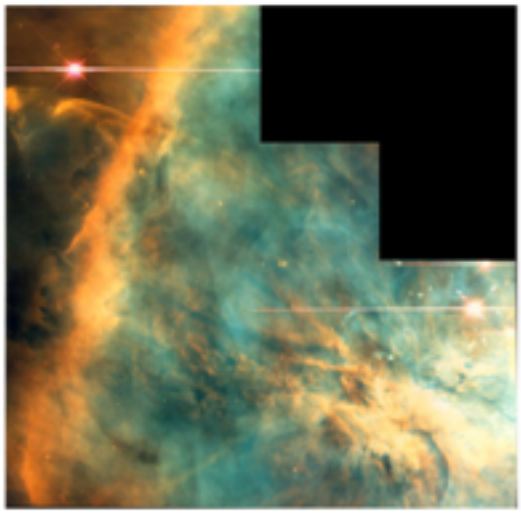
Stages of Stars' Life

#1 - The Great Orion Nebula

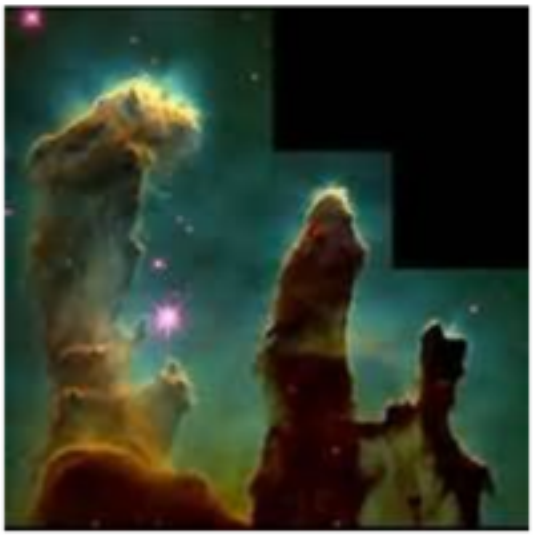


This is one of the nearest regions of very recent star formation (300,000 years ago). The nebula is a giant gas cloud illuminated by the brightest of the young hot stars on the right side of the picture. Many of the fainter young stars are surrounded by disks of dust and gas, that are slightly more than twice the diameter of the solar system (or 100 Astronomical Units in diameter).
The great plume of gas in the upper left in this picture is the result of the ejection of material from a recently formed star.

The diagonal length of the image is 1.6 light years. Red light depicts emission in Nitrogen, green is Hydrogen, and blue is Oxygen.

The Orion Nebula star-birth region is 1,500 light-years away.

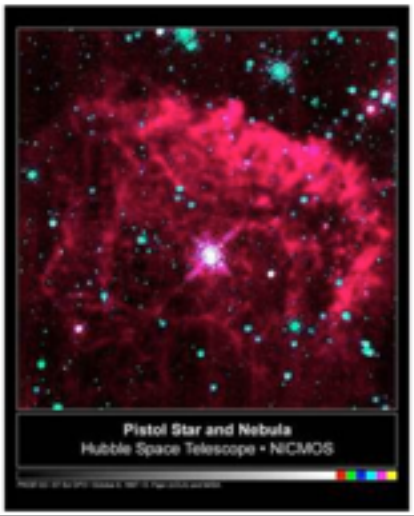
#2 - Eggs in the Eagle Nebula (M16)



Eerie, dramatic pictures from the Hubble telescope show newborn stars emerging from "eggs" - not the barnyard variety - but rather, dense, compact pockets of interstellar gas called evaporating gaseous globules (EGGs). Hubble found the "EGGs," appropriately enough, in the Eagle nebula, a nearby star-forming region 7,000 light-years from Earth in the constellation Serpens.

The columns - dubbed "elephant trunks" - protrude from the wall of a vast cloud of molecular hydrogen, like stalagmites rising above the floor of a cavern. Inside the gaseous towers, which are light-years long.

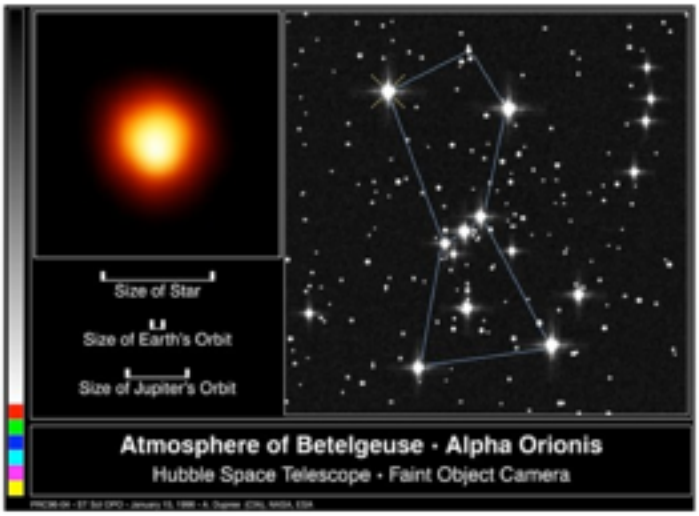
#3 - Most Mammoth Star Known – The Pistol Star



Astronomers using the Hubble telescope have identified what may be the most luminous star known ? a celestial mammoth that releases up to 10 million times the power of the Sun and is big enough to fill the diameter of Earth's orbit. The star [center of image] unleashes as much energy in six seconds as our Sun does in one year.

The image, taken in infrared light, also reveals a bright nebula [magenta-colored material], created by extremely massive stellar eruptions. The nebula is so big (4 light-years) that it would nearly span the distance from the Sun to Alpha Centauri, the nearest star to Earth's solar system.

#4 - Betelgeuse – First Direct Image of A Star Other Than the Sun

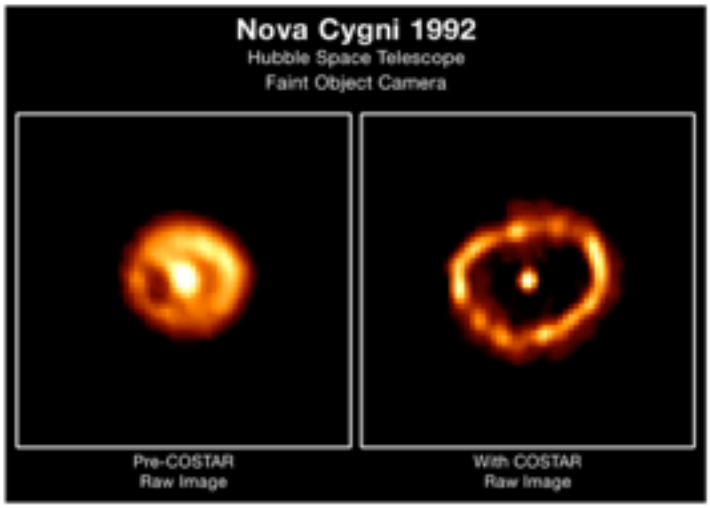


This is the first direct image of a star other than the Sun, made with NASA's Hubble Space Telescope. Called Alpha Orionis, or Betelgeuse, it is a red supergiant star marking the shoulder of the winter constellation Orion the Hunter (diagram at right).

The Hubble image reveals a huge ultraviolet atmosphere with a mysterious hot spot on the stellar behemoth's surface. The enormous bright spot, twice the diameter of the Earth's orbit, is at least 2,000 Kelvin degrees hotter than the surface of the star.

Betelgeuse is so huge that, if it replaced the Sun at the center of our Solar System, its outer atmosphere would extend past the orbit of Jupiter (scale at lower left).

#5 – Shell of Gas Around a White Dwarf



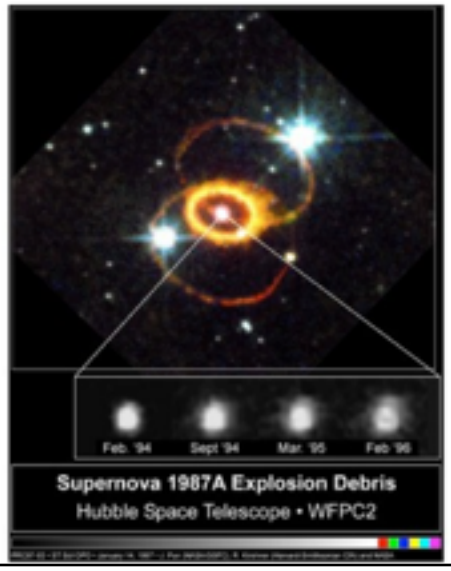
The Hubble telescope has given astronomers their best look yet at a rapidly ballooning bubble of gas blasted off a star.

The shell surrounds Nova Cygni 1992, which erupted Feb. 19, 1992. A nova is a thermonuclear explosion that occurs on the surface of a white dwarf star in a double-star system.

The image [right], taken after Hubble's near-sightedness had been corrected, reveals an elliptical and slightly lumpy ring-like structure. The ring is the edge of a bubble of hot gas blasted into space by the nova.

Another Hubble picture taken 467 days after the explosion [left] provided the first glimpse of the ring and a mysterious bar-like structure. But the image interpretation was severely hampered by the telescope's blurred vision.

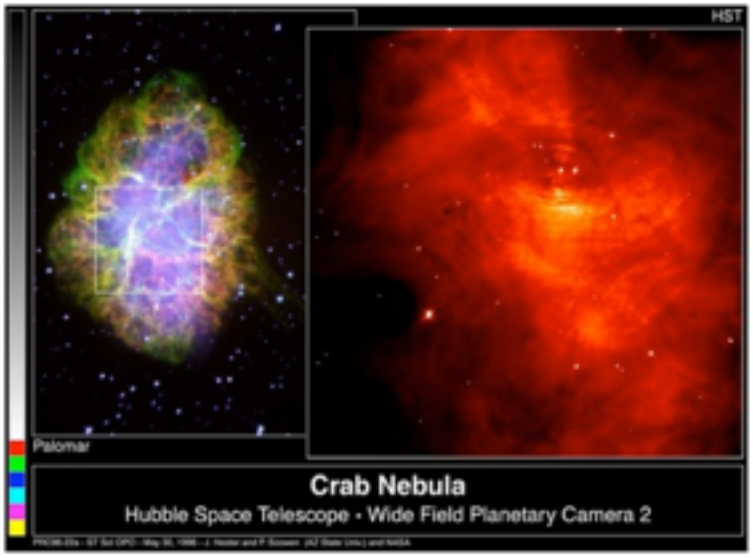
#6 – Supernova Remnant



Though the brightest supernova in four centuries lit up the southern sky almost exactly 10 years ago on Feb. 23, 1987, astronomers have waited a decade for the ballooning fireball to become large enough, about one-sixth of a light-year, to be resolved from Earth's orbit with the Hubble telescope.

Hubble's sharp "eyes" have resolved a dumbbell-shaped structure, one-tenth of a light-year long, that consists of two blobs of debris expanding apart at nearly 6 million mph from each other. This Hubble picture shows the supernova, designated 1987A, and its neighborhood. The four frames follow the evolution of the supernova debris.

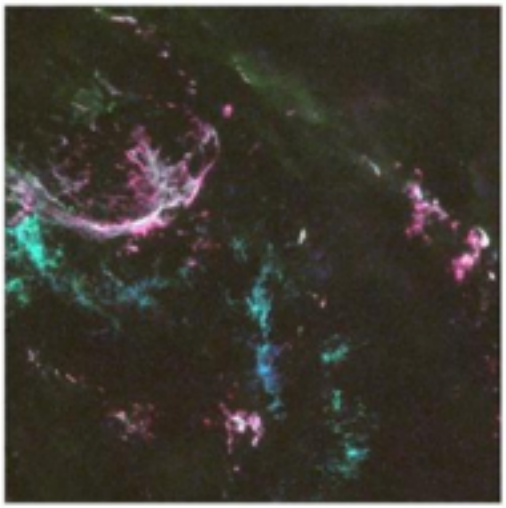
#7 – Crab Nebular Pulsar



The sequence of pictures is giving astronomers a remarkable look at the dynamic relationship between the tiny Crab pulsar - the collapsed core of the exploding star - and the vast nebula of dust and gas that it powers.

This picture, which reveals the inner parts of the Crab, represents one frame from the movie. The Crab pulsar is the star on the left [white dot] near the center of the frame. Surrounding the pulsar is a complex of sharp knots and wisp-like features.

#8 – Oxygen Rich Supernova Remnant



This is a Hubble telescope image of the tattered debris of a star that exploded 3,000 years ago as a supernova. This supernova remnant, called N132D, lies 169,000 light-years from Earth in the satellite galaxy, the Large Magellanic Cloud.

A Hubble snapshot of the supernova's inner regions shows the complex collisions that take place as fast-moving material slams into cool, dense interstellar clouds. This level of detail in the expanding filaments could only be seen previously in much closer supernova remnants.

Now, Hubble's capabilities extend the detailed study of supernovae to the distance of a neighboring galaxy.