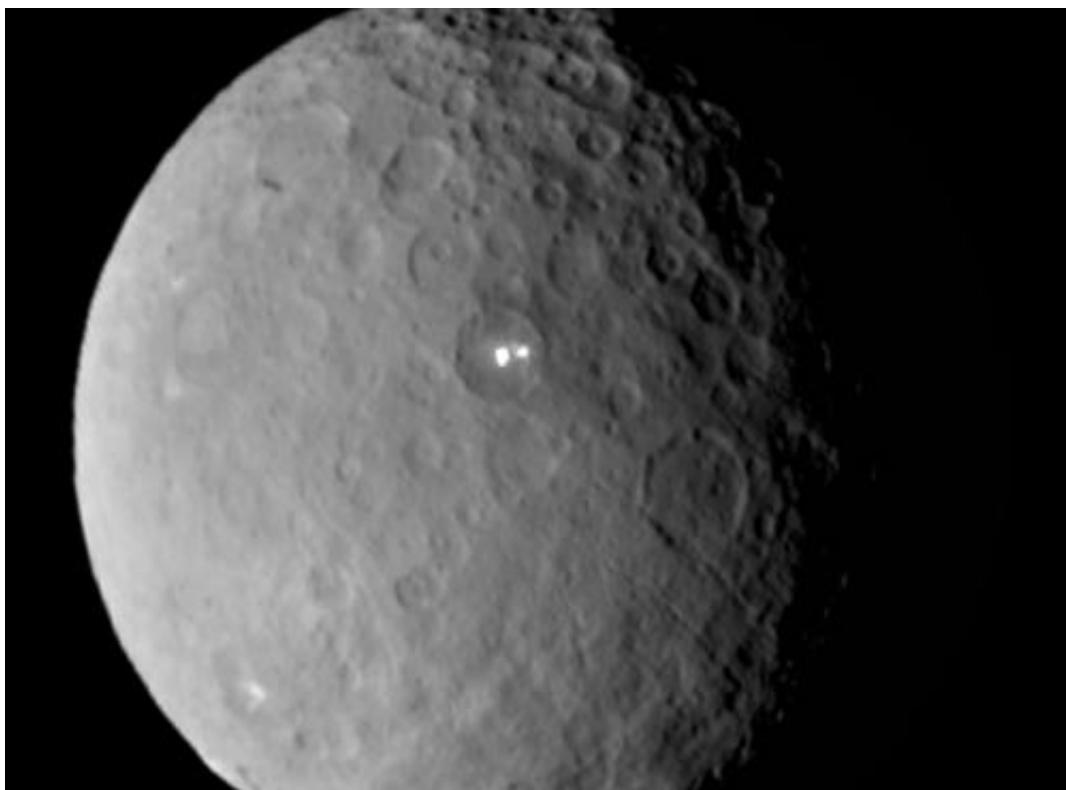


Dawn breaks over distant Ceres ... and perhaps signs of habitability

March 18 2015, by Monica Grady



What is the bright spot of Ceres? Not long till we find out. Credit: NASA

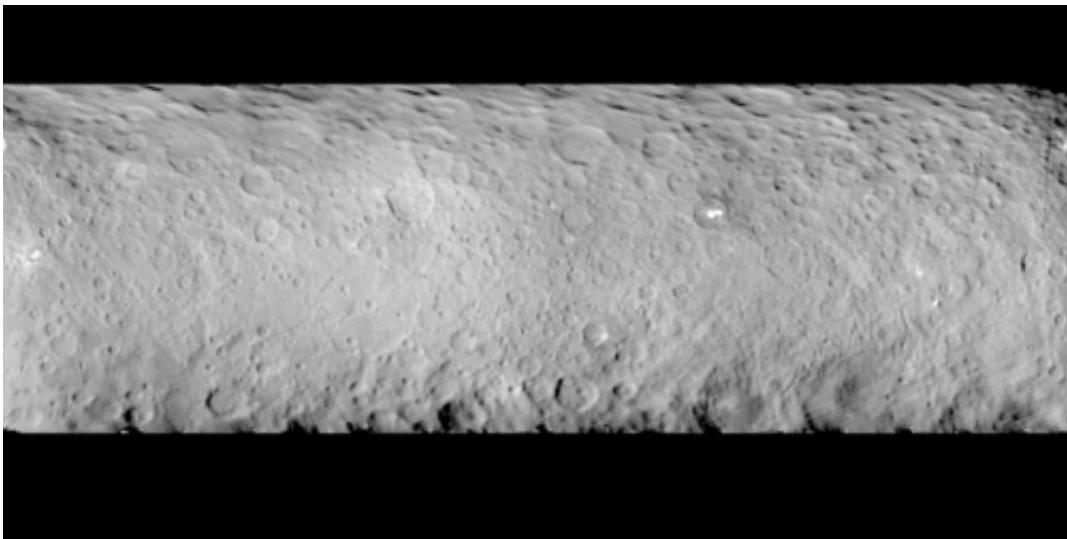
NASA's [Dawn spacecraft](#) is about to start its investigation of the largest member of the asteroid belt, [1 Ceres](#). It will take detailed images of the dwarf planet, and produce a geological map of its entire surface. But even before the spacecraft has reached its optimum orbit, the preliminary results just released are already surprising and delighting

planetary scientists.

Up until February 2015, the best images taken of Ceres were from the [Hubble space telescope](#), showing a near-spherical body with one area that was much brighter than the rest of the surface. As Dawn approached Ceres, its camera acquired some remarkable images, at about three times the resolution of those from Hubble. The pictures verified that there was indeed a brighter region.

Even better, close examination of the images showed that the area varied in brightness over the course of Ceres' day (which is only about nine hours long), growing dimmer as the [dwarf planet](#) moved into darkness. It is interpretation of this variability that has [planetary scientists](#) buzzing.

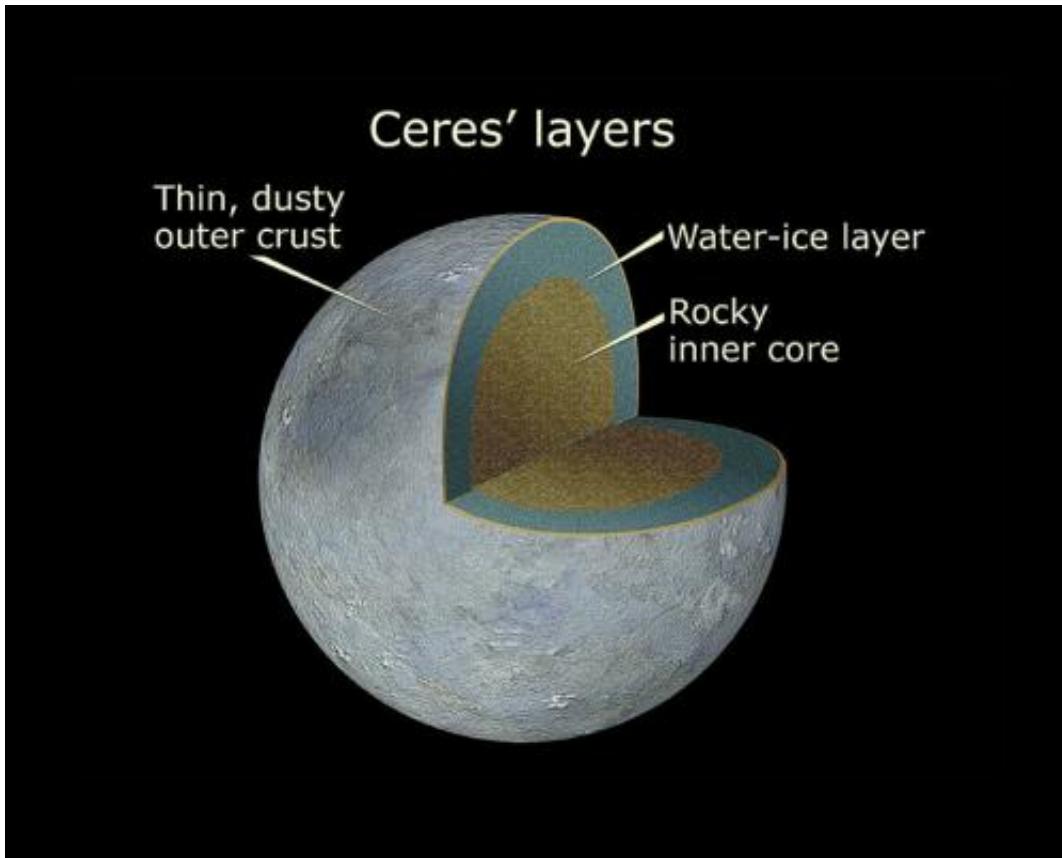
As if that were not enough, a further series of pictures appear to show a plume emanating from the surface. Is Ceres active? Does it have a layer of water or ice below a thin crust of rock? Could it be a ball of mud, overlain by a muddy ocean, on top of which is another thin muddy crust? The exact structure of Ceres is not yet known, although it is clear that it's not rocky all the way through – its density is too low, so there must be at least some water or ice present. Suggestions at the 46th [Lunar and Planetary Science Conference](#) in Houston, Texas, of icy volcanism on Ceres have led to speculation that the dwarf planet could potentially be habitable. Although Ceres does not have an atmosphere, life might exist in a subsurface ocean, as has been suggested for Europa or Enceladus, moons orbiting Jupiter and Saturn respectively.



Exploded map of Ceres showing 'bright spot'. NASA

Cryovolcanism – the presence of ice volcanoes – is not the only mechanism that can produce a plume of dust and ice from a planetary surface. The Rosetta mission has delivered amazing images of plumes coming from comet [P/67 Churyumov-Gerasimenko](#), caused by sublimation of ice that releases dust and gas trapped inside the ice. Could the bright spot be an icy plume caused by the vaporisation of Ceres' surface as it turns towards the sun's heat, and then dropping away as night falls? Corridor talk at the conference speculates that Ceres might be closer to a comet than the asteroid it is usually regarded as.

Fortunately, we won't have to wait much longer before we get some more definitive answers to questions of Ceres' physical structure and heritage. By the beginning of April, the Dawn spacecraft will be much closer and will start its imaging campaign in earnest, at which point we will start seeing craters and other surface features at better resolution.



Is Ceres more slush than solid inside? Credit: NASA

In preparation for descriptions of such features, and bearing in mind that Ceres was the Roman goddess of the harvest, the International Astronomical Union has ruled that craters on Ceres should be named after international deities of agriculture and vegetation, while other features will be named after agricultural festivals of the world.

I'm not sure just how many of these there are, or how memorable their names will turn out to be. But as the Dawn mission's principal investigator Chris Russell pointed out, there is one Mayan deity named Yum ([Yum Kaax](#), god of agriculture and the jungle), who should readily be remembered. One can only hope the mission scientists find a suitably delicious feature on Ceres to give that name.

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