

Pegasus

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Pegasus, the winged horse of Greek mythology, is a prominent constellation in the northern sky, known for its distinctive "Great Square" asterism. As one of the 48 constellations cataloged by the ancient Greek astronomer Ptolemy, Pegasus has a rich cultural and astronomical significance. Its association with the mythical creature Pegasus, ridden by heroes such as Perseus and Bellerophon, adds to its allure and makes it a captivating subject for stargazers.

Keywords: astronomy ; constellation ; IAU ; globular cluster ; galaxy ; star

1. Introduction

Pegasus, named after the legendary winged horse of Greek mythology, is a prominent constellation in the northern celestial hemisphere. Located near the autumn equinox, Pegasus is easily recognizable for its distinctive "Great Square" asterism, formed by four bright stars that outline the horse's body. This constellation holds a significant place in both ancient and modern astronomy, serving as a celestial marker for navigators.

Pegasus spans approximately 1,121 square degrees of the sky, making it the seventh largest constellation in terms of size. Its celestial coordinates lie between approximately 22 and 2 hours of right ascension and 2 to 36 degrees of declination, placing it in the vicinity of the autumn equinox. From mid-northern latitudes, Pegasus is visible year-round, reaching its highest point in the sky during the autumn months. The most recognizable feature of Pegasus is the Great Square asterism, formed by the stars Alpheratz (Alpha Andromedae), Scheat (Beta Pegasi), Markab (Alpha Pegasi), and Algenib (Gamma Pegasi). Alpheratz, traditionally considered part of both Pegasus and the neighboring constellation Andromeda, serves as the northeastern corner of the square. These four stars, although not physically related, create a striking geometric pattern in the sky that aids in identifying Pegasus (**Figure 1**).

Pegasus is also home to several notable deep-sky objects, including the spiral galaxy Messier 31 (the Andromeda Galaxy) and the globular cluster Messier 15. These celestial treasures offer astronomers a wealth of opportunities to explore the mysteries of the universe and unravel the secrets of distant galaxies and star clusters.

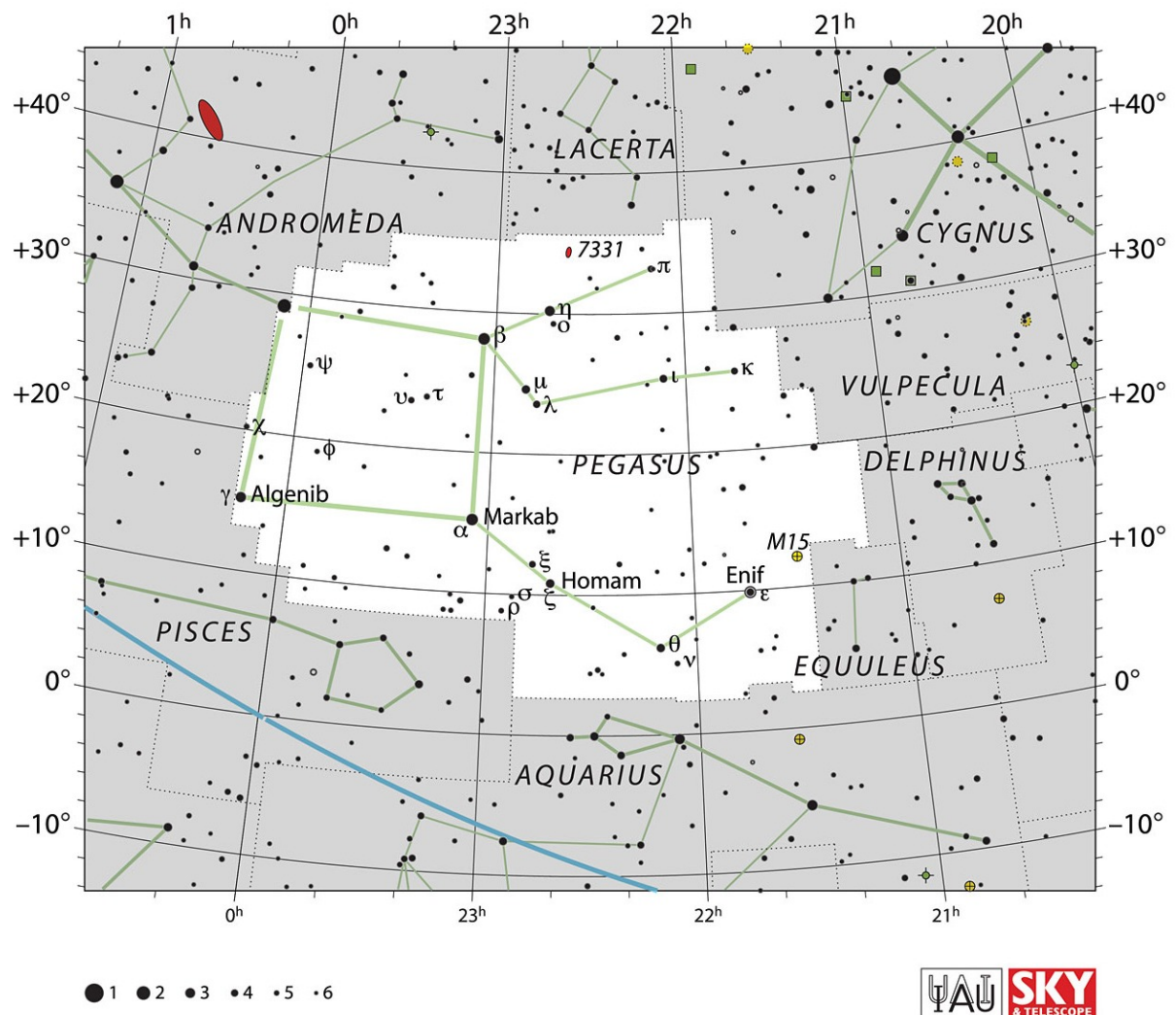


Figure 1. IAU chart of Pegasus. Source: <https://www.iau.org/static/archives/images/screen/peg.jpg>. Credit: IAU and Sky & Telescope. Reproduced under CC BY 4.0 license.

2. Historical Background and Mythology

2.1. Mesopotamian Origins

The origins of Pegasus can be traced back to ancient Mesopotamia, where the constellation was associated with the mythical figure of the horse Anzu, a divine creature known for its speed and agility. Anzu was believed to serve as the mount of the storm god Enlil, carrying him across the heavens and bringing rain and thunder to the earth. The constellation's depiction as a winged horse likely evolved from earlier Mesopotamian representations of Anzu as a swift and powerful steed.

2.2. Greek Mythology

In Greek mythology, Pegasus is most famously known as the winged horse born from the blood of the Gorgon Medusa after she was slain by the hero Perseus. According to legend, Pegasus emerged from the severed neck of Medusa as Perseus flew over the Libyan desert, carrying the head of the Gorgon in his hand. Pegasus then ascended to the heavens, where he became a constellation immortalized among the stars.

Another prominent myth involving Pegasus centers around the hero Bellerophon, who tamed and rode the winged horse to defeat the Chimera, a fearsome creature with the body of a lion, the head of a goat, and the tail of a serpent. With Pegasus's help, Bellerophon was able to fly above the Chimera's fiery breath and strike it down with his spear. Afterward, Bellerophon attempted to ride Pegasus to Mount Olympus, the realm of the gods, but was thrown off by the horse, who was not meant for mortal hands to control.

2.3. Cultural Significance

The imagery of Pegasus has permeated various aspects of ancient and modern culture, from literature and art to astronomy and astrology. In Greek art and mythology, Pegasus is often depicted as a noble and majestic creature, symbolizing the power of flight and the pursuit of divine inspiration. The winged horse has appeared in countless works of art, including sculptures, paintings, and mosaics, where it is often portrayed as a symbol of freedom, strength, and transcendence.

2.4. Astronomical Significance

In astronomy, Pegasus is one of the 48 constellations cataloged by the ancient Greek astronomer Ptolemy in the 2nd century CE. Its prominent position in the northern celestial hemisphere has made it a familiar sight to stargazers throughout history, serving as a celestial marker for navigators and a source of inspiration for astronomers and poets alike. Today, Pegasus remains an enduring symbol of the human quest for knowledge and exploration, reminding us of the boundless possibilities that await us among the stars.

3. Notable Stars

Enif (Epsilon Pegasi): Enif, also known as Epsilon Pegasi, is the brightest star in the constellation Pegasus. It is a supergiant star located approximately 690 light-years away from Earth. Enif shines with an apparent magnitude of around 2.38, making it easily visible to the naked eye. Despite its brightness, Enif is a variable star, exhibiting small fluctuations in brightness over time due to pulsations in its outer layers.

Scheat (Beta Pegasi): Scheat, also known as Beta Pegasi, is another prominent star in Pegasus. It is a red giant star located approximately 196 light-years away from Earth. Scheat is notable for its irregular variability, with its brightness fluctuating by up to half a magnitude over time. Its name is derived from the Arabic word for "upper arm," reflecting its position in the wing of the celestial horse.

Markab (Alpha Pegasi): Markab, also known as Alpha Pegasi, is a blue-white main-sequence star situated approximately 140 light-years away from Earth. It is one of the stars that forms the Great Square asterism of Pegasus, representing the horse's back. Markab has a visual magnitude of around 2.49 and is relatively young compared to other stars in the constellation.

Algenib (Gamma Pegasi): Algenib, also known as Gamma Pegasi, is a blue-white subgiant star located approximately 331 light-years away from Earth. It is one of the stars that form the Great Square of Pegasus, representing the horse's front hoof. Algenib has a visual magnitude of around 2.84 and is notable for its rapid rotation, which causes its equatorial region to bulge outward.

Matar (Eta Pegasi): Matar, also known as Eta Pegasi, is a binary star system located approximately 169 light-years away from Earth. It consists of two main components: a yellow giant star and a fainter companion. Matar is notable for its historical significance, as it served as a reference point for navigators in ancient times. Its name is derived from the Arabic word for "fortunate," reflecting its importance as a guide for travelers.

4. Deep-Sky Objects

Messier 15 (M15) - The Great Pegasus Cluster: Messier 15, also known as the Great Pegasus Cluster, is a globular cluster located approximately 33,600 light-years away from Earth. It is one of the densest and most massive globular clusters in the Milky Way galaxy, containing hundreds of thousands of stars densely packed into a spherical region. M15 is notable for its central concentration of stars, known as a core collapse, which is thought to have resulted from the gravitational interactions between stars within the cluster.

NGC 7331 - The Deer Lick Galaxy: NGC 7331, also known as the Deer Lick Galaxy, is a spiral galaxy located approximately 40 million light-years away from Earth. It is often referred to as the "twin" of the Milky Way due to its similar size and structure. NGC 7331 is notable for its prominent spiral arms and central bulge, which are believed to be the result of ongoing star formation and gravitational interactions with neighboring galaxies. It serves as a prime example of a spiral galaxy and provides valuable insights into the processes of galaxy formation and evolution.

Stephan's Quintet (NGC 7317, NGC 7318A, NGC 7318B, NGC 7319, NGC 7320): Stephan's Quintet is a compact group of five galaxies located approximately 280 million light-years away from Earth. It is named after the French astronomer Édouard Stephan, who first discovered the group in 1877. Four of the galaxies in Stephan's Quintet are

gravitationally bound to each other, while the fifth, NGC 7320, is thought to be a foreground galaxy unrelated to the others. The galaxies in Stephan's Quintet exhibit various stages of interaction, including tidal distortions, starbursts, and gas stripping.

The Einstein Cross (Q2237+030): The Einstein Cross is a gravitational lens system located approximately 8 billion light-years away from Earth. It is formed by a distant quasar whose light is gravitationally lensed by a foreground galaxy, producing four distinct images of the quasar arranged in a cross-shaped pattern. The Einstein Cross is named after the physicist Albert Einstein, who first predicted the phenomenon of gravitational lensing in his theory of general relativity. This rare and spectacular cosmic phenomenon provides astronomers with a unique opportunity to study the distribution of dark matter and the structure of the universe.

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