DAWN AT CERES: FIRST RESULTS FROM THE INNERMOST DWARF PLANET. C. T. Russell[1], B. E. Schmidt[2], and the Dawn Mission Science Team. [1]UCLA, [2]Georgia Tech (ctrusel@igpp.ucla.edu).

Introduction: Ceres, the largest asteroid in the main belt and the innermost dwarf planet, represents a possible paradigm-shift in our understanding of how size and distance from the sun affected the formation of planets. In Ceres, we have an especially unique chance to understand how water and ice may have influenced forming planets. Dawn will arrive at Ceres in spring 2015, and provide new data from its Framing Camera, Visible and InfraRed spectrometer (VIR), and Gamma Ray and Neutron Detector (GRaND).

Previous Observations: An oblate spheroid with a density near 2000 kg/m^3, it is possible that Ceres differentiated in the sense that its rock likely separated from the water and ice inside the body (though iron core formation may not have completed). Ceres shape probably cannot be explained by coagulation of rocky planetesimals and pores. Instead, its shape is most consistent with a ~100 km thick ice layer overlaying a 350 km silicate core with a mixture of hydrated and dehydrated phases. Surface color albedo maps of Ceres from Hubble and Keck show color contrast and several surface features common to both infrared and visible wavelength ranges. Thermal modeling suggests that in order to keep a stable ice layer, a lag layer of silicates would need to be only a few km. Its surface is likely comprised of hydrated silicate materials including clays such as brucite.

If indeed Ceres is a clay or mud-covered icy body, what might the processes within that surface render? What evidence, if any, is there for water processes, chemistry and activity? Dawn is poised to answer these and many more questions.

First Results: Dawn has already imaged Ceres on its slow approach to capture. These first images show a remarkable surface with an array of cratered landforms at a range of sizes, as well as other indications of geologic processes. The most enticing results thus far show that bright albedo features in the Dawn images are located within and near the centers of impact basins, including two extremely bright features. New Dawn images, visible and infrared and gamma ray spectra, and gravity data will be used to constrain the geologic and interior history, and will search for evidence of present day activity. Thus Dawn can confirm whether Ceres' interior is water rich, and place constraints on its thermal history that will allow us to constrain whether Ceres has been habitable today or in the past. Moreover, Dawn will help place constraints on the water inventory of the early solar system.

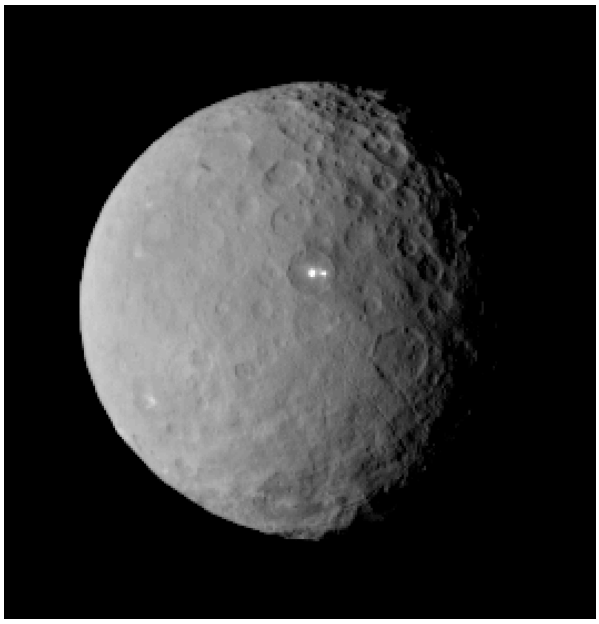

Figure 1: Ceres Imaged by Dawn on approach. This image was taken by NASA's Dawn spacecraft of dwarf planet Ceres on Feb. 19 from a distance of nearly 29,000 miles (46,000 kilometers). It shows that the brightest spot on Ceres has a dimmer companion, which apparently lies in the same basin. *Image Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA.*

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