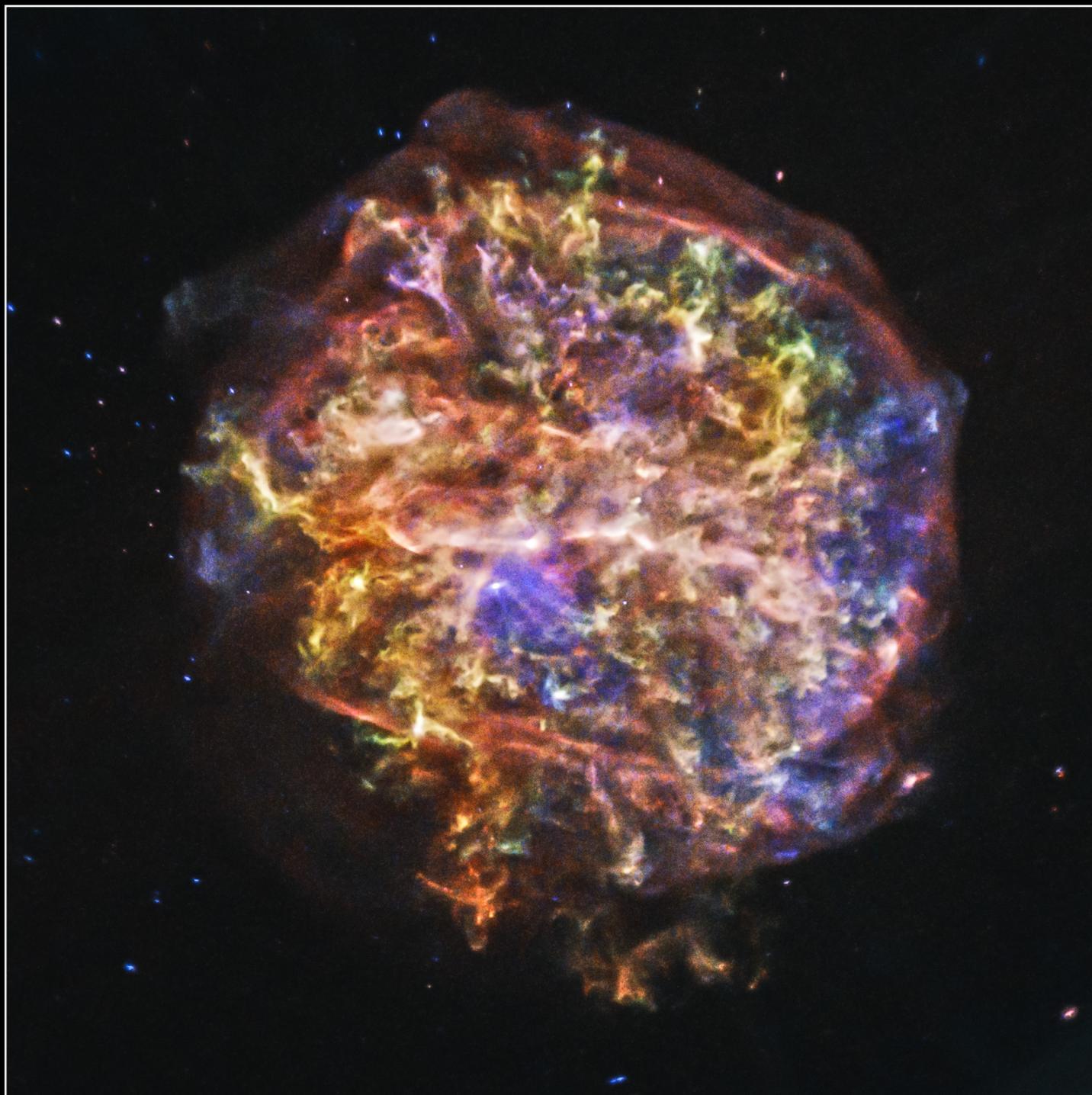




G292.0+1.8



G292.0+1.8: Stellar Forensics with Striking Image from Chandra

G292.0+1.8 is a supernova remnant located about 20,000 light years from Earth.

It is only one of three supernova remnants in the Milky Way known to contain large amounts of oxygen.

Oxygen-rich supernova remnants are important for their role in seeding future generations of planets and stars.

The aftermath of the death of a massive star is shown in beautiful detail in this composite image of G292.0+1.8. This image from the Chandra X-ray Observatory is easily the deepest X-ray image ever obtained of this supernova remnant. Although considered a "textbook" case of a supernova remnant, the intricate structure shown here reveals a few surprises.

Near the center of G292.0+1.8 is the so-called pulsar wind nebula, most easily seen in high energy X-rays. This is the magnetized bubble of high-energy particles that surrounds the "pulsar", a rapidly rotating neutron star that remained behind after the original, massive star exploded. The narrow, jet-like feature running from north to south in the image is likely parallel to the spin axis of the pulsar.

The pulsar is located slightly below and to the left of the center of G292.0+1.8. Assuming that the pulsar was born at the center of the remnant, it is thought that recoil from the lopsided explosion may have kicked the pulsar in this direction. However, the kick direction and the pulsar spin direction do not appear to be aligned, in contrast

to apparent spin-kick alignments seen in some other supernova remnants.

Another key feature of this remnant is the long white line running from left to right across the center called the equatorial belt. This structure is thought to be created when the star—before it died—expelled material from around its equator via winds. The orientation of the equatorial belt suggests the parent star maintained the same spin axis both before and after it exploded.

One puzzling aspect of the image is the lack of evidence for thin filaments of high energy X-ray emission, thought to be an important site for cosmic ray acceleration in supernova remnants. These filaments are seen in other supernova remnants such as Cassiopeia A, Tycho and Kepler. One explanation may be that efficient acceleration occurs primarily in very early stages of supernova remnant evolution, and G292.0+1.8, with an estimated age of several thousand years, is too old to show these effects. Cassiopeia A, Tycho and Kepler, with ages of several hundred years, are much younger.

NASA's Marshall Space Flight Center in Huntsville, Alabama, manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

CREDIT: NASA/CXC/Penn State/S.Park et al.
RELEASED: October 23, 2007
SCALE: Image is 11.5 arcmin per side
COORDINATES (J2000): RA 11h 24m 36.00s
Dec -59° 16' 00.00"
CONSTELLATIONS: Centaurus

OBSERVATION DATE: 6 pointings between
09/13/06 to 10/20/06

OBSERVATION TIME: 142 hours
(5 days 22 hours)

COLOR CODE: Red 0.580-710 & 0.880-950 keV,
Orange 0.980-1.100 keV, Green 1.280-1.430 keV,
Blue 1.810-2.050 & 2.400-2.620 keV

DISTANCE ESTIMATE: About 20,000 light years