= Norma (constellation) =

Norma is a small constellation in the Southern Celestial Hemisphere between Scorpius and Centaurus , one of twelve drawn up in the 18th century by French astronomer Nicolas Louis de Lacaille and one of several depicting scientific instruments . Its name is Latin for normal , referring to a right angle , and is variously considered to represent a rule , a carpenter 's square , a set square or a level . It remains one of the 88 modern constellations

Four of Norma 's brighter stars ? Gamma , Delta , Epsilon and Eta ? make up a square in the field of faint stars . Gamma2 Normae is the brightest star with an apparent magnitude of 4 @.@ 0 . Mu Normae is one of the most luminous stars known , with a luminosity half- to one million times that of the Sun . Four star systems are known to harbour planets . The Milky Way passes through Norma , and the constellation contains eight open clusters visible to observers with binoculars . The constellation also hosts Abell 3627 , also called the Norma Cluster , one of the most massive galaxy clusters known .

= = History = =

Norma was introduced in 1751 ? 52 by Nicolas Louis de Lacaille with the French name l ? Equerre et la Regle , " the Square and Rule " , after he had observed and catalogued 10 @,@ 000 southern stars during a two @-@ year stay at the Cape of Good Hope . He devised 14 new constellations in uncharted regions of the Southern Celestial Hemisphere not visible from Europe . All but one honored instruments that symbolised the Age of Enlightenment . Lacaille portrayed the constellations of Norma , Circinus and Triangulum Australe , respectively , as a set square and ruler , a compass , and a surveyor 's level in a set of draughtsman instruments , in his 1756 map of the southern stars . The level was dangling from the apex of a triangle , leading some astronomers to conclude he was renaming l ? Equerre et la Regle to " le Niveau " " the level " . In any case , the constellation 's name had been shortened and Latinised by Lacaille to Norma by 1763 .

= = Characteristics = =

Norma is bordered by Scorpius to the north , Lupus to the northwest , Circinus to the west , Triangulum Australe to the south and Ara to the east . Covering 165 @.@ 3 square degrees and 0 @.@ 401 % of the night sky , it ranks 74th of the 88 constellations in size . The three @-@ letter abbreviation for the constellation , as adopted by the International Astronomical Union in 1922 , is ' Nor ' . The official constellation boundaries , as set by Eugène Delporte in 1930 , are defined by a polygon of ten segments (illustrated in infobox) . In the equatorial coordinate system , the right ascension coordinates of these borders lie between 15h 12m 13.6119s and 16h 36m 08.3235s , while the declination coordinates are between ? 42 @.@ 27 ° and ? 60 @.@ 44 ° . The whole constellation is visible to observers south of latitude 29 ° N.

= = Notable features = =

= = = Stars = = =

Lacaille charted and designated ten stars with the Bayer designations Alpha through to Mu in 1756 , however his Alpha Normae was transferred into Scorpius and left unnamed by Francis Baily , before being named N Scorpii by Benjamin Apthorp Gould , who felt its brightness warranted recognition . Though Beta Normae was depicted on his star chart , it was inadvertently left out of Lacaille 's 1763 catalogue , was likewise transferred to Scorpio by Baily and named H Scorpii by Gould . Norma 's brightest star , Gamma2 Normae , is only of magnitude 4 @.@ 0 . Overall , there are 44 stars within the constellation 's borders brighter than or equal to apparent magnitude 6 @.@ 5 .

The four main stars ? Gamma , Delta , Epsilon and Eta ? make up a square in this region of faint stars . Gamma1 and Gamma2 Normae are an optical double , and not a true binary star system . Located 129 ± 1 light @-@ years away from Earth , Gamma2 Normae is a yellow giant of spectral type G8III around 2 to 2 @.@ 5 times as massive as the Sun . It has swollen to a diameter 10 times that of the Sun and shines with 45 times the Sun 's luminosity . It also is half of a close optical double , with a magnitude 10 companion star related by line of sight only . Gamma1 Normae is a yellow @-@ white supergiant , located much further away at around 1500 light @-@ years 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 . There is a third star separated by 22 arcseconds , which has a magnitude of 7 @.@ 5 and is likely a smaller B @-@ type main sequence star of spectral type B9V . The system is 530 ± 20 light @-@ years distant from Earth , Eta Normae is a yellow giant of spectral type G8III with an apparent magnitude of 4 @.@ 65 . It shines with a luminosity approximately 66 times that of the Sun .

Iota1 Normae is a multiple star system . The AB (mag 5 @.@ 2 and 5 @.@ 76) pair orbit each other with a period of 26 @.@ 9 years ; they are 2 @.@ 77 and 2 @.@ 71 times as massive as the Sun respectively . The pair are 128 ± 6 light @-@ years distant from Earth . A third component is a yellow main sequence star of spectral type G8V with an apparent magnitude of 8 @.@ 02 .

Mu Normae is a remote blue supergiant of spectral type O9.7Iab , one of the most luminous stars known . Uncertainties regarding its distance leave open the possibility that Mu Normae could be up to a million times as luminous and 60 times as massive as the Sun , though it is more likely to have around 500 @,@ 000 times the Sun 's luminosity and 40 times its mass . It is suspected of being an Alpha Cygni variable , with a magnitude range of 4 @.@ 87 ? 4 @.@ 98 . QU Normae is another hot blue @-@ white star that is a variable , ranging from magnitude 5 @.@ 27 to 5 @.@ 41 over 4 @.@ 8 days . Lying near Eta Normae is R Normae , a Mira variable . Its visual magnitude range is 6 @.@ 5 ? 13 @.@ 9 and its average period is 507 @.@ 5 days . Located halfway between Eta Normae and Gamma Circini is T Normae , another Mira variable . It ranges from magnitude 6 @.@ 2 to 13 @.@ 6 , with a period of 244 days . S Normae is a well @-@ known Cepheid variable with a magnitude range of 6 @.@ 12 ? 6 @.@ 77 and a period of 9 @.@ 75411 days . It is located at the centre of the open cluster NGC 6087 . It is a yellow @-@ white supergiant of spectral type F8 @-@ G0Ib that is 6 @.@ 3 times as massive as the Sun . A binary , it has a 2 @.@ 4 solar mass (M ?) companion that is a blue @-@ white main sequence star of spectral type B9.5V.

IM Normae is one of only ten recurrent novae known in the Milky Way . It has erupted in 1920 and 2002 , reaching magnitude 8 @.@ 5 from a baseline of 18 @.@ 3 . It was poorly monitored after the first eruption , so it is possible that it erupted in between . Norma hosts two faint R Coronae Borealis variable stars of magnitude 10 ? RT Normae and RZ Normae ? rare degenerate stars thought to have formed from the merger of two white dwarfs that fade by several magnitudes periodically as they eject large amounts of carbon dust . A faint object of magnitude 16 , QV Normae is a high mass X @-@ ray binary star system 15 @,@ 000 ? 20 @,@ 000 light @-@ years distant from Earth . It is composed of a neutron star orbiting a blue @-@ white supergiant approximately 20 times as massive as the Sun . The stellar wind from the more massive star is drawn to the magnetic poles of the neutron star , forming an accretion column and producing X @-@ rays . Located 19 @,@ 000 light @-@ years away , QX Normae is an active low mass X ray binary composed of a neutron star and its companion star that is smaller and cooler than the Sun . The neutron star is 1 @.@ 74 ± 0 @.@ 14 times as massive as the Sun , yet its radius is a mere 9 @.@ 3 ± 1 @.@ 0 km . 1E161348 @-@ 5055 is a neutron star found in the centre of RCW103 supernova remnant . A periodic X @-@ Ray source with a period of 6 @.@ 67 hours , it is approximately 2000 years old and 10 @,@ 000 light @-@ years away from Earth . It is unusual in that it is spinning much too slowly for its young age , behaving instead like a multi @-@ million @-@ year @-@ old star . SGR J1550 @-@ 5418 is a soft gamma repeater (SGR) ? a magnetar that is emitting gamma ray flares , located some 30 @,@ 000 light @-@ years distant from Earth . The rotation period , of approximately 2 @.@ 07 seconds , is the fastest yet observed for a magnetar . XTE J1550 @-@ 564 is another X @-@ ray binary , this time composed of a large black hole around 10 times as massive as the Sun and a cool orange donor star . The black hole is a microquasar , firing off jets of material most likely from its

accretion disk .

Four star systems are known to harbour planets . HD 330075 is a sunlike star around 164 light @-@ years distant that is orbited by a hot Jupiter every 3 @.@ 4 days . Announced in 2004 , it was the first planet discovered by the HARPS spectrograph . HD 148156 is a star 168 ± 7 light @-@ years distant . Slightly larger and hotter than the Sun , it was found to have a roughly Jupiter @-@ size planet with an orbital period of 2 @.@ 8 years . HD 143361 is a binary star system composed of a sunlike star and a faint red dwarf separated by 30 @.@ 9 AU . A planet roughly triple the mass of Jupiter orbits the brighter star every 1057 ± 20 days . HD 142415 is approximately 113 light @-@ years distant and has a Jupiter @-@ sized planet with an orbital period of around 386 days .

= = = Deep @-@ sky objects = = =

Due to its location on the Milky Way , this constellation contains many deep @-@ sky objects such as star clusters , including eight open clusters visible through binoculars . NGC 6087 is the brightest of the open clusters in Norma with a magnitude of 5 @.@ 4 . It lies in the southeastern corner of the constellation between Alpha Centauri and Zeta Arae . Thought to be around 100 million years old , it is about 3300 light @-@ years away and is around 14 light @-@ years in diameter . Its brightest member is the Cepheid variable S Normae . A rich background star field makes it less distinct , though around 36 member stars are visible though a 10 cm telescope at 150x magnification . Located 0 @.@ 4 ° north of Kappa Normae is NGC 6067 , which has an integrated magnitude of 5 @.@ 6 though it is indistinct as it lies in a rich star field . It is thought to be around 102 million years old , and contain 891 solar masses . Two Cepheid variables ? QZ Normae and V340 Normae ? have been identified as members of the cluster . Fainter open clusters include NGC 6134 with a combined magnitude of 7 @.@ 2 and located 4000 light @-@ years away from Earth , the spread @-@ out NGC 6167 of magnitude 6 @.@ 7 , NGC 6115 near Gamma Normae , NGC 6031 and NGC 5999 .

Located around 4900 light @-@ years distant is Shapley 1 (or PK 329 + 02 @.@ 1) , a planetary nebula better known as the Fine @-@ Ring Nebula . Appearing ring @-@ shaped , it is thought that it actually is cylindrical and oriented directly at Earth . Around 8700 years old , it lies about five degrees west @-@ northwest of Gamma1 Normae . Its integrated magnitude is 13 @.@ 6 and its mean surface brightness is 13 @.@ 9 . The central star is a white dwarf of magnitude 14 @.@ 03 . Mz 1 is a bipolar planetary nebula , thought to be an hourglass shape tilted at an angle to observers on Earth , some 3500 light @-@ years distant . Mz 3 ? known as the Ant Nebula as it resembles an ant ? has a complex appearance , with at least four outflow jets and two large lobes visible .

Approximately 200 million light @-@ years from Earth with a redshift of 0 @.@ 016 is Abell 3627 ; also called the Norma Cluster , it is one of the most massive galaxy clusters known to exist , at ten times the average cluster mass . Abell 3627 is thus theorized to be the Great Attractor , a massive object that is pulling the Local Group , the Virgo Supercluster , and the Hydra @-@ Centaurus Supercluster towards its location at 600 ? 1000 kilometres per second .