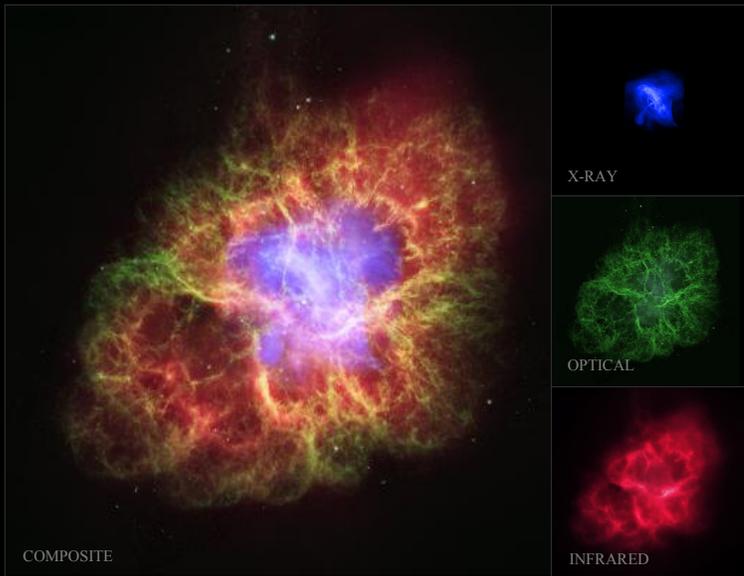


## BULLET CLUSTER

(3.4 billion light-years)

The "Bullet Cluster" galaxy was formed when two large groups of galaxies collided, the most energetic event known in the Universe since the Big Bang. Data from the Hubble Space Telescope and visible light telescopes on the ground show how dark matter (blue) has separated from "normal" matter in the form of hot gas (pink) detected by the Chandra X-ray Observatory.

Credit: X-ray: NASA/CXC/CfA/M.Markevitch et al.; Optical: NASA/STScI; Magellan/U.Arizona/D.Clowe et al.; Lensing Map: NASA/STScI; ESO WFI; Magellan/U.Arizona/D.Clowe et al.

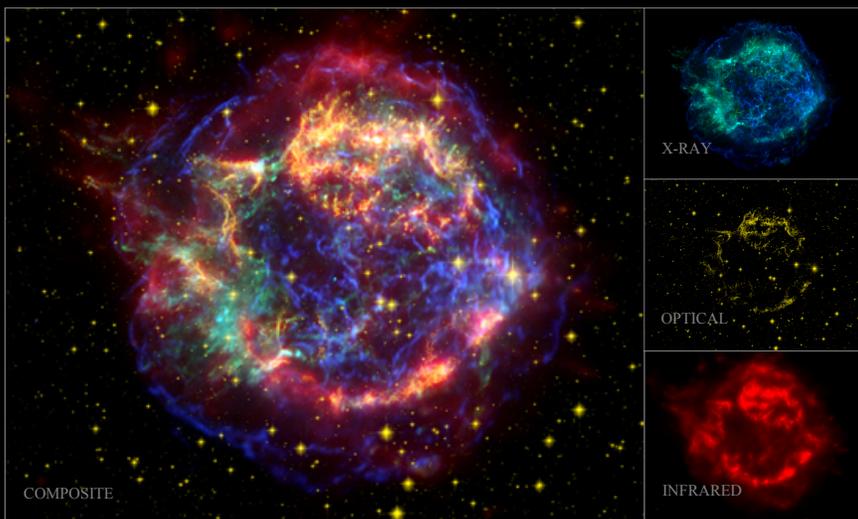


## CRAB NEBULA

(6000 light-years)

The Crab Nebula is the remnant of a supernova explosion recorded by Chinese and Arab astronomers in 1054. At its peak it would have been brighter than every star and planet in the night sky. In its wake the explosion left us the ever-expanding nebula, and a rapidly spinning neutron star called a pulsar at its center. This image was made by the Spitzer Space Telescope (red), the Hubble Space Telescope (green and dark blue) and the Chandra X-ray Observatory (light blue).

Credit: X-ray: NASA/CXC/ASU/J.Hester et al.; Optical: NASA/ESA/ASU/J.Hester & A.Loll; Infrared: NASA/JPL-Caltech/Univ. Minn./R.Gehrz



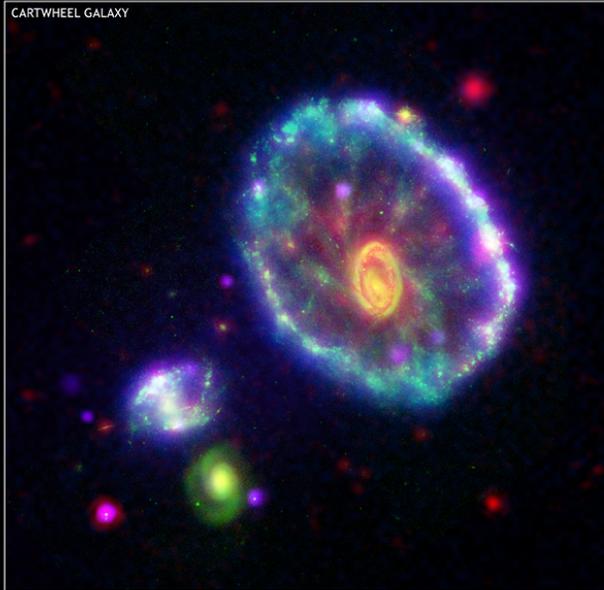
## CASSIOPEIA A

(11,000 light-years)

Cassiopeia A is the youngest supernova remnant in our Milky Way Galaxy, believed to be the leftovers of a massive star that exploded over 300 years ago. The material ejected during the supernova smashed into the surrounding gas and dust at about 16 million kilometers per hour. This collision superheated the debris field to millions of degrees, causing it to glow brightly in X-rays.

Credit: X-ray: NASA/CXC/SAO; Optical: NASA/STScI; Infrared: NASA/JPL-Caltech

CARTWHEEL GALAXY



## CARTWHEEL GALAXY

(400 million light-years)

The unusual shape of the Cartwheel galaxy results from one of the smaller galaxies to the left passing through it about 100 million years ago. This created a huge compression wave, like a ripple in a pond, and this wave triggers intense bouts of star formation. Four of NASA's orbiting observatories collaborated to make this image: the Chandra X-ray Observatory, GALEX in ultraviolet, the Hubble Space Telescope in visible, and the infrared Spitzer Space Telescope.

Credit: Composite image made by P. Appleton et al. for NASA / JPL-Caltech / ESA.

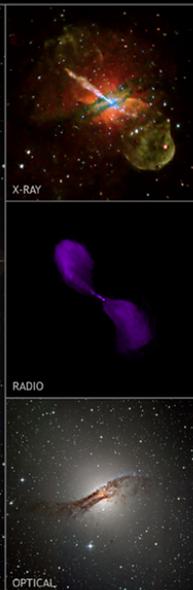
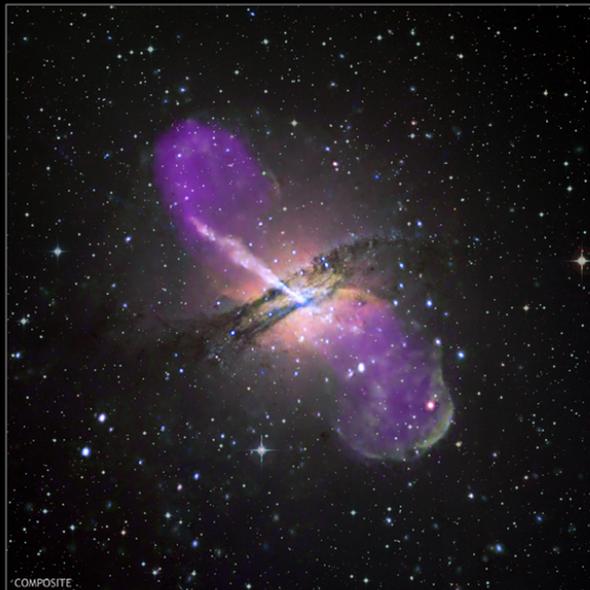


## M101

(23 million light-years)

The galaxy Messier 101 (M101) is a swirling spiral of stars, gas, and dust whose diameter is nearly twice that of our Milky Way galaxy. Infrared data from Spitzer reveals the galaxy's delicate dust lanes. In Hubble's visible light image, the bright clumps are regions where new stars have formed, while the core consists mainly of old stars. Meanwhile, X-rays from Chandra show the remains of exploded stars and million-degree gas that permeates the galaxy.

Credit: X-ray: NASA / CXC / JHU / K.Kuntz et al; Optical: NASA / STScI; Infrared: NASA / JPL-Caltech.



## CENTAURUS A

(11 million light-years)

A dramatic image from NASA's Chandra X-ray Observatory of the nearby galaxy Centaurus A provides one of the best views ever of the effects of an active supermassive black hole (bright dot at the center). A prominent jet is seen extending for 13,000 light years and points to the upper left in the image, with a shorter "counterjet" aimed in the opposite direction.

(Credit: X-ray: NASA/CXC/CfA/R.Kraft et al; Radio: NSF/VLA/Univ.Hertfordshire/M.Hardcastle; Optical: ESO/WFI/M.Rejkuba et al.)