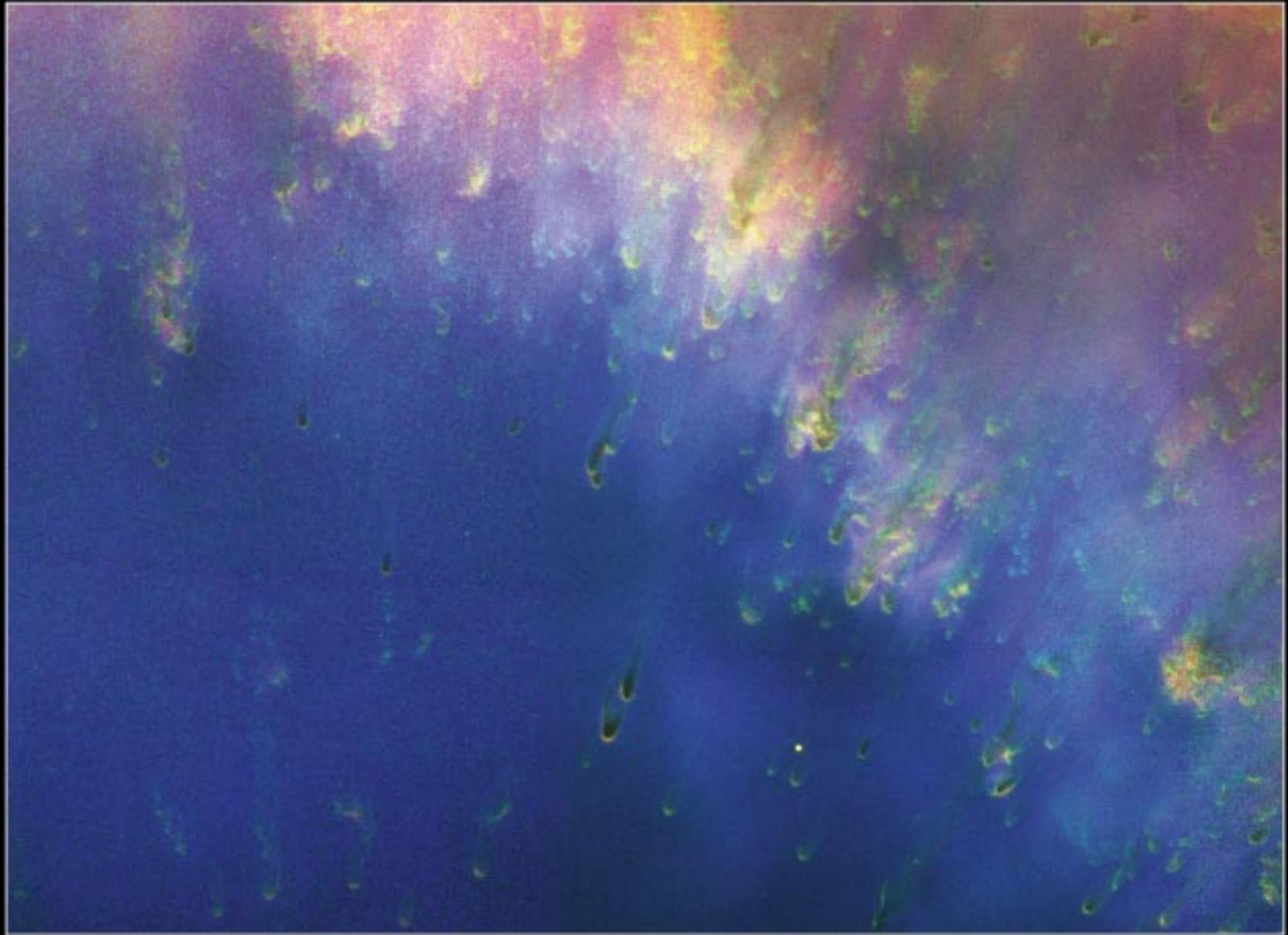


Helix Nebula



Helix Nebula

Even astronomers were surprised when they saw the thousands of gigantic tadpole-shaped objects surrounding a dying star in the Helix Nebula, the closest planetary nebula to Earth at 700 light-years away in the constellation Aquarius. Called “cometary knots” because of their resemblance to comets, they had not previously been seen in such abundance until the Hubble Space Telescope took this image.

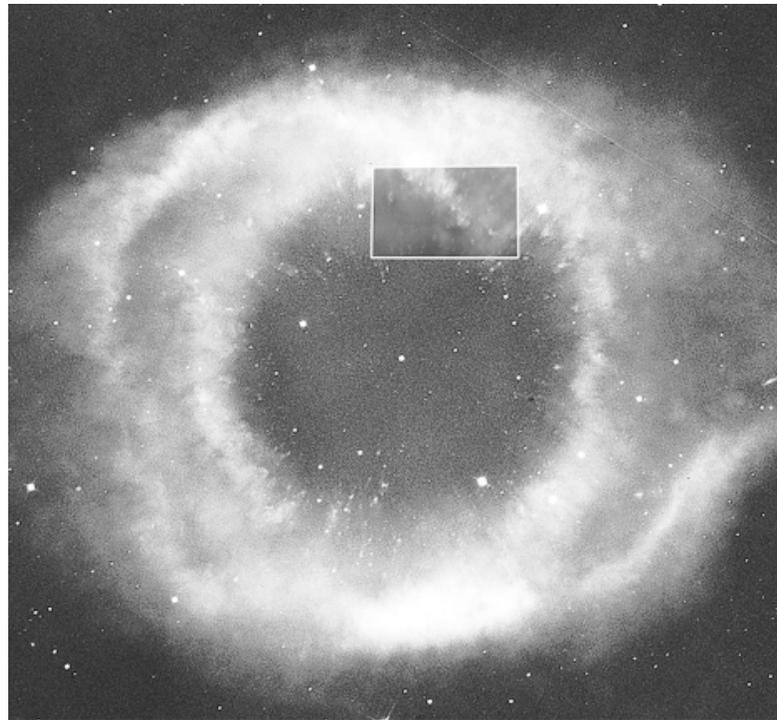
Dissecting the Knots

The gaseous knots are enormous. Each head is at least twice the size of our solar system and each tail stretches at least 100 billion miles, about 1,000 times the Earth’s distance to the Sun. Astronomers believe that the knots probably formed when hot gas spewed by the doomed star collided with cooler gas that the star had ejected 10,000 years before. Astronomers believe that eventually the gaseous knots will dissipate into the cold blackness of space.

Dark Icy Worlds?

It also is possible that these objects will contract to form permanent bodies, snowballing to form planet-sized objects. These icy worlds will then escape the dead star and presumably roam interstellar space forever. If this phenomena is common among stars, then our galaxy could be littered with trillions of these objects, which may contribute to a fraction—less than 10 percent—of the missing mass in our galaxy. Astronomers know that so-called dark matter exists because its gravity affects the motion of stars.

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About the Image

The mysterious “space pods” came into view as astronomer C. Robert O’Dell used the Hubble Space Telescope’s Wide Field Planetary Camera 2 to survey the Helix Nebula, which is so close that its angular size is almost half that of the full Moon. The most visible knots all lie along the inner edge of the doomed star’s ring. The red light depicts nitrogen emission; green, hydrogen and blue, oxygen.

Definitions

Planetary Nebula: mostly circular, expanding envelopes of gas thrown off by a dying star, like our sun, before ending its life as a white dwarf. The name is misleading; the objects appeared as fuzzy planets in early telescopes.

White Dwarf: remnant left at the end of the life of a low mass star like our Sun, compressed to the size of the Earth; shines only from left-over heat from earlier nuclear fusion.

Dark Matter: also called “missing” mass, which may constitute 90 percent of all mass in the universe. Scientists believe dark matter (made up of dead stars, black holes and unknown exotic particles) may exist because of unexplained gravitational tugging on visible matter.

Fast Facts

Location

In the constellation Aquarius

Distance from Earth

700 light-years

Size

Each cometary knot is at least twice the size of our solar system; each tail stretches for 100 billion miles, about 1,000 times the distance between the Earth and Sun.

Electronic Addresses

You can get images and other information about the Hubble Space Telescope using the Internet.

Using the World Wide Web (Netscape Navigator, Microsoft Internet Explorer, and other browsers), use URL <http://opposite.stsci.edu/public.html> and follow links from there.

Using ftp, connect to [ftp.stsci.edu](ftp://ftp.stsci.edu) and find files and directories in /pubinfo.