

= 4 Vesta =

Vesta , minor @-@ planet designation 4 Vesta , is one of the largest objects in the asteroid belt , with a mean diameter of 525 kilometres (326 mi) . It was discovered by the German astronomer Heinrich Wilhelm Olbers on 29 March 1807 and is named after Vesta , the virgin goddess of home and hearth from Roman mythology .

Vesta is the second @-@ most @-@ massive and second @-@ largest body in the asteroid belt after the dwarf planet Ceres , and it contributes an estimated 9 % of the mass of the asteroid belt . It is slightly larger than Pallas , though significantly more massive . Vesta is the last remaining rocky protoplanet (with a differentiated interior) of the kind that formed the terrestrial planets . Numerous fragments of Vesta were ejected by collisions one and two billion years ago that left two enormous craters occupying much of Vesta 's southern hemisphere . Debris from these events has fallen to Earth as howardite ? eucrite ? diogenite (HED) meteorites , which have been a rich source of information about Vesta .

Vesta is the brightest asteroid visible from Earth . Its maximum distance from the Sun is slightly greater than the minimum distance of Ceres from the Sun , though its orbit lies entirely within that of Ceres .

NASA 's Dawn spacecraft entered orbit around Vesta on 16 July 2011 for a one @-@ year exploration and left orbit on 5 September 2012 en route to its final destination , Ceres . Researchers continue to examine data collected by Dawn for additional insights into the formation and history of Vesta .

= = History = =

= = = Discovery = = =

Heinrich Olbers discovered Pallas in 1802 , the year after the discovery of Ceres . He proposed that the two objects were the remnants of a destroyed planet . He sent a letter with his proposal to the English astronomer William Herschel , suggesting that a search near the locations where the orbits of Ceres and Pallas intersected might reveal more fragments . These orbital intersections were located in the constellations of Cetus and Virgo . Olbers commenced his search in 1802 , and on 29 March 1807 he discovered Vesta in the constellation Virgo ? a coincidence , because Ceres , Pallas , and Vesta are not fragments of a larger body . Because the asteroid Juno had been discovered in 1804 , this made Vesta the fourth object to be identified in the region that is now known as the asteroid belt . The discovery was announced in a letter addressed to German astronomer Johann H. Schröter dated 31 March . Because Olbers already had credit for discovering a planet (Pallas ; at the time , the asteroids were considered to be planets) , he gave the honor of naming his new discovery to German mathematician Carl Friedrich Gauss , whose orbital calculations had enabled astronomers to confirm the existence of Ceres , the first asteroid , and who had computed the orbit of the new planet in the remarkably short time of 10 hours . Gauss decided on the Roman virgin goddess of home and hearth , Vesta .

= = = Name = = =

Vesta was the fourth asteroid to be discovered , hence the number 4 in its formal designation . The name Vesta , or national variants thereof , is in international use with two exceptions : Greece and China . In Greek , the name adopted was the Hellenic equivalent of Vesta , Hestia (4 ?????) ; in English , that name is used for 46 Hestia (Greeks use the name " Hestia " for both , with the minor @-@ planet numbers used for disambiguation) . In Chinese , Vesta is called the ' hearth @-@ god (dess) star ' , ??? zàoshénx?ng , in contrast to the goddess Vesta , who goes by her Latin name .

Upon its discovery , Vesta was , like Ceres , Pallas , and Juno before it , classified as a planet and given a planetary symbol . The symbol representing the altar of Vesta with its sacred fire and was

designed by Gauss . In Gauss 's conception , this was drawn ; in its modern form , it is .

After the discovery of Vesta , no further objects were discovered for 38 years , and the Solar System was thought to have eleven planets . However , in 1845 , new asteroids started being discovered at a rapid pace , and by 1851 there were fifteen , each with its own symbol , in addition to the eight major planets (Neptune had been discovered in 1846) . It soon became clear that it would be impractical to continue inventing new planetary symbols indefinitely , and some of the existing ones proved difficult to draw quickly . That year , the problem was addressed by Benjamin Apthorp Gould , who suggested numbering asteroids in their order of discovery , and placing this number in a disk (circle) as the generic symbol of an asteroid . Thus , the fourth asteroid , Vesta , acquired the generic symbol $\circ 4$. This was soon coupled with the name into an official number - name designation , $\circ 4$ Vesta , as the number of minor planets increased . By 1858 , the circle had been simplified to parentheses , (4) Vesta , which were easier to typeset . Other punctuation , such as 4) Vesta and 4 , Vesta , was also used , but had more or less completely died out by 1949 . Today , either Vesta , or , more commonly , 4 Vesta , is used .

== Early measurements ==

Photometric observations of Vesta were made at the Harvard College Observatory in 1880 - 1882 and at the Observatoire de Toulouse in 1909 . These and other observations allowed the rotation rate of Vesta to be determined by the 1950s . However , the early estimates of the rotation rate came into question because the light curve included variations in both shape and albedo .

Early estimates of the diameter of Vesta ranged from 383 (in 1825) to 444 km . E.C. Pickering produced an estimated diameter of 513 ± 17 km in 1879 , which is close to the modern value for the mean diameter , but the subsequent estimates ranged from a low of 390 km up to a high of 602 km during the next century . The measured estimates were based on photometry . In 1989 , speckle interferometry was used to measure a dimension that varied between 498 and 548 km during the rotational period . In 1991 , an occultation of the star SAO 93228 by Vesta was observed from multiple locations in the eastern United States and Canada . Based on observations from 14 different sites , the best fit to the data was an elliptical profile with dimensions of about 550 km \times 462 km . Dawn confirmed this measurement .

Vesta became the first asteroid to have its mass determined . Every 18 years , the asteroid 197 Arete approaches within 0.04 AU of Vesta . In 1966 , based upon observations of Vesta 's gravitational perturbations of Arete , Hans G. Hertz estimated the mass of Vesta as $(1.20 \pm 0.08) \times 10^{-10}$ solar masses . More refined estimates followed , and in 2001 the perturbations of 17 Thetis were used to estimate the mass of Vesta as $(1.31 \pm 0.02) \times 10^{-10}$ solar masses .

== Orbit ==