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Comet Halley Observed at La Silla

While Periodic Comet Halley rapidly approaches the Sun, preparations are being made in many places to observe this distinguished celestial visitor. During most of the months of June and July 1985, Halley was "behind" the Sun and could not be observed. From about July 15, attempts to obtain images of Halley were made in various places, and it now appears that the first confirmed sighting was made at the European Southern Observatory on July 19.

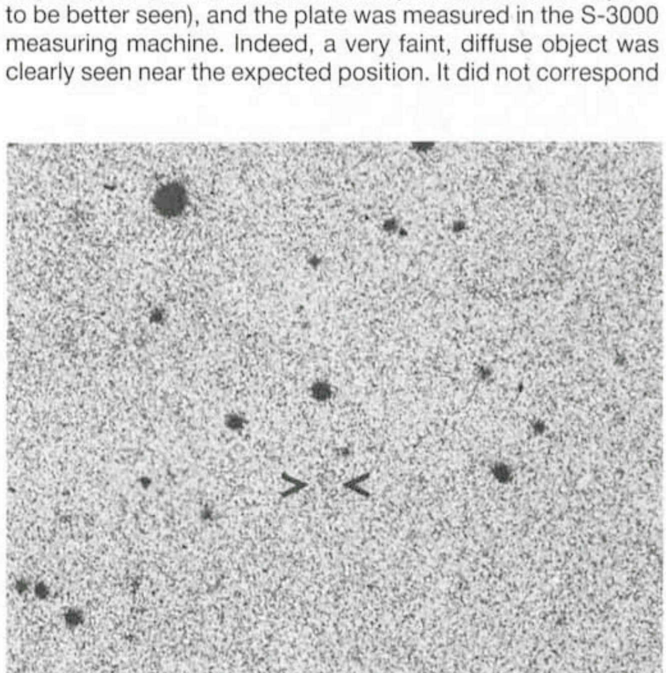
On this date Halley was at declination +18 degrees and only 30 degrees west of the Sun. From the time the comet rose over the eastern horizon at La Silla to the moment when the sky brightness became excessive, there was at most 20 minutes. The only telescope at La Silla which is able to point in this direction is the 40 cm double astrograph (GPO) – all others are prohibited to do so by sophisticated computer control or limit switches without pity. The 40 cm is also the smallest telescope on La Silla, so the outcome of the attempt to observe Halley was very doubtful.

At this very low altitude, accurate guiding is difficult because the refraction in the Earth's atmosphere changes very rapidly as the object moves away from the horizon. Moreover, the expected brightness of Halley was only 14.5–15.0 and it could under no circumstances be seen in the guiding telescope. Offset guiding at the rate of the comet's motion was therefore necessary.

Together with Drs. Pereyra and Tucholke, I was not optimistic about the prospects on that morning, when we made the first attempt. A heavy bar which supports the dome obstructed the view and it was only possible to get one good 10-min. IIa-O plate. After processing, it was inspected carefully – it showed stars down to 16 mag or fainter, but there was no obvious comet image. Since the field is in the Milky Way, there were several very faint images; however, they all turned out to be faint stars when a comparison was made with the Palomar Atlas.

Another plate was obtained on July 20, but this morning the wind was strong and gusty and the telescope could not be held steady. The limiting magnitude was therefore about 0.5 mag brighter than on the preceding morning. Then came a snowstorm and with that the end of our attempts. We sent a telex to Dr. Brian Marsden at the IAU Central Telegram Bureau informing him about the negative result. The most important was of course that Halley appeared to be about 1.5 mag fainter than predicted.

Upon my return to ESO-Garching, by the end of July, ESO photographer C. Madsen and I decided to have a closer look at the plates. A photographically amplified copy was made of the July 19 plate (this method allows very faint, extended objects to be better seen), and the plate was measured in the S-3000 measuring machine. Indeed, a very faint, diffuse object was clearly seen near the expected position. It did not correspond



to any image on the Palomar Atlas. Although difficult to measure, a position could be transmitted to Dr. Marsden with the proviso that it would be wise to await confirming observations from other observatories before publication of the ESO position.

On July 27, 28 and 29 Halley was observed by Gibson at Palomar (60 inch telescope) and later, on August 1 and 4 by Seki in Japan. The magnitude of Halley on August 1 was 16, confirming our earlier estimate. These observations showed that our measurement on July 19 was within a few arcseconds of where Halley should have been, thus eliminating doubt about the correctness of the identification. The ESO observation was published on IAU circular 4090.

Although this fact in itself carries little scientific value, it bodes well for the ESO observations of Halley in mid-February 1986, when it reappears from behind the Sun, just after the perihelion passage. At that time our observations will be vastly more important, because they will contribute essentially to the navigation of the spacecraft, which are now en route to Halley for close encounters in early March 1986. And, of course, it is always nice to be the first, at least once in a while . . .!

R. WEST

The ESA PCD at the 2.2 m Telescope

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The ESA PCD (Photon Counting Detector) (di Serego Alighieri et al., 1985a) was developed at ESTEC as a scientific model for the Faint Object Camera (FOC) of the Hubble Space Telescope (HST). It has been used at various telescopes (Asiago 1.8 m, ESO 3.6 m and 2.2 m, CFHT 3.6 m) providing us with data whose properties are very similar to those expected for FOC data (di Serego Alighieri et al., 1984 and 1985b). Since last April the PCD is offered to ESO visiting astronomers at the 2.2 m telescope within the terms of an ESA/ESO agreement, where ESA provides the detector and its computer system, the documentation and support during the first few times the instrument is operated at the telescope; ESO provides the interfaces for long slit spectroscopy and direct imaging, operational support, telescope time and data reduction software.

The PCD is a bidimensional photon counting detector consisting of a 3-stage image intensifier with magnetic focussing and bialkali first photocathode (Fig. 1), coupled by a reimaging lens to a television tube. The TV camera detects the scintillations at the output of the intensifier corresponding to the arrival of individual photons at the first photocathode. The central X-Y position of each burst is measured by a video processing electronics, and in an image memory the memory cell corresponding to that position is incremented by one. The image gradually builds up during the exposure and can be read non-destructively and displayed at any intermediate time. The detector and its electronics are controlled by a minicomputer, and the astronomer sits at a terminal in the control room. Displays are provided both for the analog output of the TV camera and for the digital data being integrated in the image memory. Experience has demonstrated that the possibility of easily and quickly monitoring the data, while these are acquired, considerably increases the efficiency and the quality of the observation. An IHAP station can also be used for the first data reduction at the telescope. The documentation available includes a Users Manual and an Installation Guide.

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1. Long-Slit Spectroscopy

Because of its very low intrinsic background noise and of the absence of readout noise the PCD is particularly well suited to applications where the sky background is low. These situations also allow to exploit the best part of the dynamic range, before saturation sets in. This is certainly the case for the long-slit spectroscopy mode implemented with the Boller & Chivens spectrograph at the ESO/Max-Planck 2.2 m telescope.

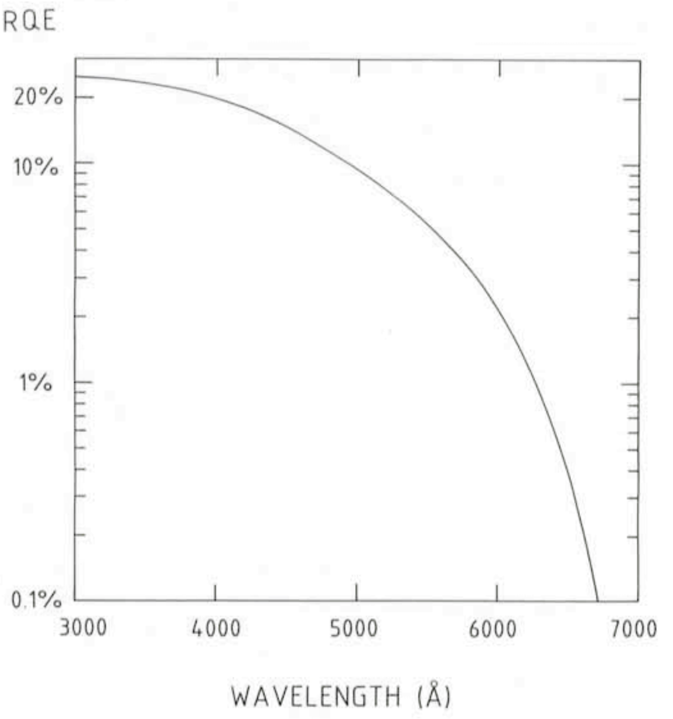

Figure 1: *The responsive quantum efficiency of the PCD image intensifier as measured by the manufacturer.*