

Color Variations Of Saturn's Small Satellites: The Ring Connection

Sarah J. Morrison¹, P. Helfenstein¹, P. Thomas¹, J. Veverka¹, T. Denk²

¹Cornell University, ²Freie Universitat Berlin, Germany.

We investigate color heterogeneities among Pandora, Janus, Epimetheus, and Telesto in calibrated high resolution (<1.5 km/pixel) Cassini Imaging Subsystem (ISS) images over the UV3 (338 nm), GRN (568 nm), IR3 (930 nm) broadband filters. The whole-disk color ratios show a progression with increasing distance from Saturn from Pandora to Telesto (and from the F-ring to the E-ring). The mode UV3/IR3 ratio for Pandora is ~0.5; for Janus and Epimetheus it is ~0.6 and is ~1.0 for Telesto. The systematic increase of blueness toward the E-ring may be a result of contamination by E-ring particles injected by the cryovolcanic plume eruptions from Enceladus (Pang et al. 1984, JGR 89, 9459-9470).

All of these satellites exhibit subtle regional color variations that deviate no more than +/-0.2 from the modal ratio value. These variations may reflect different geologic compositional units or grain sizes. Telesto is the most uniform with ratio differences that are mostly less than +/- 0.04. Pandora has a UV3/IR3 ratio variation generally less than +/-0.12 that shows different material in parts of larger crater interiors. Janus has a latitudinal UV3/IR3 variation in which the south is redder than the north, which is consistent with VIMS observations of Janus (Filacchione et al. 2009, LPSC 40, 1780). Many crater rims on Epimetheus have UV3/IR3 ratios distinct from smoother surroundings.