

NATURE OF BRIGHT SPOTS ON DWARF PLANET CERES FROM THE DAWN FRAMING CAMERA.

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Introduction: The Framing Cameras (FC) onboard the Dawn spacecraft have started the mapping phase of the dwarf planet Ceres with seven color filters and one clear panchromatic filter after capture in March 2015. During the approach phase, several high albedo spots associated with impact craters were observed on Ceres [1]. The most prominent of these is a cluster of spots inside an 80-km impact crater called feature #5 (Hubble Space Telescope designation). Here we report on Framing Camera color observations of the bright spots on Ceres in an effort to characterize compositional properties and meteorite analogs.

Color Data: Each Framing Camera is equipped with seven color filters in addition to a clear panchromatic filter. The color filters span the wavelength range of 0.430 to 0.980 μm and have a band width range (FWHM) of 0.036 to 0.086 μm . Ceres was imaged during the approach phase as part of three rotational characterizations (RC1-RC3) with ever increasing spatial resolution. Color data were processed using Integrated Software for Imagers and Spectrometers (ISIS) developed and maintained by USGS Flagstaff. The pipeline description is similar to the one used during the Vesta phase and is described in detail in [2].

Color Properties: Color spectra of several bright spots on Ceres show similarities in spectral shape and absolute reflectance. The exception being high albedo spots such as feature #5, which had a geometric albedo high enough to saturate the detector in some color filters during RC2 phase. A sequence of images with shorter exposures was added to the RC3 observations to prevent saturation of feature #5. Initial reflectance measurements put the geometric albedo of these spots between 0.5 and 0.8 in the 0.55 μm filter.

Relationship with Herschel and Hubble Observations: The Herschel space telescope observed Ceres between 2011 and 2013, which allowed the discovery of water vapor being produced from two regions on the surface [3]. These locations coincided with features #2 and #5 in the Hubble Space Telescope map from [4]. Dawn FC color images show that both these features correspond to impact craters with bright spots.

Summary: Our analysis of the Dawn FC color data of bright spots on Ceres is consistent with presence of water ice. We have identified features #2 and #5 as probable sources of water vapor observed by Herschel space telescope [3].

References: [1] Nathues A. et al. 2015. Abstract #1957. 46th Lunar & Planetary Science Conference. [2] Reddy V. et al. 2012. *Science* 336:700-704. [3] Küppers et al. 2014. *Nature* 505:525-527. [4] Li J.-Y. et al. 2006. *Icarus* 182:143-160.

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