

## **The Deep Space 1 Encounter with Comet 19P/Borrelly**

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On 22 Sept 2001 at 22h 29m 33s UTC the Deep Space 1 (DS1) spacecraft encountered the comet 19P/Borrelly at a distance of 2171 km. Measurements were undertaken by two dedicated science instruments on the spacecraft and by the spacecraft's ion propulsion system diagnostic sensors (IDS). The images are the highest resolution ever obtained of a cometary nucleus and show topography and albedo differences on the surface at a resolution of 47m. The disk averaged geometric albedo is less than 0.03, among the lowest of any solar system object observed. The surface reflectance varies by a factor of three; the most absorbing areas having a normal reflectance of less than 0.01. Material is being emitted of from localized regions on the nucleus generally in the sunward direction. These regions are cylindrically shaped about 0.5 km in diameter and about 5 km in length. The cometary bow shock and other features associated with the cometary environs are asymmetrically offset from the sun-Borrelly axis. This suggests that the localized emission regions seen in the images may cause the coma to be asymmetrically offset from the sun-nucleus line. Such an offset has not been reported in previous spacecraft encounters with other comets.