resolved emission nebula around the SN has been carried out with the ESO echelle spectrograph by Wampler and Richichi (1988, *The Messenger* No. 52) and Wampler (1989, preprint). The emitting gas is likely to be the remnant of the stellar winds of the supernova precursor star and it appears unevenly distributed.

In March 89, three high resolution spectra (R = 60,000) were also obtained by S.D. with the CES spectrograph, linked via a fibre to the 3.6 m telescope, which provide additional information on the circumstellar gas. The aperture on the sky corresponds to 3.4 arcsec. A first spectrum was taken in the region of the interstellar NaI absorption lines. A cursory inspection shows no strong variations in the absorption components with respect to the spectra taken immediately after the explosion. Two more spectra were obtained at the strong [NII] and [OIII] emission lines (658.4 and 500.7 nm respectively) seen at a velocity of about 287 km/sec. The [NII] line shows a single, narrow component. The [OIII] line shows close to the main component of FWHM = 17 km/sec a much fainter one, of about the same width, blueshifted by 29 km/sec. On the red side of the main component a faint, broader component extends to about 90 km/sec. The velocity structure points to the presence of different components of highly ionized gas moving at different velocities.

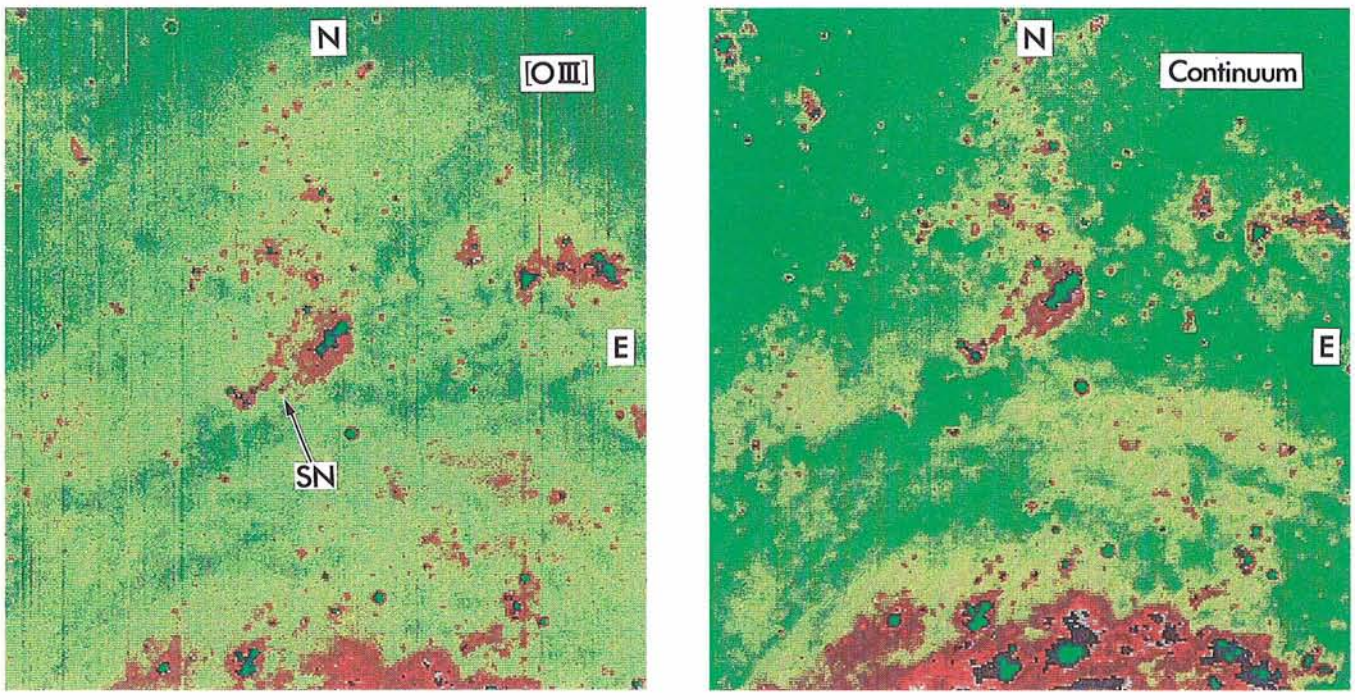
While the full interpretation of these features require more data, it is clear that a new, fascinating phase in the formation of the remnant of SN 1987A has started. Close monitoring of its evolution in the next year bears great promise of new interesting discoveries.

The Remnant of SN 1957d in M83

M. TURATTO, E. CAPPELLARO, Asiago Astrophysical Observatory, Asiago, Italy
I.J. DANZIGER, ESO

A pilot programme dedicated to studying previously reported extragalactic supernovae of advanced age (> 300 days) has had some early success with observations made at La Silla in April 1989. We report here the detection from direct imaging, and subsequent spectroscopy of the remnant of SN 1957d in M83. This galaxy has been a prolific producer of SNe this century (5 so far), and therefore offers a good opportunity for studying evolutionary effects in SNe of different types concentrated in a small area of sky. Unfortunately SN 1957d was not a well observed SN at early phases, and therefore neither the light curve nor the early spectroscopy was available to ensure an unambiguous classification. We now know that many SNe, as they age, develop strong lines of [OI] λλ 6300,63 or strong lines of [OIII] λλ 4959, 5007, and these characteristics facilitate detection by using narrow band filters to image objects in the light of these emission lines. Figure 1 shows the result of imaging of an area of M83 in the light of (a) [OIII] λ 5007 and (b) a nearby continuum wavelength with EFOSC on the 3.6 m telescope. The arrow points to the position of an object with enhanced brightness in the [OIII] λ 5007. This object coincides closely with the known reported position of SN 1957d.

Figure 2 shows a spectrum of this object, of approximately 20 Å resolution, resulting from a total exposure time of 200 minutes with the B300 grism in EFOSC. The most striking feature of this spectrum is the broad line blend of [OIII] λλ 4959, 5007. A weaker broad line feature due to [OI] λλ 6300,63 is also evi-



(a) (b)

Figure 1: *(a) Direct CCD image of M83 with narrow band filter isolating [OIII] λ 5007 emission. (b) Direct CCD image of M83 with narrow band filter isolating continuum emission.*

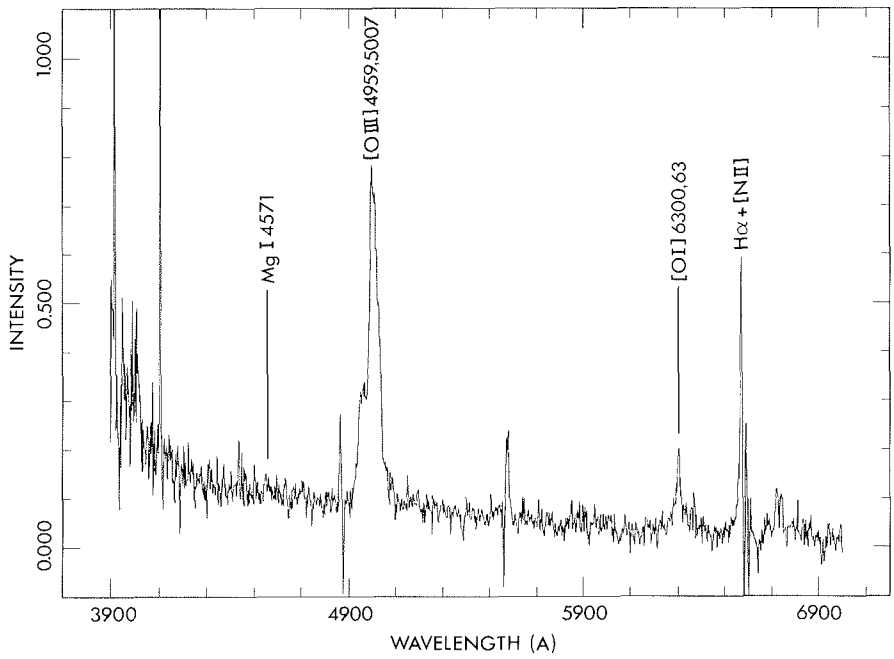


Figure 2: *Spectrum of SN 1957d. Wavelength identifies features discussed in the text, since the redshift of M83 is only 500 km s^{-1}.*

dent, as is a feature (not shown here) at 7320 Å presumably due to the [O II] λλ 7319,30 doublet. There is some weaker evidence that a feature corresponding to a blend of Hα + [N II] λλ 6548,83 has a broad component, although this is obscured by the imprecise subtraction of the overlying spectrum of narrow line H II regions in the vicinity of the object. There is also weak evidence for the presence of a line of Mg I λ 4571. Other possible lines may be present and will be the subject of a more detailed analysis.

In a qualitative way the spectrum is similar to that of Cas A (320 years) and N 132 D in the LMC (~1500–2000 years) although the relative line strengths are different for the various remnants. Since we have not detected [O III] λ 4363 we are unable to establish an indicative temperature for the [O III] line emitting region. Thus at present we can only arrive at some lower limit for the mass of O^{++}. Nevertheless our measured flux of [O III] λλ 4959, 5007 ~2×10^{-15} ergs cm^{-2} s^{-1}, converted to an absolute flux for a distance of M83 = 3.7 Mpc, is not so different from that of Cas A, when account is taken of the uncertainties in reddening and distance.

More information is available by virtue of the high S/N in the [O III] λλ 4959, 5007 line. The width (FWHM) of the [O III] λ 5007 feature is ~2700 km/sec. In addition, the red wing of this line extends to ~4500 km/sec beyond the zero velocity position (+500 km s^{-1}) in the rest frame of M83. How this transforms into a determination of the real expansion velocity of the oxygen-rich material is complicated by the fact that the [O III] lines are clearly asymmetric with a velocity of the maximum emission of approximately −650 km s^{-1} relative to the rest velocity. [O I] λ 6300 also shows this effect, although possibly to a lesser degree.

It has been pointed out by Danziger, Bouchet, Gouiffes and Lucy (IAU Circ. 4746) that this asymmetry with a blue shift of the peak of the emission lines noted since September 1988 in the spectrum of SN 1987A is a characteristic created by the presence of dust filling the envelope or the line forming region. Other interpretations in the case of SN 1957d with the data currently available are possible if one concedes the possibility of large deviations from spherical symmetry. However, if dust is the cause, then a rather careful analysis of the possible, but not inevitable, effects of differential reddening will be necessary in order to ascertain to what extent relative line strengths are affected.

The ESO Exhibition Tours Europe

Following the successful presentation in The Hague (see *the Messenger* **55,** p. 37), the ESO Exhibition moved on to Münster (F.R. Germany), where the opening took place at the Westfälische Museum für Naturkunde on April 20, 1989. More than 100 invited participants listened to brief, introductory talks in the Planetarium of this beautiful, modern museum and then continued on a guided tour through the exhibition. It will be on display until June 4, and since the number of visitors to the museum normally reaches a maximum during the month of May, it is expected that well over 15000 persons will make use of this opportunity to learn more about ESO and modern astronomy.

The ESO Information Service has recently concluded the planning for the next 12 months; in view of the many invitations, the exhibition photos will be duplicated at the ESO photographic laboratories during the coming summer months. Upcoming stations now include Klagenfurt, Austria (June 23–August 27), Copenhagen, Denmark (October 31–January 3, 1990), Stuttgart, F.R. Germany (mid-November 1989–mid-February 1990) and CERN, Geneva, Switzerland (early March 1990–late May 1990). ESO material will also be shown in connection with various meetings and local activities, e.g. in Groningen (the Netherlands) on the occasion of the 375th anniversary of the Groningen University (first three weeks in June 1989); in Vienna (Austria) at the "World Tech Vienna" (June 18–22, 1989); in Montpellier (France) at the "Colloque Européen sur l'Astronomie et l'Espace" (September 20–23, 1989). Further exhibitions are being planned for 1990 in other cities, mostly in the member states, but also in Austria and Portugal.

Moreover, it has been decided that ESO will have an information stand at the European Symposium of Hypersonics, which will take place at the European Patent Office in Munich, on July 13–14, 1989. This symposium, which is concerned with the solutions to known technological problems and also addresses social, economical and environmental aspects of hypersonics, will serve to promote contacts and cooperation between aeronautical/astronautical professionals and students in Europe. It is organized by the EUROAVIA association with domicile in Munich. This meeting offers a good opportunity for ESO to make itself and its wide spectrum of activities better known to specialists from academic institutions and industry, working in an important neighbouring high-technology field.