Norma

Subjects: Astronomy & Astrophysics
Contributor: Encyclopedia Editorial Office

Norma, Latin for "the square," is a small southern constellation located in the Milky Way. Despite its diminutive size and lack of bright stars, it remains one of the 88 modern constellations recognized by the International Astronomical Union (IAU).

astronomy constellation IAU

1. Introduction

Norma, Latin for "the square," is a constellation nestled within the southern celestial hemisphere. Despite its relatively modest size and dim stellar population, Norma possesses a rich astronomical tapestry, adorned with captivating deep-sky objects. Positioned along the Milky Way, Norma is a part of the larger celestial canvas that stretches across the southern sky. Characterized by its unassuming appearance, Norma covers an area of approximately 165 square degrees, making it one of the smaller constellations in the night sky. Its boundaries are delineated by neighboring constellations, including Scorpius, Ara, Circinus, and Lupus. Norma's celestial coordinates span roughly between 15 and 21 hours of right ascension and -45 to -60 degrees of declination, placing it within the range of visibility for observers located in southern latitudes (**Figure 1**).

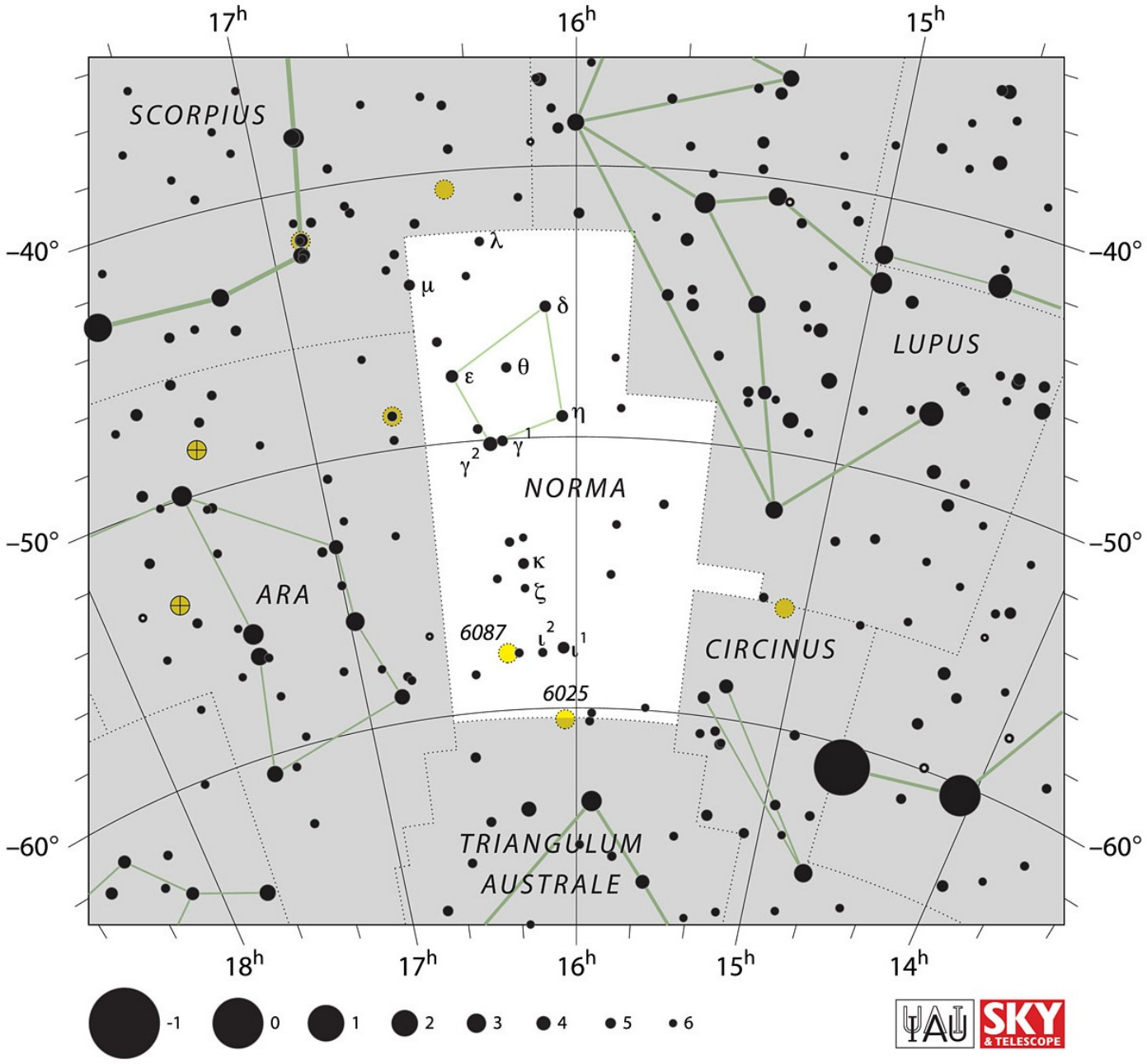

Figure 1. IAU chart of Norma. Source: https://www.iau.org/static/archives/images/screen/nor.jpg. Credit: IAU and Sky & Telescope. Reproduced under CC BY 4.0 license.

While Norma may lack prominent stars that stand out to the naked eye, it compensates with a wealth of deep-sky objects that intrigue astronomers and astrophotographers. Notable features within the constellation include globular clusters, emission nebulae, and dark nebulae, each offering unique insights into the cosmos. The Milky Way passes through Norma, and the constellation contains eight open clusters visible to observers with binoculars.

2. Historical Background and Mythology

Norma was introduced in the 18th century by the French astronomer Nicolas-Louis de Lacaille during his observations of the southern skies from the Cape of Good Hope in South Africa. Unlike many other constellations, Norma does not have a rich cultural or mythological background. Its name, Latin for "the square," reflects its shape as perceived by Lacaille, who sought to fill gaps in the southern sky with new constellations based on geometric figures and scientific instruments.

Norma's inclusion in Lacaille's catalog of constellations underscores the growing influence of scientific exploration and discovery during the Age of Enlightenment. As European astronomers ventured into the southern hemisphere to explore uncharted celestial territories, they encountered unfamiliar constellations that were not part of classical Greek or Roman mythology. In response, astronomers like Lacaille introduced new constellations based on their observations and scientific principles, contributing to the expansion of humanity's understanding of the cosmos.

3. Notable Stars

The four main stars—Gamma, Delta, Epsilon and Eta—make up a square in this region of faint stars. Gamma2 Normae is a multiple star system located in Norma. It consists of at least four stars orbiting each other in a complex dance of gravity. The primary star, Gamma2 Normae A, is a blue-white giant with a spectral type of B2. Its companion stars are fainter and less massive, contributing to the overall dynamism of the system. Gamma2 Normae is situated approximately 595 light-years away from Earth. Epsilon Normae is a spectroscopic binary, with two blue-white main sequence stars of almost equal mass and spectral type (B3V) orbiting each other every 3.26 days. Eta Normae is a yellow giant of spectral type G8III with an apparent magnitude of 4.65.

IM Normae is a recurrent nova in the constellation Norma, one of only ten known in the Milky Way. It has been observed to erupt in 1920 and 2002, reaching magnitude 8.5 from a baseline of 18.3.

4. Deep-Sky Objects

NGC 6067: NGC 6067 is an open cluster located in the northern part of the Norma constellation, near its border with the constellation Circinus, approximately 4,400 light-years away from Earth. This cluster is relatively young, with an estimated age of around 60 million years. NGC 6067 contains dozens of stars, including several bright blue giants that illuminate the surrounding space. It spans about 13 light-years across and is easily observable with binoculars or small telescopes under dark skies.

NGC 6087: NGC 6087 is another open star cluster in Norma. It is located at a distance of approximately 4,100 light-years from Earth. The cluster is famous for its striking appearance, with a diverse array of stars in different colors, ranging from blue to red. NGC 6087 is a favorite target for observers due to its beauty and high concentration of stars. NGC 6087 contains several notable stars, including Kappa Normae, a blue giant with an apparent magnitude of 4.67, and SAO 251800, a red supergiant with an apparent magnitude of 6.64.

NGC 6167: NGC 6167 is an open cluster situated in the northern part of Norma, near its border with the neighboring constellation Scorpius. This cluster is relatively young, with an estimated age of around 5 million years. NGC 6167 contains several dozen stars, including several bright blue giants and main sequence stars. It is notable for its compact appearance and high concentration of stars.

Norma Galaxy Cluster: The Norma Galaxy Cluster, also known as Abell 3627, is a massive cluster of galaxies located in the Norma constellation. It is one of the most massive structures in the universe, containing thousands of galaxies bound together by gravity, at ten times the average cluster mass. Abell 3627 is located about 200 million light-years from Earth, near the center of the Great Attractor.

Shapley 1, also known as the S Normae Cluster, is a planetary nebula located in the constellation Norma. It was discovered by the American astronomer Harlow Shapley in 1936. This nebula is relatively small and faint, making it challenging to observe without the aid of telescopes. The central star of Shapley 1 is a binary system consisting of a white dwarf and a red giant. The interaction between these two stars has resulted in the formation of the planetary nebula, with the white dwarf stripping material from its companion star, causing it to shed its outer layers and form a glowing shell of gas and dust. Shapley 1 exhibits complex structures and intricate filamentary patterns, typical of planetary nebulae. Its appearance is further enhanced by the presence of emission lines from ionized gases, giving it a colorful and ethereal appearance when viewed through telescopes equipped with specialized filters.
