coincident, within 15 km s^{-1}, with that of Lyβ and is connected to the ground state by a strong UV transition. A large fraction of the Lyβ photons can, therefore, be "transformed" into O I transitions (1.1287 μm + 8447 Å + 1304 Å) provided that the optical depth in Hα is large enough to inhibit the competitive process which transforms Lyβ photons into Hα + Lyα. It is not clear at present whether the observed line ratio Hα/Pβ can be accounted for by $\tau(H\alpha) \sim 500$, as required in the case of cosmic O I/H I abundance. Also, we cannot determine how much [S I] 1.1306 contributes to the observed 1.132 μm feature. We expect, however, that the O I line should vary more rapidly than the H lines due to its dependence on the optical depth of Hα and Lyβ. Future spectra should, hopefully, be able to confirm (or exclude) the O I identification and to determine the O I/H I abundance ratio.

Other lines have been identified on the basis of wavelength coincidence with atomic transitions between low lying states which may be collisionally populated at T ~ 5,000 K. Some of these identifications are further strengthened by the presence of several transitions (e.g. Na I, Mg I). In general, however, these identifications must be treated with caution at this stage.

CO

The fundamental band of carbon monoxide at 4.6 μm appears to dominate the emission in the M window (4.5–5 μm) and its first overtone band the emission between 2.3 and 2.5 μm. As noted already, the CO emission is redshifted by the same amount as the atomic and ionic lines and is thus apparently associated with the SN ejecta rather than ambient material. Several of the individual $\Delta v = 2$ bands are resolved in the 2.3–2.4 μm region and their relative strengths lead to a crude temperature estimation of $T \approx 2{,}000$ K and a CO mass of $\sim 4 \cdot 10^{-4} M_{\odot}$. Relative to the first overtone, however, the emission in the fundamental band is a factor ~ 3 too weak (the same as observed for Pfβ). This cannot be a calibration effect (because the flux levels in our spectrum are consistent with lower resolution CVF observations made slightly later by P. Bouchet) and therefore implies the importance of strong radiation transfer effects in the envelope. In this case the strength of the fundamental and first overtone bands can be expected to vary at different rates in the future.

Summary

The infrared spectrum is dominated by emission lines from a gas of low ionization degree (including molecular CO) and, apparently, relatively normal abundances. Whereas the symmetry and widths of the lines are generally consistent with an envelope expanding at $\sim 1-2 \times 10^3$ km s^{-1} however, the emission in virtually all lines appears to be dominated by gas receding along the line of sight at a few $\times 10^2$ km s^{-1} relative to the systemic velocity of the LMC.

IR Speckle Interferometry

Infrared (IR) speckle observations performed in early May and in June do not show the mystery spot – whose infrared detection has been erroneously mentioned in the summary of the ESO Workshop on SN 1987A. With the separation observed in visible light, the mystery spot must be, at 3.8 microns, at least 4 magnitudes fainter than the supernova to escape detection. But beginning from mid-June, our observations show a barely resolved structure appearing in this band and lying at the limit of detectability, thus either extremely small or extremely weak. Further observations carried out on August 6 confirm that the supernova is definitely resolved in IR. A weak oscillation shows up in all visibilities obtained from 2.2 to 4.6 microns. The actual structure causing this, accounting for 2.5 to 3 per cent of the total flux, cannot be unambiguously derived until now: the presence of one or several IR spots at 0.35 arcsecond, as measured on the N-S and E-W axis, is as plausible as that of a ring-like structure of 0.42 arcsecond diameter, although the latter seems physically more realistic. Whatever the correct model is, the projected velocity of about 0.4 c clearly points to a light echo.

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Conference Report:

Astronomy from Large Databases: Scientific Objectives and Methodological Approaches

The conference on Astronomy from Large Databases: Scientific Objectives and Methodological Approaches took place in Garching on 12–14 October 1987.

Approximately 150 attended. The projects and missions represented included, amongst others, HST, IUE, IRAS, ROSAT, EXOSAT, EUVE, and Hipparcos. In the three days of the conference, 74 presentations were discussed. These were organized in sessions on Astrophysics from Large Databases, Object Classification Problems, Statistics, Pattern Recognition and Expert Systems, and Databases – Current Trends.

Half of the presentations were in the latter category and hence a comprehensive view of work in progress in this area of astronomy can be gleaned from the papers. The diversity of approaches in this area (for example, the range of database systems in use, generally customized) points to the need for coordination. This conference provided a good start in this direction.

In other sessions, discussion took place on the applications of new technologies to stored astronomical data. Some of the papers on expert systems and statistics will provide useful reference material – not easily available elsewhere – when considering the application of methods in these fields.

The proceedings will be published by the European Southern Observatory and are expected to be available around the end of January 1988.

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