that a successful effort was made at the very moment when a spaceship was about to observe for the first time the remote planet. The harvest of data sent by Voyager is eagerly awaited, but no doubt several more earth-based observations will be necessary for fully understanding these mysterious formations. In the meantime, a very favourable occultation will be observed from ESO, Brazil, Tenerife and Pic du Midi on July 8, 1989, giving a last terrestrial glance before the rendez-vous . . .

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International Halley Watch Meets at ESO

On April 22, 1989, members of the Steering Group and Discipline Specialists of the International Halley Watch (IHW) met at ESO Headquarters to discuss recent progress with the Halley Archive.

This group of cometary scientists was established in 1982 through an initiative by NASA; the same year it was recognized by the International Astronomical Union as the body responsible for coordination of the various programmes in connection with the Halley passage in 1985–86.

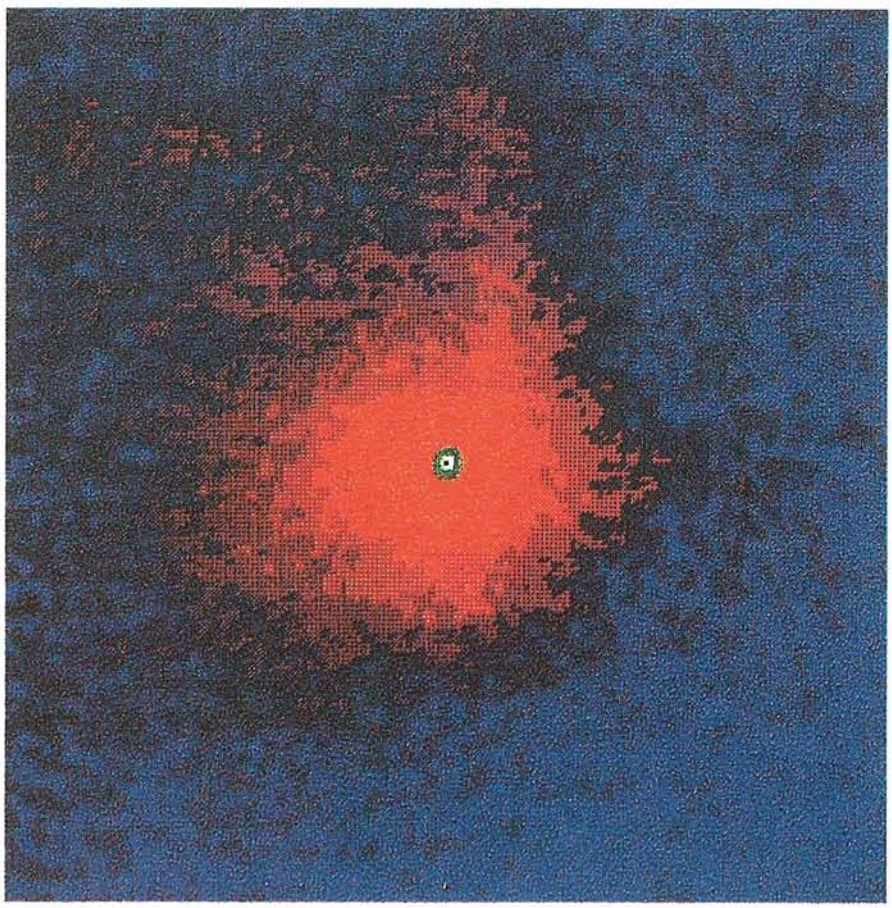
At this supposedly final IHW meeting with about 40 participating scientists, mostly from North America and Europe, it became clear that the main goal is now within reach. All of the "Networks" reported good progress in collecting the available data from all over the world. It is expected that the "final" deadline will be June 30, 1989 and by that time, about 22 Gbytes of data will have been gathered. In addition to the ground-based data, many will come from the highly successful space experiments in March 1986.

The archive will be made available on 22 computer readable Compact disks, of which 20 will include about 1000 selected, large scale images of the comet, the others carry spectra and photometry in the visible and infrared regions, astrometric positions, radio observations, meteor data, close-up images of the near-nucleus region and the best amateur observations. A magnetic tape version will also be produced. It has not yet been decided whether a subset of this enormous quantity of data will be published in printed form, although a book with the best pictures will appear in early 1990.

By early May 1989, Comet Halley was more than 1600 million kilometres from the Sun and still going strong. The false-colour picture shown here was made when it was at heliocentric distance 10.14 A.U., or 1517 million kilometres, i.e. beyond the orbit of Saturn. It is a composite of 29 CCD exposures obtained with the Danish 1.5 m telescope at the ESO La Silla observatory during five nights in early January 1989. The total integration time is 860 minutes.

The nucleus is seen as a point of light near the centre of an asymmetric dust cloud (coma) which measures ~80 arcsec across, or 550,000 km. The mean magnitude of the nucleus is V = 23.5, and its brightness is seen to vary by ~1 mag from night to night. The total magnitude of the comet is V = 18.4.

A comparison with the coma observed with the same equipment in April–May 1988 shows that the overall



dust density has remained virtually unchanged in the meantime. There is a broad, fan-shaped area of excess luminosity towards East; i.e. in the direction opposite to the comet's motion. This apparently represents the projected image of a normal dust tail, seen almost head-on. There is also a rather narrow fan that extends towards North, possibly a result of an earlier dust ejection event.

Some technical information: Johnson-V filter; stars, galaxies and cosmics cleaned from individual frames before addition; smoothed by 3 × 3 gaussian filter; outermost isophote corresponds to ~28 mag/arcsec^2; 1 pixel = 0.464 arcsec; frame size: 201 × 201 pix = 93 × 93 arcsec; seeing 1.2–1.5 arcsec; North is up and East is to the left.

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Some Highlights from Comet Tempel 2 Observations at ESO

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1. Introduction

During its 1988 perihelion passage, periodic comet P/Tempel 2 (orbital period of 5.3 years) was an object of intense ground-based observations, because it was one of the possible targets for the NASA Comet Rendezvouz and Asteroid Flyby mission (CRAF) in 1993. Although due to funding problems the CRAF project has been postponed to at least 1995, thereby automatically rejecting P/Tempel 2 from the mission target list, the ground-based study of this comet continues.

ESO has granted observing time for P/Tempel 2 to several groups of observers. Here we present preliminary results from our direct imaging and spectroscopic observations of comet P/Tempel 2. The data were collected at ESO La Silla between early May and early November 1988 with the 2.2 m, the 1.5 m Danish, the 1.5 m ESO and the GPO telescopes. Table 1 summarizes the geometrical aspects of the Sun-Earth-Comet constellation during the observation intervals.

2. Direct Imaging of P/Tempel 2

On May 4, 1988, comet P/Tempel 2 was observed with the 2.2 m telescope + CCD through a Johnson V filter. Two short exposures of 30 seconds and 3 minutes were taken. The nucleus of the comet appears star-like in the images, no coma can be detected around the comet (see Fig. 1). The small brightness extension to the west of the nucleus arises from a faint background star close by the cometary position. From the CCD images a nucleus brightness of 16.45 ± 0.05 mag is derived. From that one can estimate the effective nucleus radius R of comet P/Tempel 2 by (Spinrad et al., 1979)

$$R^2 A \Phi(\alpha) = r^2 \, 10^{0.4 (M_\odot - (m - 5 \log \Delta))}$$

$M_\odot$ and m are the filter brightnesses of the Sun and the comet, respectively, r (in km) and Δ (in AU) the solar and Earth distances of the comet, A the albedo and $\Phi(\alpha)$ the phase function of the nucleus for the phase angle α. Using the albedo A = 0.024, derived by A'Hearn et al. (1988) for P/Tempel 2 from simultaneous optical and infrared observations, the effective nuclear radius R of the comet is about 6.1 km, when using the phase function of the Moon and about 5.1 km when using the phase function of Spinrad et al. (1979). A'Hearn et al. (1988) found an effective nuclear radius R = 5.6 km for comet P/Tempel 2, the data published by Spinrad et al. (1979) lead to R = 4.1 km when scaled to the much lower albedo A = 0.024 measured recently. Sekanina (1988) suggested nucleus dimensions of 18 × 11 × 7 km for P/Tempel 2 based on observations of Luu and Jewitt (1988a, b) in 1987 and 1988. Photometric obser-

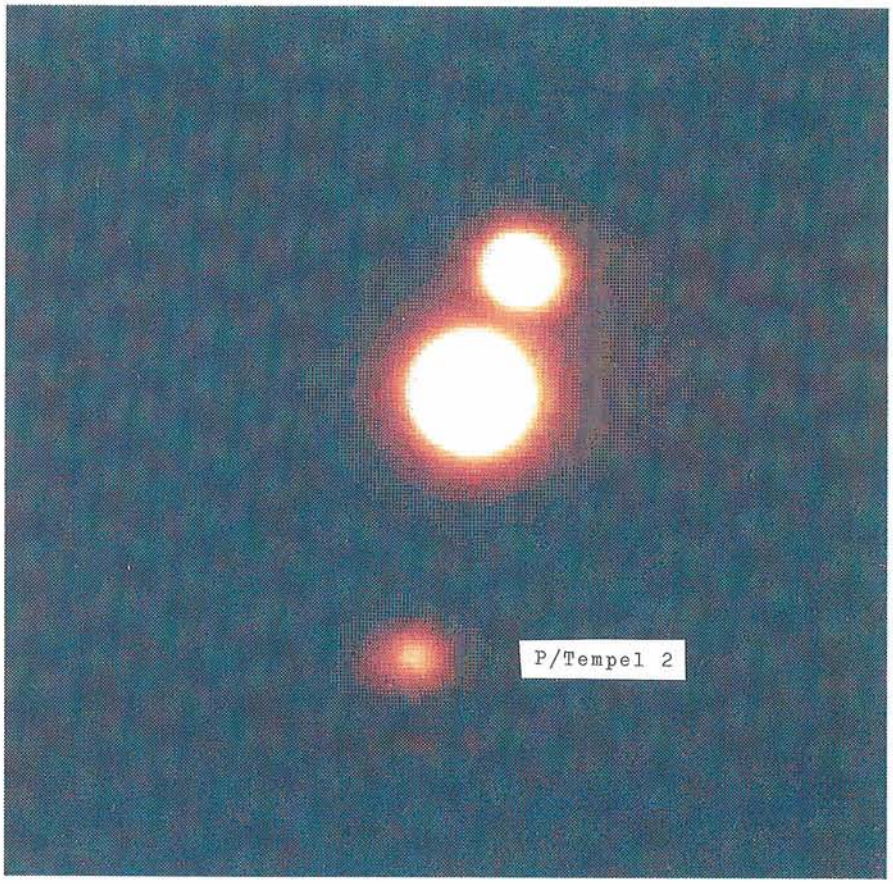

Figure 1: *3-min V exposure of comet P/Tempel 2, obtained with the 2.2 m telescope at ESO La Silla on May 4, 1988. North is up, east is to the right, the field of view is 1 × 1 arcmin. The small image extension of P/Tempel 2 to the west arises from a faint background star.*