these features are notoriously difficult to attribute to different chemical elements but it appears likely that the strongest of them can be identified with singly ionized calcium and iron. When the optical and infrared data are combined, the temperature of the "black-body" continuum is readily measured; it was 5900 K on the night of 1–2 March (see the plot of the infrared – optical photometry). The fact that this temperature was higher in the initial phase was good news for the IUE for which the supernova now provides a greatly weakened source.

Another aspect of the spectroscopy which is causing great excitement is the possibility such a bright object in the LMC provides for the study of the interstellar/intergalactic medium between us and the supernova. Sight lines outside our own Galaxy have been studied before, using as background sources bright stars in the Magellanic Clouds and much more distant Quasars and Seyfert galaxies. These, however, are very faint objects and the opportunity presented by a naked eye supernova has already resulted in a Bonanza of results from the very high resolution spectrograph (CAT/CES) at ESO (see contribution by Andreani, Ferlet and Vidal-Madjar). *R. Fosbury (ST-ECF)*

High-resolution Spectroscopy of 1987A

Observations at the 1.5-m CAT telescope with the Coudé Echelle Spectrograph and the Reticon Detector at resolution 100,000 (3 km/sec) have led to the identification of the following eleven intervening main structures in the direction of the supernova: 7–22 km/s (heliocentric), strong Na I, Ca II, K I; 38 km/s, weak Ca II; 55–63 km/s, strong Ca II, weak Na I; 70–74 km/s, same; 121–127 km/s, strong Ca II; 160–169 km/s, same; 206–218 km/s, strong Ca II and Na I; 248–253 km/s, weak Ca II and Na I; 264–269 km/s, same; 278–283 km/s, strong Ca II, Na I, K I; 293 km/s, weak Ca II. Many of these main structures are resolved into two or three nearby components. In particular, the 7–22 km/s structure clearly shows three distinct components.

In addition to the identification of a large number of intervening clouds, these observations establish with certainty that supernova 1987A is situated in the Large Magellanic Cloud, since no absorption lines are seen with velocities higher than that of the LMC.

P. Andreani, R. Ferlet and R. Vidal-Madjar (IAP, Paris)

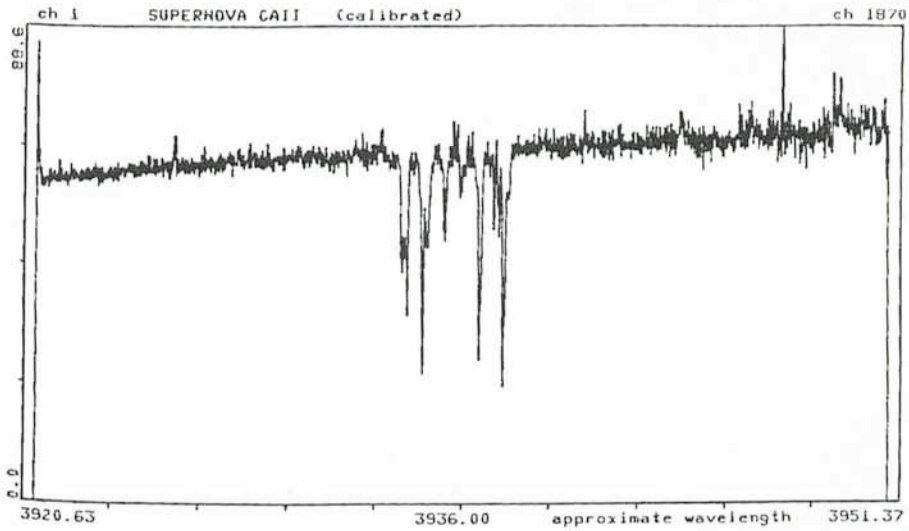


Figure 1: *The spectrum of 1987A, around the Ca II (K) line at 393.3 nm, as obtained on February 25.05, with the CAT + CES + Reticon detector at resolution 100,000. The exposure time was 1,200 sec. This figure shows the main absorption structures only; up to 22 absorption lines from interstellar and intergalactic clouds were detected.*

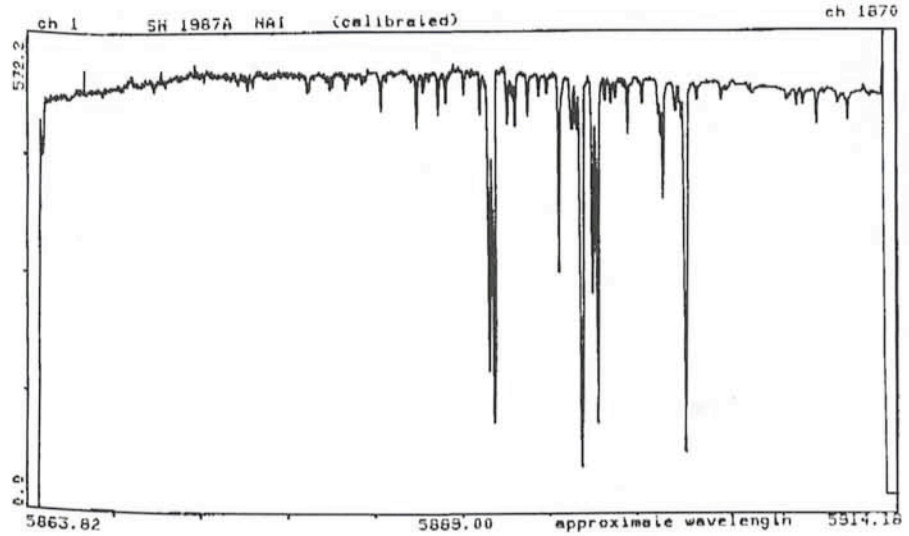
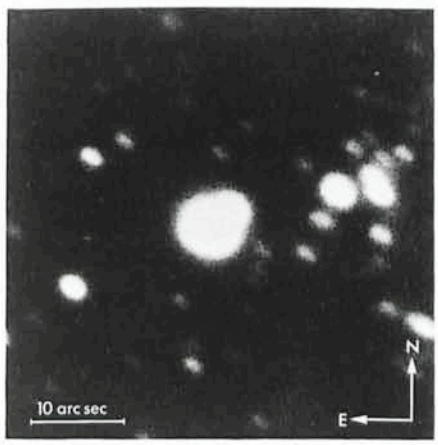
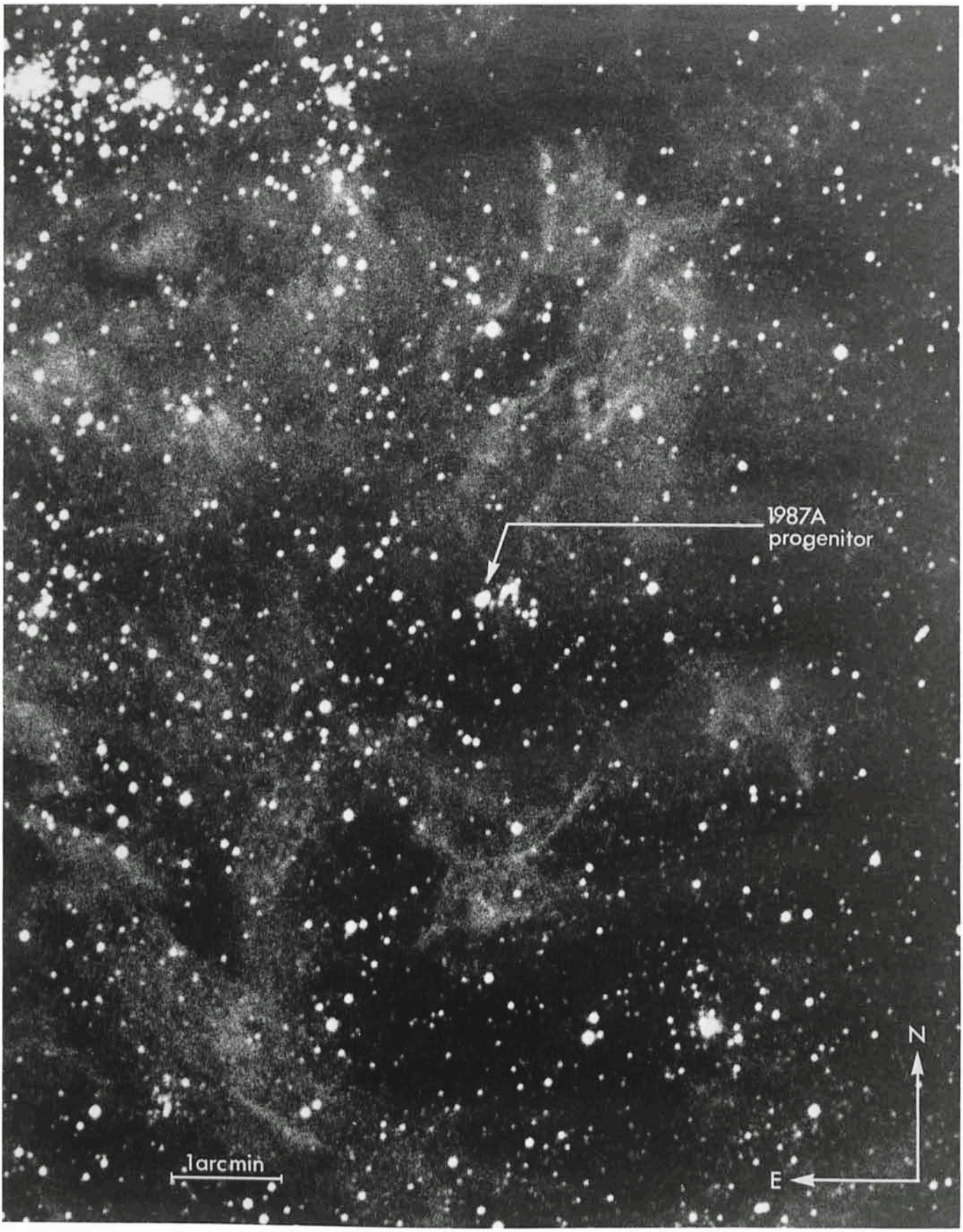


Figure 2: *A spectrum taken by G. Vladilo on February 28 with the CAT + CES + Reticon detector, around the Na I doublet at 589 nm. The strongest lines correspond to absorption in the Galaxy and in the LMC.*



This red photo (098-04 + RG 630, 60 min) of Sanduleak –69202, *the suspected progenitor of supernova 1987A, was obtained with the ESO 3.6-m telescope on December 6, 1979. The star has at least two companions; one of them is clearly seen here (as a prominent bulge) to the northwest at a distance of only 2.6 arcseconds. It is not the progenitor, since its position does not coincide with that of the supernova. A third star lies about 1 arcsecond southeast of Sanduleak –69202, but it cannot be seen on this photo. The stellar images are very close to the edge of the plate and are somewhat elongated, due to less than optimal optical adjustment.*



The star that exploded on February 23 in the Large Magellanic Cloud (the progenitor *of supernova 1987A) has now been identified. It was catalogued in 1969 as an OB star of 12th magnitude and given the designation* Sanduleak −69202. *Observations at the European Southern Observatory in the mid-1970's allowed to classify it as of spectral type* B3 I, *that is a very hot, supergiant star. It is here shown on a photograph, obtained with the ESO Schmidt telescope in ultraviolet light on December 9, 1977 (IIa-O + UG1, 60 min). Closer inspection has now revealed that two other stars are seen very close to this star. On this photo, the image of Sanduleak −69202 is somewhat elongated towards northwest, since one of the companions lies in this direction at a distance of only 2.6 arcseconds. This companion cannot be the progenitor, since its position does not coincide with that of the supernova. However, there is a third star within 1 arcsecond, just southeast of the main star. Further investigations are needed to ascertain which of the two became the supernova. Observers: H.-E. Schuster and O. Pizarro.*

This blue photo (IIa-O + GG 385, 15 min) of the bright supernova in the LMC was obtained with the ESO 1-m Schmidt telescope on February 26 at 01 : 25 UT. On this date, the supernova had reached visual magnitude 4.4. The photo should be compared with the ultraviolet photo showing the supernova progenitor which was taken with the same telescope in 1977. The enormous increase in brightness, around 2,000 times, is evident. The background nebulosity emits strongly in the ultraviolet and is therefore better visible on the ultraviolet photo. Otherwise more or less the same stars are seen on both photos. Note that the "cross" around the supernova is an optical effect in the telescope which is caused by the support of the plateholder. Observer: G. Pizarro.