



Fig. 3: The shell star HR 5999 unveiled. An artist's impression. Courtesy Mrs. M. Moesman.

derived. It is shown in Fig. 2 as an extension of the visual part of the law. Compared to the normal extinction law of interstellar matter, the behaviour of the UV circumstellar law is completely different. The 2200 Å bump is somewhat lower and shifted towards larger wavelengths. Furthermore, at about 1800 Å it is very much lower, resembling that for the star σ Sco reported by Savage.

The Spectrum

A study was made of the red and blue spectral plates (12 Å/mm) of HR 5999 taken in May 1978. Many lines of H I, Ca I, Fe II and Ti II are present and are composed of a broad photospheric component and several blue-shifted shell components. There are, however, lines which are purely photospheric (e.g. Mg II λ 4481) whereas other lines have only shell components (Na I D). The H-alpha line is in emission and has variable double structure. This variation appears to be in antiphase with the brightness changes of the star. Low resolution IUE spectra, taken also in May 1978, show in the short wavelength range ($\lambda < 2000$ Å) the presence of emission lines of O I, C II, C IV and probably Al II; in the long wavelength range ($2000 \text{ Å} < \lambda < 3000$ Å) there are indications of strong and broad absorption features. A steep drop-off of the continuum at about 1800 Å is in agreement with the spectral type A7 derived earlier from the red and blue plates. High resolution IUE spectra of the long wavelength region, taken more recently by Hack and Selvelli, reveal the presence of many shell lines from multiplets of Fe II, Cr II and Mn II in absorption and strong emission of the Mg II λ 2800 doublet with a double structure, comparable with that of H-alpha.

The radial velocities of the shell components on the blue and red plates vary in time between -40 and -5 km/s, more or less in phase with the variation of the dust extinction. Because of the large width of photospheric lines their radial velocities are more difficult to determine. The values vary between -20 and +20 km/s.

Although many details of the spectra are still being studied, the spectral data support our belief in the existence of a hot emission shell (C IV emission line) around the star, surrounded by a cooler, less dense shell region, where the shell absorption components are formed and in which the circumstellar dust is embedded. If this is

true, one can imagine that the dust extinction and polarization variations are the result of changes in the character of the dust grains due to perturbations in the photospheric or hot shell region, which are propagated outward supersonically through the cooler dusty surroundings. The cause and the characteristics of the perturbations are not yet clear, but the existence of instabilities in the shell of HR 5999 can be expected in view of the evolutionary stage of this pre-main-sequence star.

A Supernova Discovered at La Silla

Dr. André B. Muller from ESO recently described (*The Messenger* No. 19, p. 29, 1979) a new system allowing an easy and efficient monitoring of galaxies for the detection of supernovae. Using this system, H.E. Schuster discovered a supernova in NGC 1255 on December 30, 1980 (*IAU Circular* No. 3559, 1981). At the time of discovery its magnitude was 17. This was the first supernova found on La Silla.

Thanks to the kind collaboration of Visiting Astronomers Dr. W. Seitter and Dr. H. Duerbeck, an immediate follow-up was carried out, showing that it was a type II supernova.

P. V.

ESO/ESA Workshop on "Optical Jets in Galaxies"

With the aim of encouraging European cooperation and coordination in the use of the Space Telescope within some fields of research, ESO and ESA have arranged a series of workshops on the use of the Space Telescope and coordinated ground-based observations. The second of these workshops, entitled "Optical Jets in Galaxies", took place in the auditorium of the new ESO Headquarters in Garching on February 18-19, 1981.

Thanks to active contributions from 50 participants from different institutions in Europe and the USA, the meeting was very successful. Optical, radio and ultraviolet observations of jets were discussed in great detail. One of the results of the meeting is that the Space Telescope is expected to play a key role in the study of jets because of high resolution and UV sensitivity. The workshop proceedings will be published in a short time by the ESA Press.

M. T.

ALGUNOS RESUMENES

Observaciones "Speckle" en infrarrojo realizadas con una cámara de televisión

En principio, los grandes telescopios, como el de 3.6 m de la ESO, tienen una resolución angular mejor que 0.1 segundo de arco, vale decir, que detalles así de pequeños pueden ser vistos; pero comúnmente éste no es el caso. Las mejores fotografías tomadas con grandes telescopios pocas veces muestran detalles más pequeños que 1 segundo de arco (un segundo de arco es la separación angular de dos puntos separados por un milímetro a una distancia de 200 metros); esto se debe a la presencia de la atmósfera que es turbulenta, y esta turbulencia produce una imagen borrosa del objeto.

ESO, the European Southern Observatory, was created in 1962 to... establish and operate an astronomical observatory in the southern hemisphere, equipped with powerful instruments, with the aim of furthering and organizing collaboration in astronomy ... It is supported by six countries: Belgium, Denmark, France, the Federal Republic of Germany, the Netherlands and Sweden. It now operates the La Silla observatory in the Atacama desert, 600 km north of Santiago de Chile, at 2,400 m altitude, where ten telescopes with apertures up to 3.6 m are presently in operation. The astronomical observations on La Silla are carried out by visiting astronomers – mainly from the member countries – and, to some extent, by ESO staff astronomers, often in collaboration with the former. The ESO Headquarters in Europe are located in Garching, near Munich. ESO has about 120 international staff members in Europe and Chile and about 150 local staff members in Santiago and on La Silla. In addition, there are a number of fellows and scientific associates.

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Los astrónomos denominan esto "seeing"; y ellos se sienten bastante contentos cuando el "seeing" se reduce a un segundo de arco. Hace aproximadamente 10 años, un astrónomo francés, Dr. Antoine Labeyrie, notó que exposiciones de extremadamente corta duración (de sólo algunas centésimas de segundos) de estrellas brillantes muestran detalles (llamados "speckles") que son tan pequeños como la resolución teórica del telescopio, y desarrolló una técnica (interferometría speckle) que permite extraer la información que contiene un gran número de fotografías de corta exposición de un sólo objeto.

En el campo óptico esta técnica es usada hoy en día por un gran número de grupos en todo el mundo. Recientemente los Drs. P. Lamy y S. Koutchmy han realizado con éxito varios tests en La Silla que mostraron que esta técnica también puede ser aplicada en el infrarrojo (a 1.6 μ m).

El gas ionizado de M33 visto con un telescopio de 6 m

Generalmente las regiones de hidrógeno ionizado (H II) en una galaxia son fuentes que emiten sólo algunas líneas de muy baja intensidad. La mejor manera para obtener fotografías detalladas de las estructuras de hidrógeno

ionizado en galaxias cercanas es usar un filtro de interferencia angosto para seleccionar una de las líneas más intensas, en combinación con un reductor focal para aumentar la iluminación del plano focal en el foco de un gran telescopio.

Debido a su gran extensión angular y a su favorable inclinación, M33 es una de las galaxias más apropiadas para investigar las estructuras de H II.

Cuando fue observada por primera vez por el Dr. Courtès y sus colaboradores con el telescopio de 1.93 m de Haute-Provence, usando un filtro de interferencia angosto y un reductor focal, se hizo evidente que se requería una mayor resolución angular para poder obtener más detalles de las estructuras de hidrógeno ionizado. Ya que la resolución angular aumenta con el tamaño del telescopio, el reductor focal del Dr. Courtès fue adaptado al foco primario del telescopio de 6 m en la montaña del Cáucaso, cerca de Zelentchuk en la Unión Soviética.

En las páginas 16 y 17 se pueden apreciar dos fotografías tomadas con este instrumento, que es el telescopio óptico más grande en el mundo. Ellas muestran más detalles que cualquier otra fotografía tomada antes de la misma región y más estudios serán necesarios para entender el origen de las varias estructuras que se pueden apreciar en las placas.

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