Auriga

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Auriga, an IAU-recognized constellation, lies in the northern celestial hemisphere. Notable for its pentagonal shape, it encompasses several bright stars, including Capella. This constellation is visible during winter and contains various deep-sky objects like star clusters and nebulae.

IAU constellation astronomy

1. Introduction

Auriga, officially recognized by the International Astronomical Union (IAU), is a constellation located in the northern celestial hemisphere. It occupies a significant portion of the winter sky, making it a prominent feature for observers in the northern latitudes. Auriga is characterized by its distinctive pentagonal shape, formed by its brightest stars, with the notable Capella adorning its zenith (**Figure 1**).

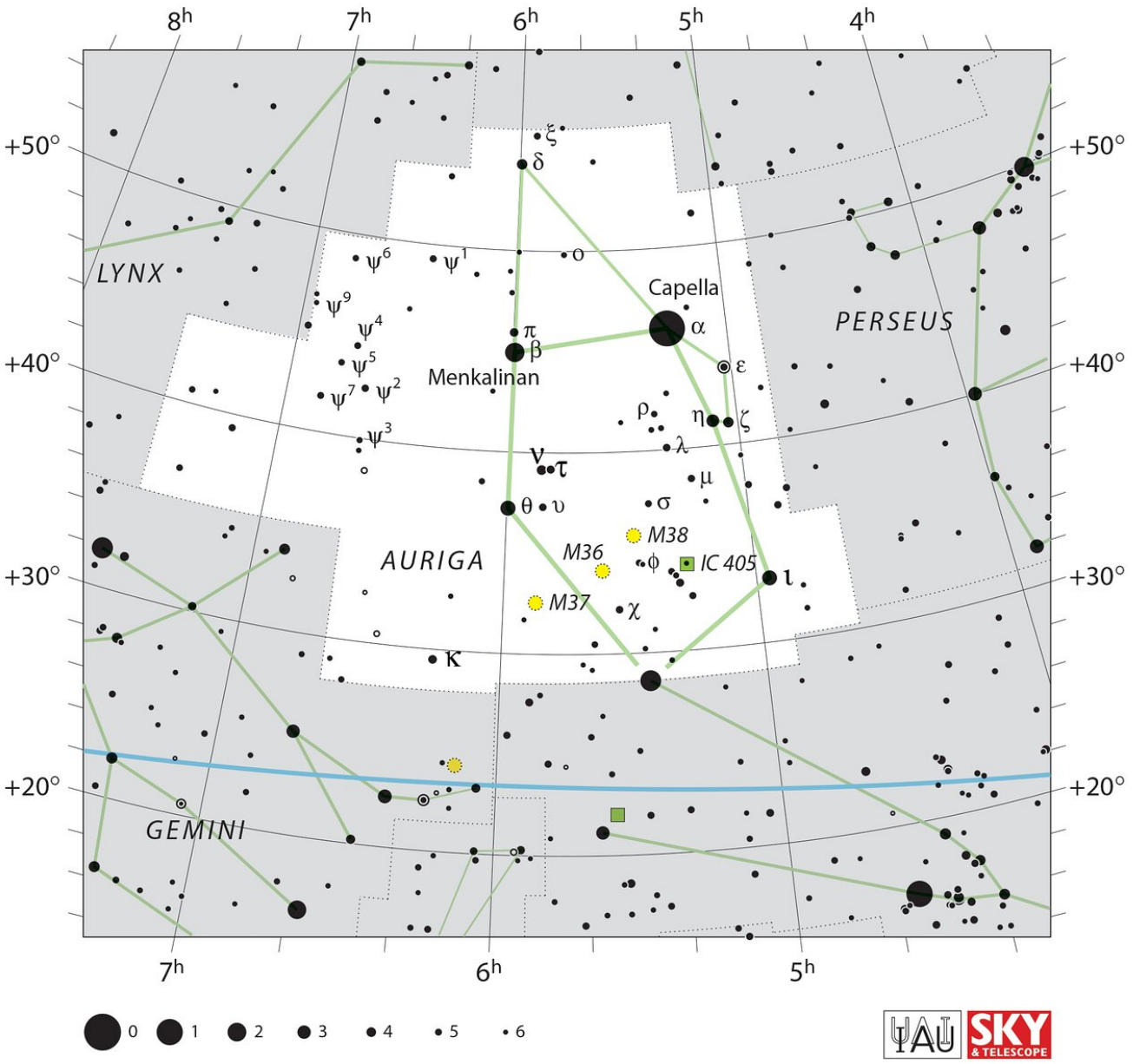


Figure 1. IAU chart of Auriga. Source: https://www.iau.org/static/archives/images/screen/aur.jpg. Credit: IAU and Sky & Telescope. Reproduced under CC BY 4.0 license.

The celestial coordinates of Auriga lie approximately between right ascension 4 hours and 7 hours and declination +27 degrees to +56 degrees. Positioned between the constellations of Perseus, Taurus, Gemini, and Lynx, Auriga offers stargazers and astronomers a wealth of celestial wonders to explore.

At the heart of Auriga shines Capella, a binary star system consisting of two pairs of stars. Capella is one of the brightest stars in the northern hemisphere and serves as a guiding light for navigators and celestial enthusiasts alike. Its golden hue and prominent position make it a striking sight in the night sky. Aside from Capella, Auriga boasts several other notable stars, including Menkalinan, Alkaid, and Mahasim, each adding to the constellation's celestial tapestry. Auriga is also home to various deep-sky objects, such as star clusters and nebulae, including the open clusters M36, M37, and M38, which are popular targets for amateur astronomers.

In ancient mythology, Auriga is often associated with multiple figures, including the charioteer Erichthonius from Greek mythology and the Babylonian hero Gilgamesh. The constellation's significance transcends cultural boundaries, symbolizing various themes such as guidance, skill, and exploration.

2. Historical Background and Mythology

Auriga, a constellation located in the northern celestial hemisphere, has a rich historical background and is steeped in mythology dating back to ancient civilizations. Its name is Latin for "charioteer," reflecting its association with the figure of a charioteer or chariot driver, a motif found in various cultures throughout history.

In Greek mythology, Auriga is often associated with the story of Erichthonius, the mythical king of Athens. According to legend, Erichthonius was the son of Hephaestus, the god of fire and craftsmanship, and Gaia, the Earth goddess. Erichthonius is credited with the invention of the four-horse chariot, a significant technological advancement in ancient times. As a result, he is often depicted as a charioteer riding a celestial chariot across the night sky.

Another interpretation of Auriga in Greek mythology associates the constellation with Myrtilus, the charioteer of King Oenomaus of Elis. In this myth, Myrtilus assists the hero Pelops in winning a chariot race against King Oenomaus, ultimately leading to the king's downfall. As a reward for his aid, Myrtilus is honored with a place among the stars as the constellation Auriga.

In Babylonian astronomy, Auriga is associated with the figure of Gilgamesh, a legendary king of the city-state of Uruk. Gilgamesh is depicted as a heroic figure, renowned for his strength and courage, and is often depicted riding a celestial chariot across the heavens.

In addition to these myths and legends, Auriga holds significance in other cultures and civilizations throughout history. In ancient Egypt, the constellation may have been associated with various deities, such as Osiris or Horus, depending on regional and cultural variations. In Chinese astronomy, Auriga is often associated with the Vermilion Bird, one of the four mythological creatures that symbolize the cardinal directions.

From ancient times to the present day, Auriga has served as a celestial marker and cultural symbol, representing themes of skill, guidance, and heroism. Its prominent position in the night sky and its association with mythical figures and legends have inspired awe and wonder in observers throughout the ages.

3. Notable Stars

3.1. Capella (Alpha Aurigae)

Capella is the brightest star in the constellation Auriga and the sixth brightest star in the night sky. It is a multiple star system located approximately 42 light-years away from Earth. Capella consists of four individual stars grouped

into two binary pairs. The primary pair, Capella Aa and Capella Ab, are both yellow giant stars. Capella Aa is the brighter of the two, with a spectral type of G8III, indicating it is a giant star nearing the end of its life cycle. Capella Ab is slightly fainter and cooler, with a spectral type of G0III. These two stars orbit each other with a period of about 104 days. The secondary pair, Capella H and Capella L, are both red dwarf stars. They are much fainter than the primary pair and orbit each other at a greater distance. Capella H is a spectral type of M0V, while Capella L is a spectral type of M2V.

Capella's name means "little goat" in Latin and reflects its association with the charioteer's goats in Greek mythology. Its distinctive golden hue and prominent position in the sky make it a popular target for stargazers and astronomers alike.

3.2. Menkalinan (Beta Aurigae)

Menkalinan is the second brightest star in the constellation Auriga. It is a binary star system located approximately 81 light-years away from Earth. Menkalinan consists of two main-sequence stars orbiting each other.

The primary star, Menkalinan A, is a spectral type A2V star, indicating it is a blue-white main-sequence star. It is the brighter of the two components and contributes most of the system's light. The companion star, Menkalinan B, is a spectral type F0V star, slightly cooler and fainter than the primary.

Menkalinan is notable for its role as one of the stars forming the pentagonal shape that represents Auriga's "Charioteer" in the night sky. Its proximity to Capella and its own binary nature make it an interesting object for observation and study in astronomy.

4. Deep-Sky Objects

4.1. Messier 36 (M36)

Messier 36, also known as NGC 1960, is an open star cluster located in the northern part of Auriga. It is one of three open clusters in Auriga that make up the Auriga Cluster, along with M37 and M38. M36 is relatively young, with an estimated age of about 25 million years. It contains over 60 stars, including several bright blue-white giants. M36 is visible with binoculars or a small telescope and is a popular target for amateur astronomers.

4.2. Messier 37 (M37)

Messier 37, also known as NGC 2099, is another open star cluster in Auriga. It is the richest and most densely populated of the three Auriga clusters, containing over 500 stars. M37 is older than M36, with an estimated age of about 300 million years. The cluster is arranged in a loose, irregular shape and contains stars of various colors and magnitudes. M37 is visible to the naked eye under dark skies and is a spectacular sight through binoculars or a telescope.

4.3. Messier 38 (M38)

Messier 38 is the third open star cluster in the Auriga Cluster. It is located near the border with the constellation Perseus. M38 is younger than M37 but older than M36, with an estimated age of about 220 million years. The cluster contains over 100 stars, arranged in a compact, spherical shape. M38 is visible with binoculars and is a popular target for amateur astronomers due to its proximity to the bright star Capella.

4.4. IC 405 (Flaming Star Nebula)

IC 405, also known as the Flaming Star Nebula, is an emission nebula located in the southern part of Auriga. It is illuminated by the bright star AE Aurigae, which is believed to have formed within the nebula and is responsible for its striking appearance. IC 405 is characterized by its vibrant colors and intricate filaments of gas and dust. It is a challenging object to observe visually but can be captured beautifully through long-exposure astrophotography.

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