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Twilight refraction in the upper layers of Venus atmosphere during the June 2004 transit

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Observations of the historical transits of Venus in front of the Sun have shown that, when the planet is crossing the limb and is partially projected against the dark sky background, sunlight refracted by the upper layers of the atmosphere of Venus can be seen in visible light [1][2]. Visual and CCD observations of Venus transiting in front of the Sun on June 8, 2004, revealed traces of the same twilight phenomena. The 2004 opportunity was the first observed by electronic equipment. Several images were obtained by widely different instruments, at different wavelengths. Photometric measurements of the arc brightness have been obtained and have shown variations as a function of time and of the position along the limb. A latitude dependence, in particular, is clearly detected, with an intensity maximum close to the planet polar regions. Since the amount of refracted light depends upon the structure of the planet atmosphere, we intend to obtain constraints on its scale height as a function of latitude by fitting an appropriate model.

[1] F. Link, Eclipse phenomena in Astronomy, Springer Verlag (Berlin 1969) [2] H.N. Russell, ApJ 9, 284 (1899)