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Rosetta's OSIRIS Observes Steins Phase Reddening

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Abstract

The ESA Rosetta spacecraft performed a successful fly-by of asteroid Steins on 5 September 2008. Its wide angle camera (WAC) observed Steins through different color filters over a wide range of phase angles, including zero. WAC photometry reveals an increase of surface brightness towards lower phase angles, in particular a strong increase towards towards zero phase angle (the *opposition effect*). The steepness of the phase curve and the strength of the opposition effect depend on the wavelength, a phenomenon known as *phase reddening*.

Phase reddening has been observed on asteroids [1], the Moon [2], Mercury [3], and is thought to arise from shadow hiding becomes less effective for a high albedo surface due to an increasing contribution of multiple scattering (e.g. [4]). These objects then exhibit phase reddening because their visible reflectance increases with wavelength. We compare phase reddening parameters observed for Steins with those of other solar system bodies.

To examine this phenomenon we will perform experiments with the Bern PHIRE goniometer [5]. By measuring the reflectance of well-characterized regolith analogs at different wavelengths and phase angles we aim to better understand the mechanism of phase reddening in general and on Steins in particular.

Bibliography

References

[1] Lumme, K. and Bowell, E. (1981) *AJ*, 86, 1705–1721.

[2] Buratti, B. J. et al. (1996), *Icarus*, 124, 490–499.

[3] Warell, J. and Bergfors, C. (2008) *P&SS*, 56, 1939–1948.

[4] Shkuratov, Y. G. et al. (2008) *Icarus*, 141, 132–155.

[5] Gunderson K. et al. (2006) *P&SS*, 54, 1046–1056.