COMET C/2006 P1 (MCNAUGHT): OBSERVATIONS OF DUST AND NEUTRAL SPECIES BY THE STEREO AND SOHO SPACECRAFT. G. H. Jones[1,2], J. S. Morrill[3], K. Battams[4], M. J. Owens[5], R. A. Howard[3], G. A. Stenborg[4], and C. M. Lisse[6], [1]Mullard Space Science Laboratory, University College London, Holmbury St. Mary, Dorking, Surrey RH5 6NT, UK; ghj@mssl.ucl.ac.uk. [2]Centre for Planetary Sciences, University College London, [3]Naval Research Laboratory, [4]Interferometrics, Inc., [5]Center for Space Physics, Boston University, [6]Johns Hopkins University Applied Physics Laboratory.

Introduction: We present observations of comet C/2006 P1 (McNaught) obtained by the twin NASA STEREO spacecraft's SECCHI heliospheric imagers, and the ESA/NASA SOHO spacecraft's LASCO coronagraph [1] during this most spectacular comet's apparition in January, 2007.

The STEREO SECCHI instruments include two wide field heliospheric imagers, HI-1 and HI-2. Each HI-1 imager has a 20 degree field of view, centered at 13.65 degrees from the Sun; its passband covers 630-730 nm. Both STEREO spacecraft were in the vicinity of the Earth at the time of the McNaught observations. McNaught's nucleus was within the STEREO-A HI-1 field of view during January 9.5-15.0 UT, spanning the comet's perihelion paasage at January 12.8, when the comet was 0.171 AU from the Sun.

The LASCO C3 coronagraph images a 15 degree-wide region centered on the Sun. McNaught's nucleus was present in its field of view of from 2007 January 12.0 to 15.0 UT. The region of McNaught's nucleus was overexposed in most LASCO and SECCHI images, but extremely valuable and unique data were obtained on the large-scale stucture of the dust and neutral tails.

Dust tail: One of the most striking aspects of McNaught's extensive dust tail was its clear system of striae, which displayed a mixture of ordered and quasi-random structuring of the comet's dust population.

We simulate the striae's formation and development using a two-step fragmentation model [2], releasing low-beta model grains from the nucleus (where beta is the ratio of radiation to gravitational forces acting on the particles). Following a delay, these relatively massive grains then fragment, through some undetermined process. The products of this framentation possess a range of beta values, and subsequently spread along a near-linear region, forming striae. Initial and secondary beta values as well as the delay until fragmentation are adjusted to fit to the striae locations, until the best fits are found to observed striae. We also investigate the possible effects of varying solar wind conditions at the comet, through the use of a magneto-hydrodymic model of the inner heliosphere [3].

The quasi-periodicity of striae formation is suspected to be linked to the nuclear rotation rate. We compare the results to a similar study of the LASCO-observed C/2002 V1 (NEAT), which also possessed tail striae. Our simulations of these quasi-linear striae in both comets provide unique new insights into the processes controlling these perplexing structures' formation and development.

Neutral tail: McNaught was already reported to possess a neutral iron tail [4], and sodium has been detected [5]. LASCO images obtained on January 14 reveal the clear presence of a coherent sodium tail of the type first observed in C/1995 O1 (Hale-Bopp) [6]. We also report on this tail's characteristics.

References: [1] Brueckner G. E. et al., (1995*) Solar Physics* **162**, 357. [2] Z. Sekanina, J. A. Farrell, *Astron. J.* **85**, 11, 1538 (1980). [3] Odstrcil D. et al. (2004) *J. Atm. S. Terr. Ph. 66,* 1311-1320. [4] Fulle M. et al. (2007) *Astrophys. J. 661,* L93-L96. [5] Snodgrass C. et al. (2007) IAU CBET 832. [6] Cremonese G. et al. (1997) *Astrophys. J. 490*, L199-L202.

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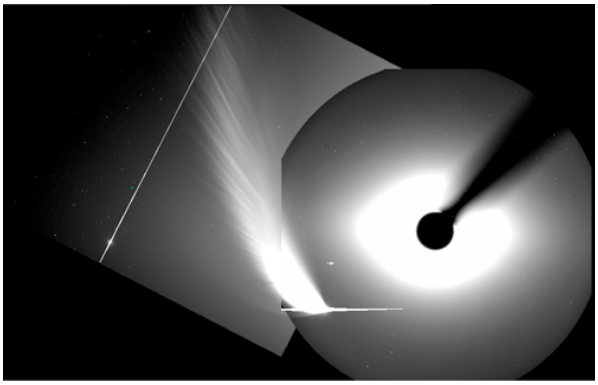

Combined view of McNaught from the SECCHI HI imager (left), and SOHO LASCO instrument (right). The Sun is located behind the LASCO occulting disk at centre right. The solar F corona has not been removed. The tilted line at left is caused by the presence of Venus in the HI field of view. Overexposure of the coma region is responsible for the horizontal feature in the LASCO image.