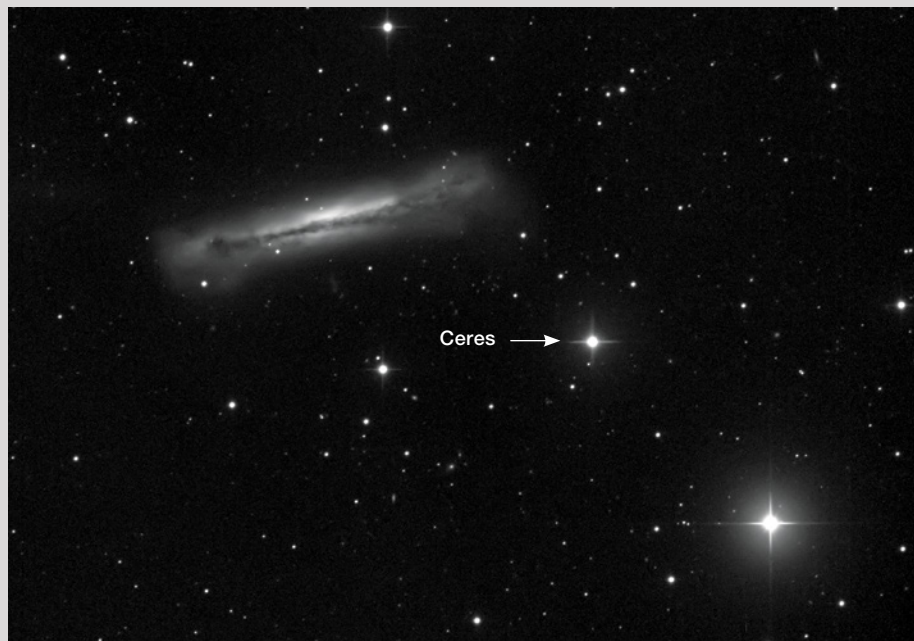


Article courtesy of SKY & TELESCOPE

Ceres at Opposition on March 21st

The brightest and closest dwarf planet visits galaxies in Virgo during its upcoming apparition.



Following 1 Ceres is going to be a lot of fun this month. It reaches opposition on March 21st in Coma Berenices at magnitude 6.9 — its brightest apparition in five years. From the very darkest skies, experienced observers might be able to glimpse the tiny world naked eye. On opposition day, Ceres lies 239.5 million kilometers (148.8 million miles) from Earth. It won't be as bright or as close again until 2032.

Most of us will find binoculars necessary for keeping an eye on this dual-citizen dwarf-planet/asteroid as it arcs through the northern half of the Virgo Galaxy Cluster, the richest and brightest such collection in the sky. Along the way, Ceres will have several close encounters with bright cluster members, including M88, M91, and M100. In May, when it resumes direct motion and circles back eastward, it

skirts the cluster's southern border in a slow-motion galactic lasso.

To find Ceres as March begins, start at 2.8-magnitude Epsilon (ϵ) Virginis and slide 5.1° west to 5th-magnitude Rho (ρ) Virginis, which forms a wide optical pair with 6.2-magnitude 27 Virginis. The Rho duo make a handy step-



◀ On November 6, 2022, Ceres skimmed $6'$ southwest of the Hamburger Galaxy, NGC 3628, in Leo. The solar system's brightest and closest dwarf planet spends much of its current apparition galaxy-hopping in Coma Berenices and Virgo.

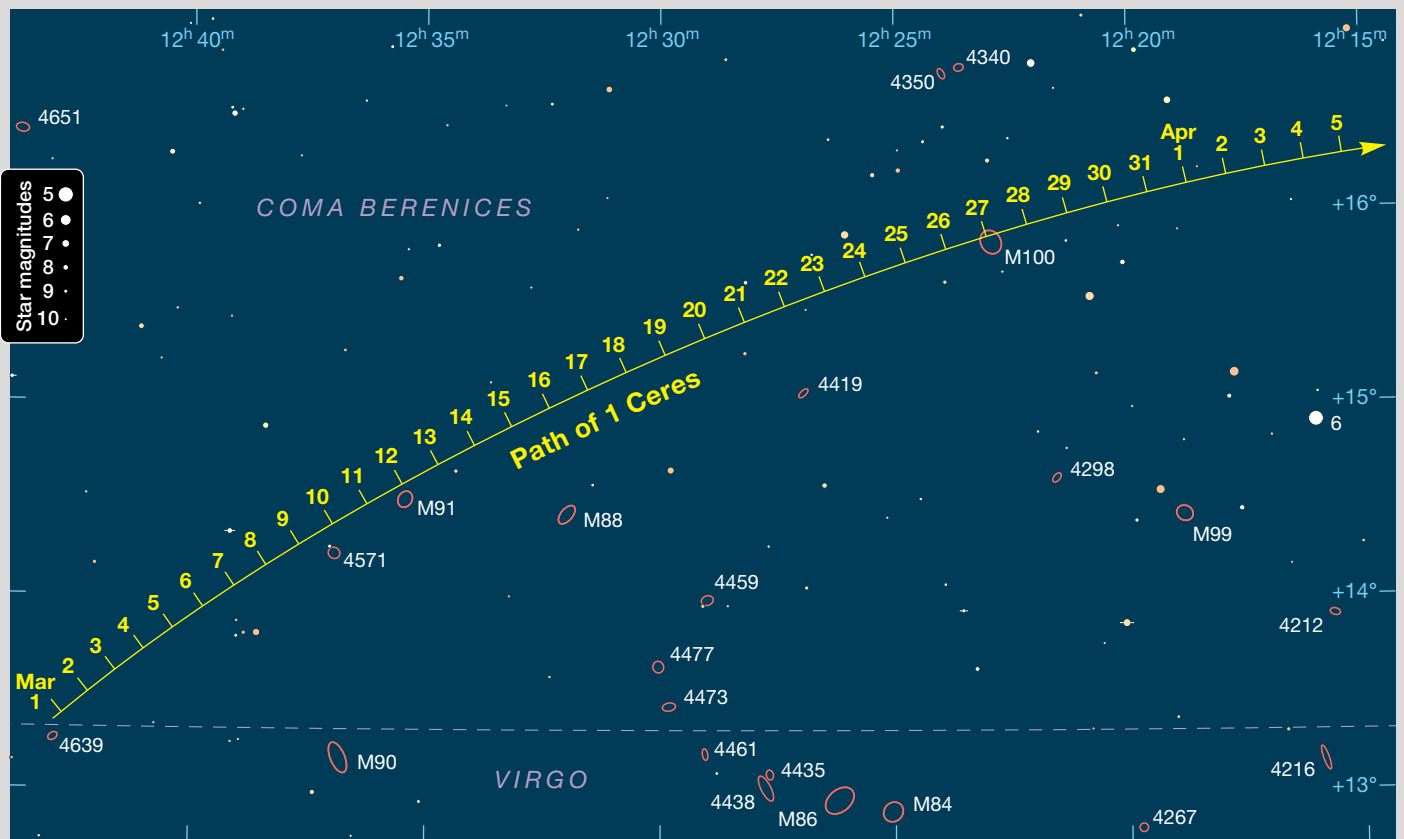
pingstone to the asteroid. Ceres is 3.3° north of the pair on the 1st and slowly loops westward in retrograde motion at a rate of around $10'$ per day, gradually increasing to nearly $13'$ per day by the end of the month.

All asteroids appear starlike in most telescopes, but given its relative proximity to Earth at the time of opposition it may be possible to resolve Ceres as a minute disk. Consider Europa, the smallest of the Galilean satellites, which spans about $1''$ when Jupiter is near opposition. The distant moon looks like the tiniest of dots in my 10-inch Dob under high magnification in excellent seeing. Ceres will swell to $0.8''$ at opposition, presenting a tempting challenge for those who enjoy pushing the limits.

Imagers and visual observers alike will find this month a great opportunity to catch the dwarf planet keeping decidedly colossal company. Ceres has close conjunctions with several prominent galaxies on four different nights: March 11th, $5'$ north of M91 (mag. 10.2); March 14th, $32'$ northeast of M88 (mag. 9.6); March 21st, $4'$ northeast of NGC 4421 (mag. 11.6); and on March 26th, $2.2'$ north of M100 (mag. 9.4). (Distances noted are from each galaxy's

◀ NASA's Dawn spacecraft captured this image of Ceres in May 2015 when the probe was just 13,641 km (8,476 mi) above the dwarf planet's surface. The bright spot right of center is the 34-km-wide impact crater Haulani.

CERES AND NGC 3628: ELIOT HERMAN; CERES FROM DAWN: NASA / JPL/CALTECH / UCLA / MPS / DLR / IDA / JUSTIN COWART



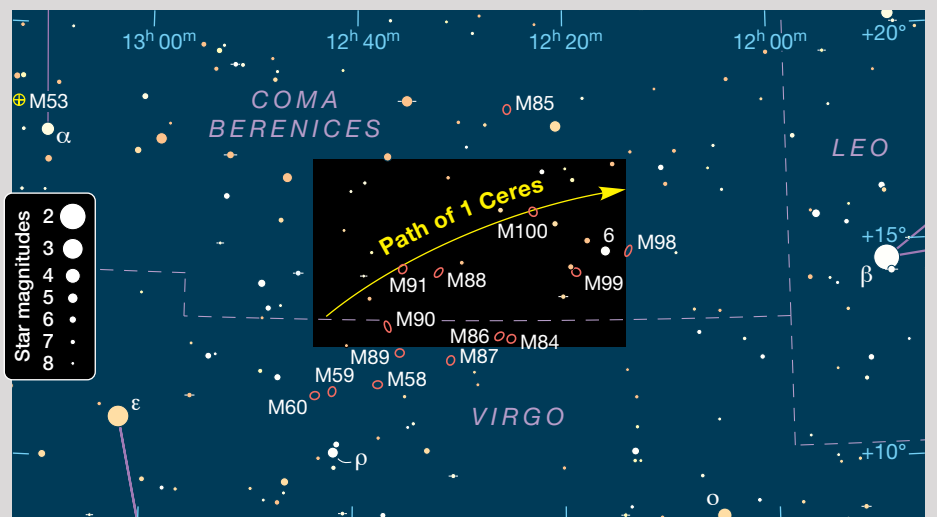
▲ Positions are shown for 0h UT.

center, at roughly 11 p.m. EDT).

The last of these encounters may be the most compelling. Not only is M100 bright, but it's also large, presenting an apparent size of 7.5' by 6.1'. For several hours centered on the time of closest approach (about 10 p.m. EDT), Ceres will hover directly over one of the galaxy's spiral arms, impersonating a wickedly luminous supernova. Transient hunters beware!

NASA's Dawn spacecraft — the first mission to a dwarf planet — arrived at Ceres in 2015 and sent back photos and other data before running out of fuel in October 2018. Although officially pronounced dead on November 1st that year, mission scientists expect the probe to orbit Ceres for at least another 50 years before it spirals downward and crashes onto the dwarf planet's surface.

Dawn revealed that Ceres is rich in water, clay, and organic compounds, and may still harbor remnants of a sub-surface ocean. Brilliant white patches in the 92-km-wide crater Occator are



sodium carbonate salt deposits thought to have originated when fissures from a massive meteorite strike allowed briny waters to ooze onto the surface.

Ceres also has a lot of ammonia-rich clay, which is an unusual substance to find on a main-belt object, though it's common in the outer solar system. Its presence is the reason scientists suspect that the dwarf planet originated beyond the orbit of Saturn and

migrated inward. Astronomers also believe Ceres is a *protoplanet* — a body with sufficient mass and internal heat to have a differentiated interior with a core and mantle. Jupiter's take-no-losers gravitational field stymied its growth and path to planethood.

Dwarf planet, protoplanet, or asteroid — no matter how you choose to categorize it, Ceres awaits your attention this spring.