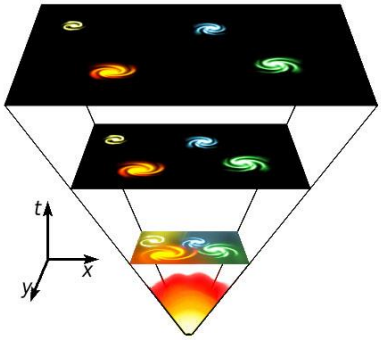
Universe Cards

The Universe

Age: 13.8 billion years

Everything that exists including all of time and space. Stars, planets, galaxies, space objects, dark matter, and human beings are all part of the universe. The universe is currently expanding and that expansion is speeding up. Its ultimate fate is unknown.



The Big Bang

When: 13.8 billion years ago

The most widely accepted scientific theory for how the universe began. Before the Big Bang, nothing in our universe existed, not even time or space. In that instant, matter exploded rapidly into existence from a single concentrated point.

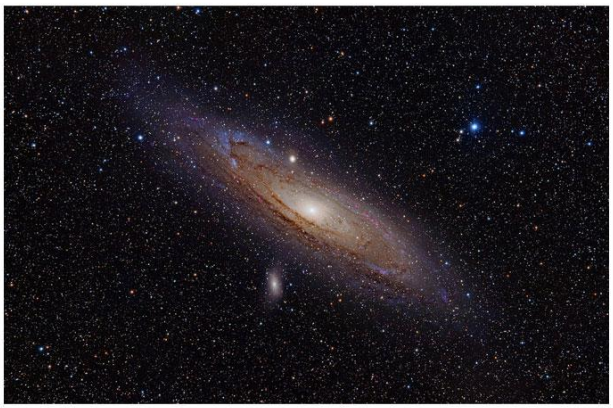
Milky Way Galaxy

Type: Barred Spiral Galaxy

Diameter: 100-180 kilo-light-years

Number of Stars: 200-400 billion

The Milky Way is the galaxy that contains our Solar System. All of the stars that can be seen in our night sky belong to the Milky Way. At the center of the Milky Way is likely a supermassive black hole.



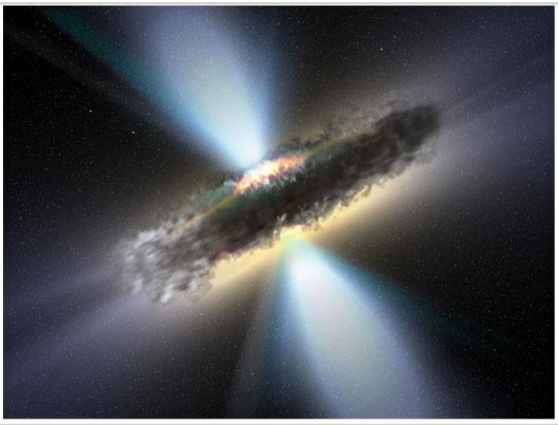
Andromeda Galaxy

Type: Spiral Galaxy

Diameter: ~260 kilo-light-years

Number of Stars: about 1 trillion

Andromeda is the closest major galaxy to the Milky Way. It is part of the same Local Group of galaxies. Andromeda is expected to collide with the Milky Way in about 4 billion years.

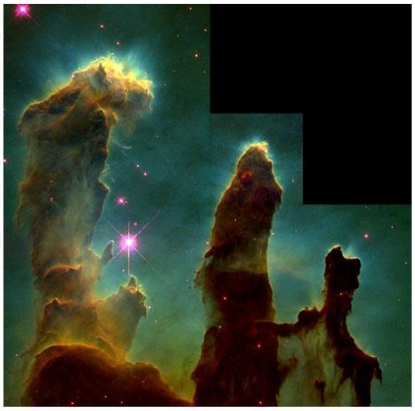


Black Hole

An extremely dense space object with such a strong gravitational field that nothing can escape, including light. Black holes form when a massive star collapses. Many galaxies are thought to have black holes at their centers.

Neutron Star

An extremely dense space object consisting mostly of neutrons that forms when a massive star collapses, but does not become a black hole. A sugar cube size amount would weigh about a billion tons.



Eagle Nebula

Age: ~5.5 million years
Constellation: Serpens
Distance: 7,000 light-years
Discovered by Jean-Philippe de Cheseaux in 1745-46 and contains many star-forming regions such as the "Pillars of Creation" featured in this image.

Cat's Eye Nebula

Age: ~1,000 years
Constellation: Draco
Distance: ~3,300 light-years
Discovered by William Hershel in 1786. The first planetary nebula to be studied using spectroscopy. Contains many concentric dust shells.

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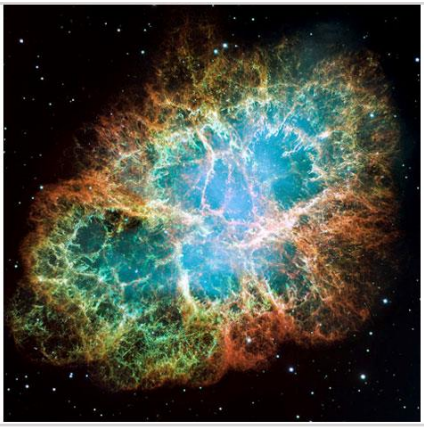


Crab Nebula

Age: ~1,000 years

Constellation: Taurus

Distance: ~6,500 light-years

In 1054, Chinese astronomers observed the supernova associated with this nebula, which was first observed in 1731 by John Bevis. At its center is a pulsar.

Carina Nebula

Age: ~3 million years

Constellation: Carina

Distance: ~6.5-10 kilo-light-years

Discovered in 1751-52 by Nicolas Louis de Lacaille. Contains some of the most luminous and massive stars in the Milky Way galaxy.

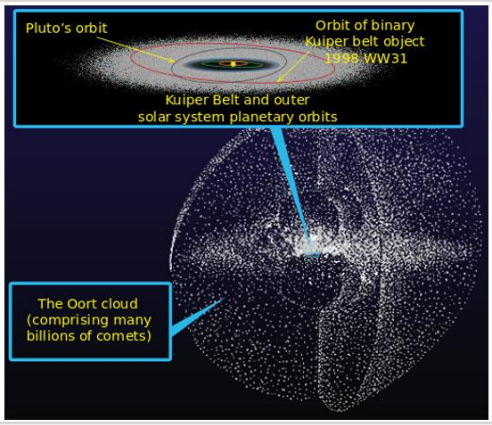
Helix Nebula

Age: ~10,600 years

Constellation: Aquarius

Distance: ~700 light-years

Discovered before 1824 by Karl Ludwig Harding. One of the closest bright planetary nebula to Earth. Sometimes referred to as the "Eye of God." Central core destined to become a white dwarf.



Oort Cloud

A theoretical cloud of mostly icy rocks that surrounds our Solar System marking the edge of the Sun's gravity. It is likely the remains of the nebula that became our Solar System. Most comets are believed to originate in the Oort Cloud.

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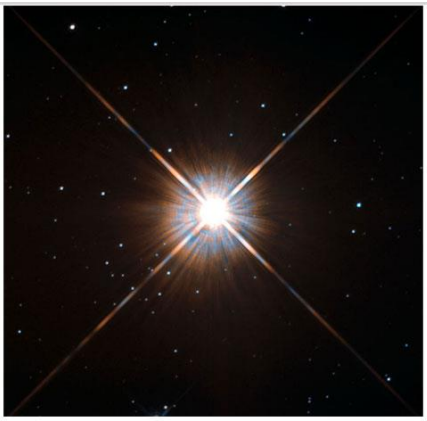
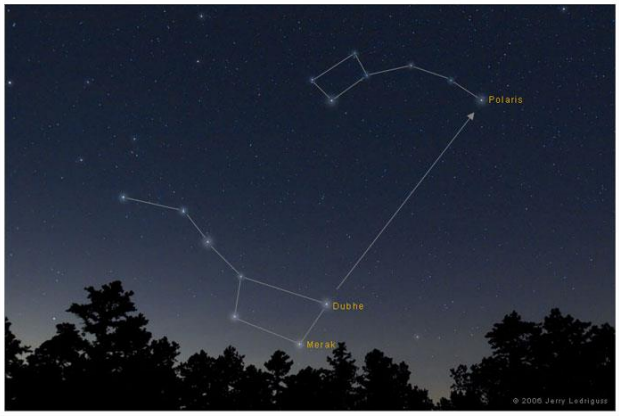


Star

A giant sphere of ionized gas (called plasma) that releases light due to the nuclear fusion reactions taking place in its core. Stars are continually being born and all stars eventually die. Our sun is the cloest star to Earth.

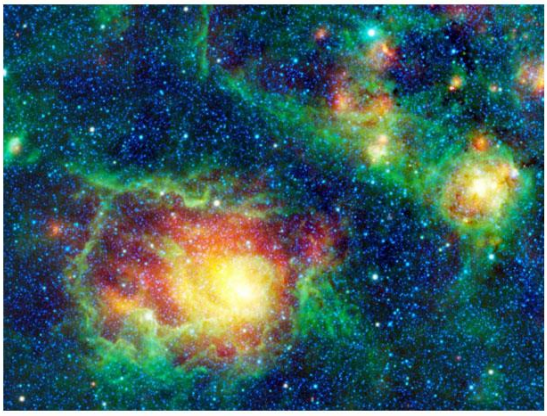
Galaxy

A group of stars, dust, gas, and dark matter held together by gravity. There are about 170 billion galaxies in the observable universe of all shapes and sizes, each containing billions of stars.



Constellation

In modern astrononomy, a constellation is one of 88 defined regions of the sky. Historically, it meant a grouping of stars named after the form or mythical figure it resembled. This image shows the Big and Little Dippers.



Nebula

An interstellar, glowing cloud of gas and dust. Nebulae can form when a star explodes in a supernova or collapses into a white dwarf. Nebulae are also frequently regions where new stars are born.

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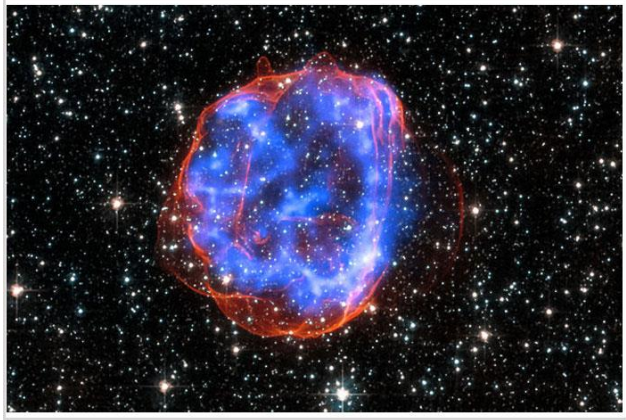


Supernova

The explosion at the end of a massive star's life cycle. Large quantities of light, radiation, and matter are expelled from the star during a supernova. The expanding shell of gas and dust is called a supernova remnant.

Pulsar

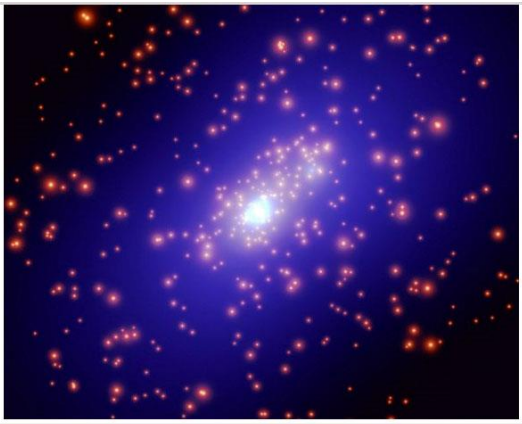
A type of highly magnetized, rotating neutron star that emits a beam of radio energy as it spins. As the beam sweeps over Earth, a pulse is detected at a rates of up to 1,000 per second.

Quasar

The region in the center of a galaxy around a supermassive black hole that emits large amount of energy. Appears star-like (quasi-stellar) in a telescope. Now known to be the result of a collision between a galaxy and its central black hole.

Globular Cluster

Spherical regions of space packed with stars and held together by gravity. Some of the oldest stars in the universe are in globular clusters. There are about 150 to 158 known globular clusters in the Milky Way galaxy.



Dark Matter

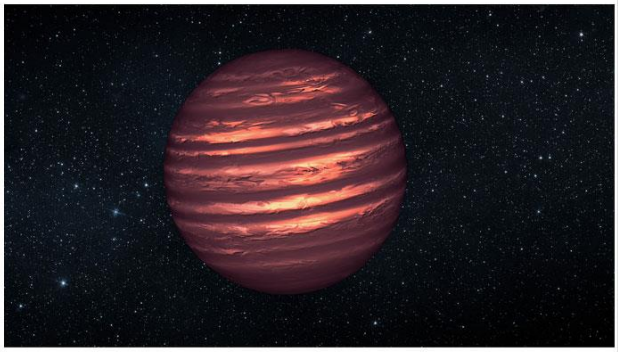
Theoretical, mysterious, invisible matter that makes up 84.5% of the matter in the universe. Dark matter can be inferred from its gravitational effects. The image shows the distribution of dark matter within a galaxy in blue.

Gamma Ray Bursts

The brightest explosions in the universe that release a burst of high energy radiation called gamma rays. Many gamma ray bursts are the result of supernovas or hypernovas.

White Dwarf

The dense remnant of a once larger star, like our Sun, that has used up all its fuel. Larger stars become black holes or neutron stars at the end of their life cycle. Smaller stars become white dwarfs.



Brown Dwarf

A faintly glowing space object larger than a gas giant planet, but not massive enough to become a star. Unlike main-sequence stars, brown dwarfs do not contain enough mass to sustain nuclear fusion reactions in their cores.

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Virgo Cluster Galaxies - http://apod.nasa.gov/apod/ap110422.html

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153309 Main Hidden Blackhole - http://www.nasa.gov/vision/universe/starsgalaxies/integral_blackholes.html

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Helix Nebula – Unraveling at the Seams - http://www.nasa.gov/multimedia/imagegallery/image_feature_2368.html

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The Big Dipper - http://apod.nasa.gov/apod/ap070108.html

WISE Catches the Lagoon Nebula in Center of Action - http://www.nasa.gov/mission_pages/WISE/multimedia/gallery/pia13453.html

"NASA-SNR0519690-ChandraXRayObservatory-20150122" by X-ray: NASA/CXC/Rutgers/J.Hughes; Optical: NASA/STScI - http://astropix.ipac.caltech.edu/image/chandra/587b (direct link); see also http://chandra.harvard.edu/photo/2015/iyl/. Licensed under Public Domain via Wikimedia Commons - https://commons.wikimedia.org/wiki/File:NASA-SNR0519690-ChandraXRayObservatory-20150122.jpg#/media/File:NASA-SNR0519690-ChandraXRayObservatory-20150122.jpg

"Chandra-crab" by Optical: NASA/HST/ASU/J. Hester et al. X-Ray: NASA/CXC/ASU/J. Hester et al. - http://hubblesite.org/newscenter/newsdesk/archive/releases/2002/24/image/a. Licensed under Public Domain via Wikimedia Commons - https://commons.wikimedia.org/wiki/File:Chandra-crab.jpg#/media/File:Chandra-crab.jpg

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Dark Matter Map - http://apod.nasa.gov/apod/ap030814.html

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Mini Supernova Explosion Could Have Big Impact - http://www.nasa.gov/mission_pages/chandra/mini-supernova-explosion-could-have-big-impact.html

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