

DISR's Observation of the Opposition Effect on Titan's Surface

S.E. Schröder (1), H.U. Keller (1)

(1) Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany

The Huygens mission has successfully investigated the atmosphere and surface of Saturn's largest moon Titan. Images of the Descent Imager Spectral Radiometer (DISR) show that the probe landed in a dry lakebed, approximately 4 km south of a well-defined coast line. As Huygens rotated under its parachute, DISR's Downward Looking Infrared Spectrometer (DLIS) observed the lakebed under different solar phase angles, and found the intensity to be strongly phase angle dependent. Together with the independent observation at phase angle zero obtained with aid of the Surface Science Lamp (SSL), these observations provide evidence for the occurrence of the opposition effect. The opposition effect has been observed on virtually every Solar System object investigated up close, hence it is no surprise to find it on Titan. We model the data using the well-known Hapke theory for the reflectance of a particulate surface (e.g. Hapke 2002, Icarus 157: 523). We find evidence for both shadow hiding of soil particles and coherent backscatter, and discuss how the modeling results constrain the soil properties.