destruction). This hypothesis can be tested by groundbased thermal observations of Chiron. Assuming an equatorial subsolar latitude when Chiron was faintest (Sykes and Walker 1991, Science 251, p. 777), and a large obliquity,the subsolar latitude now would be moving towards a pole. The predicted infrared brightness of Chiron in 1991 could be more than an order of magnitude larger than its 1983 brightness at 20 μm at which time a possible 1.9σ grounbased detection was made by Lebofsky et al. (1984, Icarus 60, p. 532). A remaining question is whether the minimum brightness in the early to mid 1980's represents a bare nucleus, or does it reflect some minimum level of activity as seen in P/Schwassmann-Wachmann 1 (Jewitt 1990, Astrophys. J. 351, p. 277)

08.06

Where does the outgassing of comet nuclei occur?

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The light curves of comets exhibit most of the time fairly large perihelion asymmetries that are customarily understood as due to a seasonal effect: one or more active areas on a rotating nucleus are outgassing only when exposed to direct sunlight. The images of the nucleus of comet Halley taken in 1986 by the Giotto and VEGA cameras support this view, since they show an activity restricted to a few active areas that cover about 40 km^2 or 10% of the total nucleus surface. The orientation of the rotation axis, unlikely to be perpendicular to the orbital plane, induces a seasonal effect. The main difficulties with such a model is that the gas production should return at times to very low (unobserved) activity levels and that the coma should be highly asymmetrical (which is not the case). Here we present and discuss observations that challenge this point of view and we evaluate which fraction of the total outgassing rate could be due to the dark areas of the nucleus.

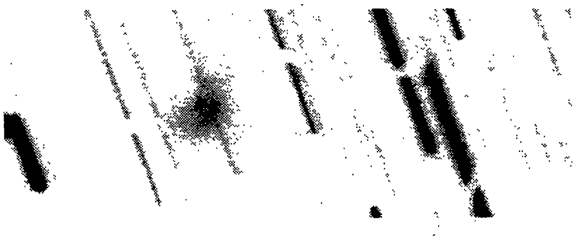
08.07

Outburst of Comet P/Halley

K. J. Meech (Institute For Astronomy, Univ. Hawaii)

CCD observations of comet P/Halley, totalling 17160 sec, taken with the UH 2.2m telescope on UT 1991 Feb. 15 showed that the comet had undergone a tremendous brightness outburst near R = 14.3 AU. At the time of observation, the comet had a magnitude of $m_R(5'') = 20.16 \pm 0.01$ within a 5" radius aperture (expected nuclear mag = 25.47), and a hemispherical coma extending >3 x 10^5 km to the southeast (see the image below). Data obtained on 1991 April 9 and 12 using the CTIO 4m and the UH 2.2m telescopes showed that the central brightness had faded considerably, and although the coma was still visible and extended out to at least 1.8 x 10^5 km, the morphology had changed, with one quadrant much faded. Continued CCD observations on 1991 May 13, obtained with both telescopes, again detected the comet. All that was visible was a diffuse low surface brightness coma (≈26.6 mag / arcsec^2), at least 2 x 10^5 km in extent, which moved between the two 2.5 hour exposures. There was no evidence of the nucleus down to a limit of $m_R = 25.5$. The coma was not seen in data obtained on 1991 June 12 and 13 with the UH 2.2m telescope when Halley was at 14.88 AU.

Earlier observations taken during 1990 April with the CTIO 4m had indicated that the comet had reached its approximate nuclear brightness, and it exhibited no coma, suggesting that by 12.86 AU, sustained activity on the comet had ceased. The outburst occurring some time before 14.3 AU is most likely caused by the release of volatiles (probably CO) from a subsurface chemical inhomogeneity such as that suggested by Belton *et al.* (1991; ACM abstracts, p. 19). The post-perihelion and ouburst lightcurves will be presented and discussed in the context of this volatile release scenario.



08.08

A Model to Explain the Activity of Comet Levy (1990c)

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Ground-based and space-based photometric observations of Comet Levy (1990c) revealed that its brightness was varying periodically in August and September 1990 with a clearly decreasing period. However, post-perihelion observation on 9 January 1991 showed no variability. The spatial structure in pre-perihelion continuum images taken in September 1990 using the Hubble Space Telescope (HST) and the New Technology Telescope (NTT) shows temporal variability in addition to a clear sunward-tailward asymmetry.

Models of the outgassing, assuming a rotational pole pointing at the sun near 9 January 1991, show that the variability cannot be due to a single narrow jet but do not distinguish between a large active area and simple variation of the sunward cross section. To explain the morphology of the images in this scenario, the variability in the outgassing must be dominated by outgassing at latitudes near -30°, i.e. near the latitude of the subsolar point, at the time of the HST and NTT images.

08.09

Multiple Scattering of Light in a Coma with an Axisymmetric Dust Jet

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We have developed a numerical solution for the anisotropic multiple scattering of light in a cometary atmosphere with an axisymmetric dust jet at the nucleus' subsolar point. The radiative transfer equation is formulated in spherical geometry, and solved throughout the coma by integrating along characteristics and using Lambda iteration.

We model the flux of visible radiation to the nucleus surface in the presence of the jet, and compare to previous studies of the case of a spherically symmetric coma dust distribution. Our solution is quite general and should be useful for image interpretation; in particular we are developing a simulation of the "azimuthal average intensity" considered by Thomas & Keller (*Annales Geophysicae*, 1990, **8**) in their examination of proposed dust fragmentation at comet P/Halley.