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Vesta's Temperature: First Results from Dawn's Survey Orbit

M.T. Capria, F. Tosi, A. Coradini, M.C. De Sanctis, E. Ammannito, F. Capaccioni, F. Carraro, G. Filacchione, S. Fonte, D. Grassi, G. Magni, R. Noschese, J.-P. Combe, M. Sykes, T. Titus, P. Tricarico, C. T. Russel, and C. A. Raymond

Abstract

The presentation will cover the first results of the VIR spectrometer as far as regards the determination of Vesta surface temperature, and the hints that can be derived from these measurements on the physical properties of the materials forming this surface.

Vesta's temperature determination

The Dawn spacecraft is now orbiting Vesta, the largest differentiated planetesimal still surviving. The onboard instruments are mapping its surface at various resolutions and in different parts of the electromagnetic spectrum. VIR, the mapping spectrometer, is acquiring data in the range 0.5-5 micron. VIR spectra, from 3 micron on, contain information on the temperature of the surface: by using temperature retrieval algorithms we will be able to obtain instantaneous temperature maps of the surface.

The temperature of a surface, and in particular its variation with respect to illumination conditions, contain precious information on the thermal properties (thermal inertia, emissivity) of the materials composing this surface. Any hint we will be able to obtain on these properties will help us, together with composition information, in the determination of the nature and physical status of the different areas of Vesta's surface.

The VIR spectrometer is sensitive only to temperatures higher than 170-180 K. To integrate the information derived from the spectra, theoretical codes solving the heat equation are needed. These codes will help us in the determination of the thermal inertia needed to explain the measured temperatures. The results of both the temperature retrieval algorithms and the thermal codes will be checked against all the available determination of the VESTA's temperatures obtained from on-ground and satellite observation.

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