on March 14 and 15. The signal changed sign on March 13 as expected from our model of the UV-pumping of the OH radical by the Sun (Biraud *et al.*, 1974, *A&A*, **34**, 163): it is a direct consequence of the Swings effect, whereby the population of the ground state lambda doublet critically depends upon the heliocentric radial velocity (Doppler shifted Fraunhofer solar spectrum).

OH Detected

The final spectrum totalizing 5 hours of integration ON source is shown on Fig. 1: it was obtained by inverting the March 11 and 12 spectra and integrating them with the March 14 and 15 spectra. The profile is well centered at the radial velocity of the nucleus and its width is ~3 km/s as expected; the amplitude, however, is only 10 millikelvin. From model calculations the OH production rate is 7 times smaller than what we anticipated from the total visual brightness announced in early February 1978 but is in satisfactory agreement with the visual magnitude observed between March 9 and 17 ($m_0 = 8.6 \pm 0.3$ instead of 6.5). In all likelihood Bradfield (1978 c) was a faint comet from the outset and the predictions were perhaps somewhat optimistic. In fact it is the faintest parabolic comet that we have measured so far at 18 cm wavelength, about 10 times weaker than Kohoutek (1973 XII) in December 1973, and 20 times weaker than West (1976 VI) in March 1976.

Accurate positions and visual magnitudes are of great interest to us. Firstly, the 18 cm OH maser gain is higher for negative heliocentric radial velocities, i.e. *before* perihelion. If we shall be able to measure new comets beyond 2 A.U., it is vital to get an accurate ephemeris *as early as possible.* On March 4, when we first observed Bradfield (1978 c), the right ascension was wrong by 1ʹ.5, and the signal halved on the Centre and West exposures; the detection would have been impossible without the accurate optical position of March 8 made at La Silla. Secondly, the visual magnitude is a good indicator of the outgassing of the nucleus, which helps us to select appropriate candidates for the study of OH gas production all along the cometary orbit.

Catching all the Photons: the CCD

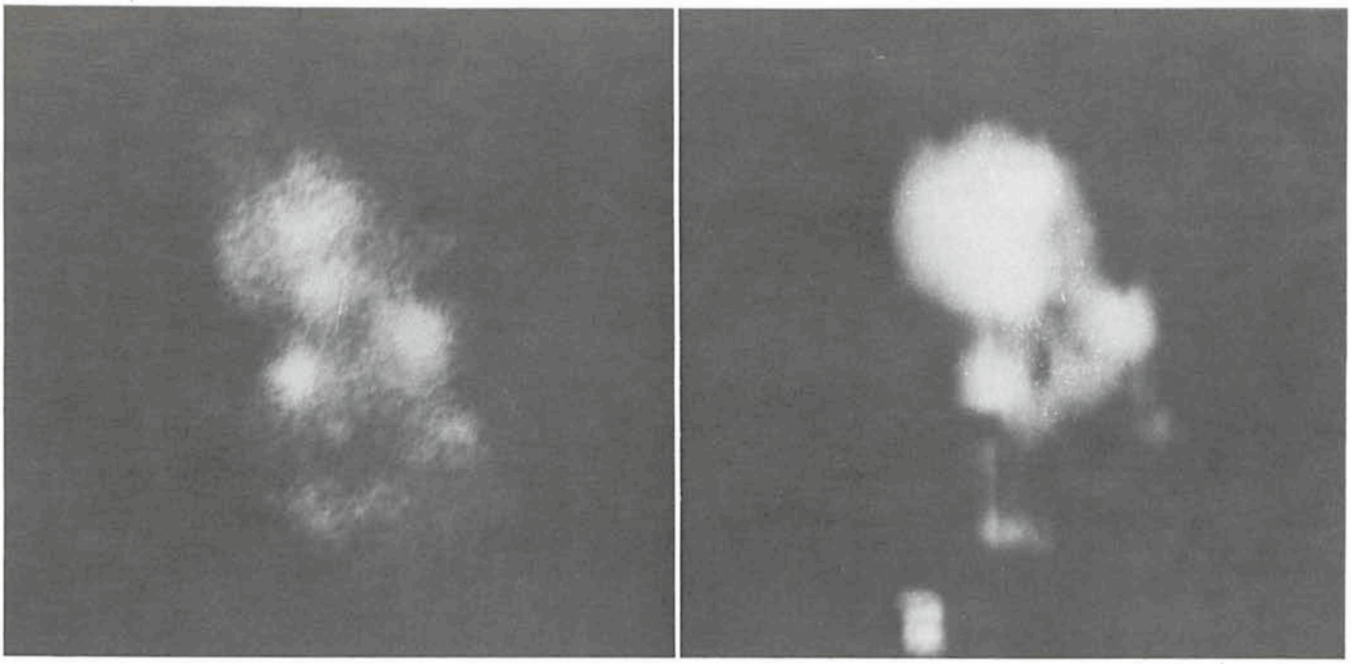
W. Wamsteker

Before you read the figure text on page 11, try to guess which of the photos was made with the ESO 1 m telescope and which with the 3.6 m telescope. The exposure times were 15 and 30 minutes, respectively. If you cannot tell the difference, then you will have been convinced of the efficiency of the new super-detector, the Charge-Coupled Device. ESO astronomer Dr. Willem Wamsteker was privileged to use a CCD on La Silla and tells us about his exciting experience.

In March of this year, ESO was given the opportunity to use at the La Silla Observatory one of the few working CCD (Charge-Coupled Device) detectors for astronomical use. This was made possible through the graciousness of our collegues at the Cerro Tololo Observatory, the generous permission of Jet Propulsion Laboratory (where the detector was developed) and the National Science Foundation which made the funds available for the operation of the detector at various observatories. The director of AURA-CTIO offered to make the JPL-CCD available to ESO for a few nights when no telescopes were available for use at their Observatory. Although the ESO telescopes are always similarly tightly scheduled, three nights could be made free at the 1 m telescope in March. Staff astronomers Drs. Wamsteker, Danks and Bouchet used these nights, assisted by Mr. Cozza (JPL) to evaluate the detector in direct imaging. The reductions were done at the CTIO computing centre in La Serena, using the basic image-processing facilities developed for AURA, in part by Dr. Albrecht (Vienna).

In the future we hope to come back in more detail on these detectors and their usefulness for astronomical observations. However, to illustrate the type of results obtained during the nights in March we show the two photos on page 11. Both pictures show the nuclear region of the nearby peculiar galaxy NGC 5253. The left-hand photograph is a direct plate taken by Dr. Wamsteker in the prime focus of the ESO 3.6 m telescope last year. The right-hand photo is a photographic reproduction (scan-converter) of a CCD frame of the same region. The text below the photographs gives the relevant details of each exposure. To compare the two photographs, it should be pointed out that the light-gathering power of the 3.6 m is about 12 times that of the 1 m, for point-like light sources; also the 3.6 m has a focal ratio about three times faster than the 1 m. Even so the exposure time on the 1 m was only half that of the 3.6 m plate. The actual resolution on both plates is about the same—limited by the mediocre seeing ~ 3 arcsec in both cases. The wavelength region chosen for the CCD exposure is essentially unaccessible to photographic emulsions.

Some of the intensity resolution in the right-hand (CCD) picture is lost in the scan conversion, which has only 16 grey levels. Even then, there exists a striking difference in the brightness distribution between the two prints. The region which dominates the right-hand picture is by far not as dominating in the left-hand photograph. Since the left-hand picture shows essentially the distribution of stellar radiation, the northern condensation is clearly associated with non-stellar radiation. This galaxy contains a strong, unresolved IR source, which is then likely to be associated with the brightest region in the right-hand photograph. The physical conditions in this must be determined on the basis of further study.



The central part of the southern galaxy NGC 5253, as seen on a conventional photographical plate at the 3.6 m telescope prime focus (left) and by a CCD at the Cassegrain focus of the ESO 1 m photometric telescope (right). Each picture measures about 33x33 arcseconds. Data: left photo: IV-N (H_2O sensitized) + RG 715, effective wavelength 8000 Å, exposure 30 min, 26 March 1977; right photo: JPL-CCD + RG 1000, effective wavelength 10000 Å, exposure 15 min, 19 March 1978. The orientation is the same on both photos: north is up and east to the left.

Since the wavelength region defined by the plate-filter combination of the left-hand photograph is relatively free of emission lines, it gives a good impression of the distribution of the stellar radiation in the nucleus of this galaxy. Note that the northern spot is much fainter than in the adjacent picture and has a brightness comparable to that of the other bright spots.

The right-hand picture is a scan converter photograph of the original, digital image. In the scan conversion, the digital quality of the image is nearly completely smoothed out; also a large amount of intensity information is lost in this reproduction, due to the 16 grey levels available in the scan converter. The pixel size is 23 microns.

Comparing the two photographs, one sees a considerable difference in the brightness distribution. Since the photographs were taken with broad-band filters, it is not possible to say if the great brightness of the northern dominant spot at $\lambda = 10000$ Å is due to non-thermal radiation or e.g. very strong emission in the Paschen γ and δ lines of hydrogen. The latter possibility is the more likely since this region coincides spatially with a point-like source of $H\alpha$ emission. The fainter spots are apparently rather dense stellar condensations in the centre of this galaxy. Reproductions: R. Donarski (ESO–La Silla).

Whatever Happened to NGC 5291?

H. Pedersen, P. Gammelgård, S. Laustsen

The striking, new photographs of NGC 5291 that were recently obtained with the ESO 3.6 m telescope show large amounts of material in the intergalactic space around that galaxy. How did it get there? No definitive answer can be given yet, say the authors, Drs. Holger Pedersen, Peter Gammelgård and Svend Laustsen from the Aarhus Observatory, Denmark, and ESO.

In December last year the Institute of Astronomy in Aarhus received the first batch of IIIa–J exposures taken in Australia as part of the joint ESO/SRC Sky Survey. One of the first plates we inspected was No. 445 which contains a beautiful cluster of galaxies, the IC 4329 group. Near the western edge of the cluster we recognized a pair of interacting galaxies of which NGC 5291 is the one. Such phenomena are quite common; whole catalogues devoted only to these objects have been compiled. In many cases the interacting galaxies are connected by diffuse, low luminosity bridges or they display long tails, as if tidal forces had torn the galaxies apart.

Something like that seems also to be the case with the present pair, but the appearance and large extension of the extragalactic material is quite unusual. Most of the light seems to come from small, but non-stellar knots. This is characteristic of H II regions, which are interstellar hydrogen clouds emitting light due to the illumination by hot,