HST Photometry of Triton: Evidence for a Changing Surface in the Outer Solar System. J. M. Bauer[1] and B. J. Buratti[1], [1] Jet Propulsion Laboratory, Californian Institute of Technology (4800 Oak Grove Dr., MS183-501, Pasadena, CA 91109, email contact: bauer@scn.jpl.nasa.gov).

Introduction: Triton is one of the few bodies in the solar system with observed cryo-volcanic activity, in the form of plumes [1](Soderblom et al. 1990). Prompted by evidence from previous observations at ground and space-based telescopes of possible seasonal surface changes on Triton [2],[3](Herbert et al. 2004 and Young & Stern 1999), we proposed to confirm and characterize these changes using the HST ACS instrument to image Triton at UV, B, V, I and Methane-band wavelengths over as much of its surface as visible from near Earth in 2005.

Observations: With Triton's angular diameter of nearly 0.13 arcsec in size, ACS's HRC mode afforded an approximately 5X5 pixel image of Triton's surface. The images were taken with Neptune off-frame, to avoid potential bleeding, charge transfer inefficiency, and scattered light problems. With HST's resolution, four regions could be resolved at a time, and particular surface features were restricted to a certain quadrant of Triton's surface. Our request for 6 observing longitudes has allowed us to resolve the longitude of surface features to within 60 degrees (see Figure 1).

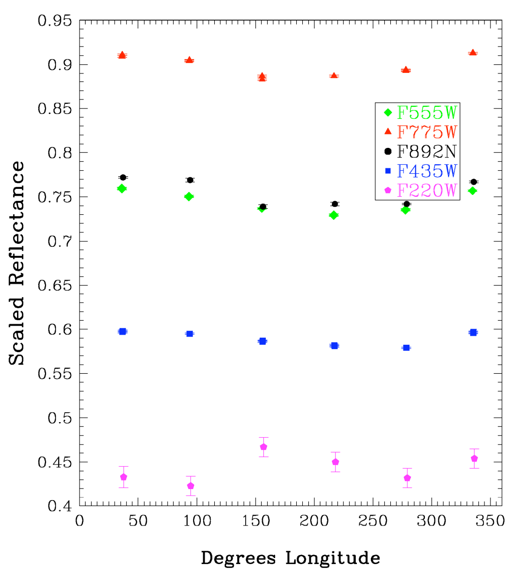

Figure 1: The light curve of Triton's rotation taken by the HST ACS camera in June of 2005. The light curves from the exposures with band passes in the visual (F435W, F555W, F775W equivalent to B, V, and R filter wavelengths respectively, and a 890nm methane, F892N, band pass) are shown along with that of the UV (220nm) band pass.

Preliminary analysis indicates a rotation light curve amplitude in excess of that predicted by static models [4],[5](Hillier et al. 1994 & Hillier 1999) for visual wavelengths, and significant departures from observations taken 12 years earlier in the UV. We will attempt to determine the resurfacing rates and set model constraints on activity and surface temperature as well as composition. Such constraints have profound implications for our understanding of Triton's evolution as well as the history of other outer solar system bodies that may undergo similar geophysical processes or have similar composition, such as Pluto (Buratti et al. 2003, Young et al. 2001).

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