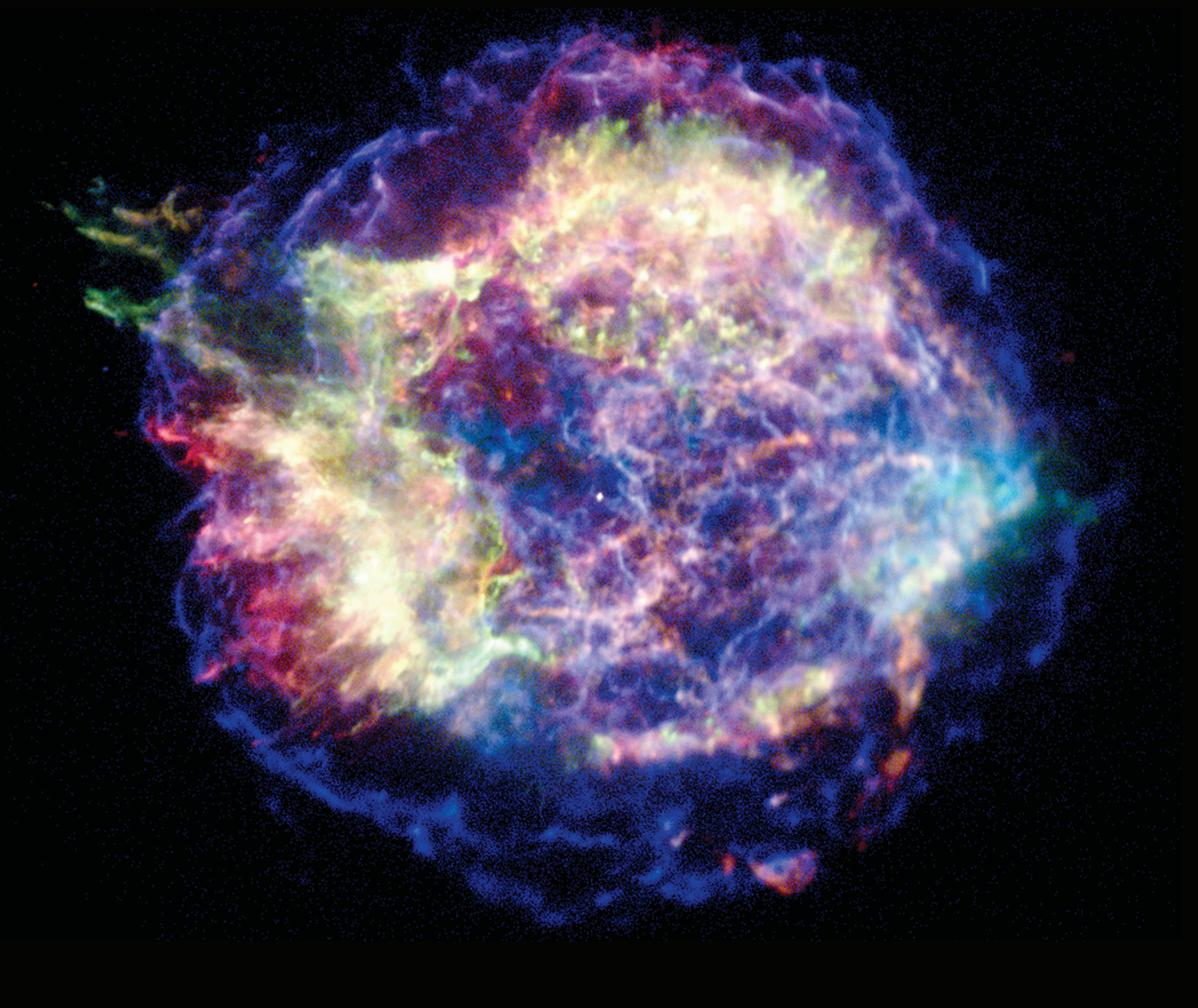

CASSIOPEIA A

Cassiopeia A is the youngest (about 300 years old) known supernova remnant in the Milky Way. Astronomers have used Chandra's long observations of this remnant to make a map of the acceleration of electrons in this supernova remnant. The analysis shows that the electrons are being accelerated to almost the maximum theoretical limit in some parts of Cassiopeia A (Cas A) in what can be thought of as a "relativistic pinball machine." Protons and ions, which make up the bulk of cosmic rays, are expected to be accelerated in a similar way to the electrons. The Cas A observations thus provide strong evidence that supernova remnants are key sites for energizing cosmic rays.

JANUARY2008

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3C442A

X-ray data from NASA's Chandra X-ray Observatory and radio observations from the NSF's Very Large Array show that a role reversal is taking place in the middle of 3C442A- a system with two merging galaxies in the center. Chandra detects hot gas (blue) that has been pushing aside the radio-bright gas (orange). This is the opposite of what is typically found in these systems when jets from the supermassive black hole in the center create cavities in the hot gas surrounding the galaxy. Astronomers believe an impending merger with another galaxy has caused the unusual dynamics in this system.

FEBRUARY2008

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G292.0+1.8

G292.0+1.8 is a young supernova remnant located in our Galaxy. This deep Chandra image shows a spectacularly detailed, rapidly expanding shell of gas that is 36 light years across and contains large amounts of oxygen, neon, magnesium, silicon and sulfur. Astronomers believe that this supernova remnant, one of only three in the Milky Way known to be rich in oxygen, was formed by the collapse and explosion of a massive star. Supernovas are of great interest because they are a primary source of the heavy elements believed to be necessary to form planets and life.

MARCH2008

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ABELL 3627

This composite image shows a tail that has been created as the galaxy ESO 137-001 plunges into the galaxy cluster Abell 3627. X-rays from Chandra (blue) and optical light (white and red) from the SOAR telescope show that as the galaxy plummets, it sheds material and is forming stars behind it in a tail that stretches over 200,000 light years long. This result demonstrates that stars can form well outside of their parent galaxy.

APRIL2008

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THE EAGLE NEBULA

Chandra's observations of the "Pillars of Creation" in the Eagle Nebula (M16) allowed astronomers to peer inside the dark columns of gas and dust. This penetrating view reveals how much star formation is happening inside these iconic structures. The Chandra data, overlaid on the Hubble optical image, show bright X-ray sources in this field, most of which are young stars. However, most of the X-ray sources are found outside the pillars, suggesting that the Eagle Nebula may be past its star-forming prime. One X-ray object found within the pillars (blue source near the tip of the pillar on the left) appears to be a very young star about 4 or 5 times more massive than the Sun.

MAY2008

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ETA CARINAE

This composite image of Eta Carinae from NASA's Chandra X-ray Observatory (yellow) and Hubble Space Telescope (blue) shows the remnants of an eruption from the star during the 1840s. Eta Carinae is a mysterious, extremely bright and massive star located 7,500 light years from Earth. For the moment, Eta Carinae is at a point of unstable equilibrium where the star's gravity is almost overcoming the outward pressure from nuclear fusion. The star is thought to be consuming its nuclear fuel at an incredible rate, and other observations suggest that it could explode at any time. When it does explode, it will perhaps rival the moon in brilliance as seen from Earth.

JUNE2008

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M51

A composite image of M51, also known as the Whirlpool Galaxy, shows a majestic spiral galaxy. Chandra finds point-like X-ray sources (purple) that are black holes and neutron stars in binary star systems, along with a diffuse glow of hot gas. Data from Hubble (green) and Spitzer (red) both highlight long lanes of stars and gas laced with dust. A view of M51 with GALEX shows hot, young stars that produce lots of ultraviolet energy (blue).

JULY2008

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ORION NEBULA

The Orion Nebula is one of the closest star formation regions from Earth at a distance of 1,500 light years. A favorite for amateur astronomers and casual sky watchers, Orion is seen as never before in this composite image created from Chandra and Hubble data. The wispy filaments seen by Hubble (pink and purple) are clouds of gas and dust that provide the material used as fuel by young stars. The bright point-like sources (blue and orange) are newly formed stars captured in X-ray light by Chandra. These fledgling stars are seen to flare in their X-ray intensity, which suggests that our Sun had many violent and energetic outbursts when it was much younger.

AUGUST2008

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SOMBRERO GALAXY

The Sombrero is one of the largest galaxies in the Virgo cluster, and is about 28 million light years from Earth. This image is a composite of observations from NASA's Chandra X-ray Observatory, Hubble Space Telescope and Spitzer Space Telescope. X-rays detected by Chandra (blue) reveal hot gas extending over 60,000 light years from the center of the galaxy, and point sources that are mostly produced by neutron stars and black holes within the Sombrero. Hubble's optical data (green) shows a bulge of starlight partially blocked by a rim of dust. That same rim of dust appears bright in Spitzer's infrared image (orange), which also traces Sombrero's central bulge of stars.

SEPTEMBER2008

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3C438

3C438 is a central galaxy in the center of a massive cluster of galaxies, 4.8 billion light years away. Chandra's observations of this object reveal evidence for one of the most energetic events in the local Universe. An arc-like feature to the lower left in the cluster's hot gas is about 2 million light years long. Astronomers have determined that an enormous amount of energy would be required to produce such a large structure. One plausible scenario is that two massive clusters collided at high velocity and later merged. Another intriguing feature in the Chandra data is the possible detection of a cavity in the hot gas, which may be the result from a tremendous outburst from a supermassive black hole.

OCTOBER2008

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CORONET CLUSTER

The Corona Australis region is one of the nearest and most active regions of ongoing star formation in our Galaxy. At only 420 light years away, the Coronet is 3.5 times closer than the Orion Nebula Cluster. The Coronet contains a loose cluster of a few dozen known young stars with a wide range of masses at various stages of evolution. The central area of the star-forming region contains the densest clustering of very young stars, embedded in dust and gas. This composite image shows the Coronet in X-rays (Chandra, purple) and infrared emission (Spitzer, orange, green, and cyan). By studying the variability in different energies, scientists hope to better understand the evolution of very young stars.

NOVEMBER2008

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GALACTIC CENTER

This Chandra image shows evidence for a light echo generated by the Milky Way's supermassive black hole, a.k.a. Sagittarius A*. Astronomers believe a mass equivalent to the planet Mercury was devoured by the black hole about 50 years earlier, causing an X-ray outburst which then reflected off gas clouds near Sagittarius A*. Studying this light echo gives a crucial history of activity from the black hole, and it also illuminates and probes the gas clouds near the center of the Galaxy.

DECEMBER2008

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28	29	30	31			