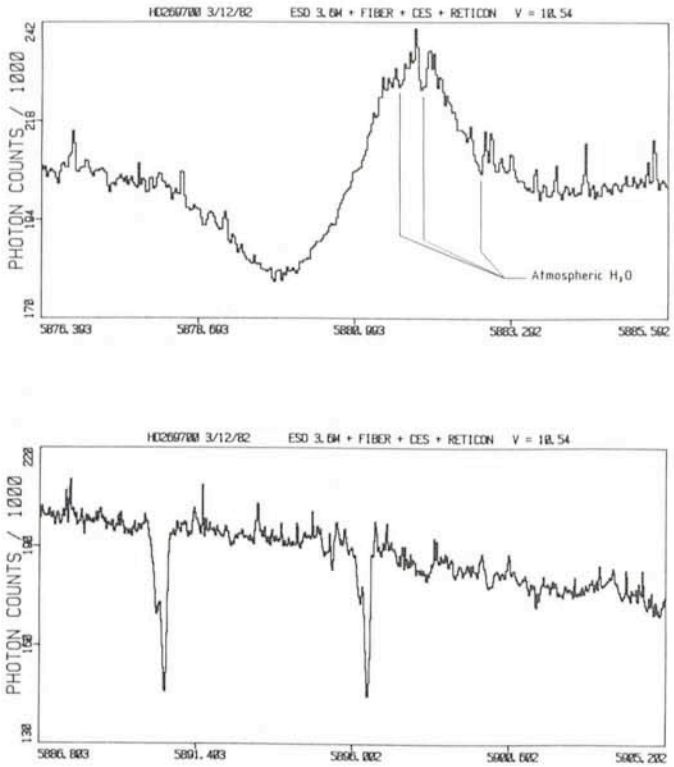

Fig. 5: *Reticon spectrum of the LMC star HD 269700 (M_v = 10.54). This spectrum was obtained after 3.5 hours of integration using the 3.6 m telescope and a 85 μm core fiber.*
(a): the P Cygni profile of He I. The detected emission and absorption line velocities are respectively 320.76 and 216.5 km sec^{-1}.
(b): Na I interstellar absorption lines. The two deep lines are galactic components, whereas several other fainter components associated with the LMC itself can also be detected.

large slit; the resolution was thus degraded by a factor of about 3 to a value of 160 mÅ (FWHM). The seeing during this observation was excellent, and possibly as much as 80 % of the light was captured by the fiber. The signal to noise ratio was about 100 and the gain compared with similar observations with the CAT corresponds to about 2 magnitudes, equivalent to the ratio of the collecting areas of the 2 telescopes. This stresses the important result that the fiber link itself can, under certain conditions, be extremely efficient and that the 2 main sources of loss are those due to input coupling with the telescope (limited by the seeing) and those due to coupling with the spectrograph (limited by the slit width).

Conclusions

It has been demonstrated that a fiber optics link could be used efficiently to couple an instrument to a telescope over distances of several tens of metres. The coupling efficiency is limited by two conflicting requirements: a large fiber should be used for good compatibility with the average seeing disk, whereas considerations of optimal slit matching would require a smaller fiber to be used.

Because of its circular collecting area, the fiber is more sensitive to seeing degradation than a normal spectrograph slit. For this reason, the potential efficiency of future systems will be to a large extent dependent upon the development of an image slicer capable of efficiently (~ 100 %) anamorphizing the output light distribution into a form entirely compatible with the spectrograph input requirements. Such an image slicer would then permit much larger fibers (limited in diameter only by the useable entrance slit or detector length) to be envisaged, thus significantly reducing the seeing dependence. This problem is not only relevant to the particular case of the CES, but is also of prominent interest for the development of future very large telescopes for which the instrumental coupling efficiency will be a critical parameter.

Before long a CCD will be installed on the CES and the present limitation in detector length will disappear, enabling a larger fiber diameter and consequently higher slicing factor to be implemented.

This new detector, when used together with an improved image slicer and fiber optics link, will yield a gain of 3 to 4 magnitudes at the 3.6 m telescope when compared with the present CAT/RETICON configuration.

It is hoped that within the first half of 1984, a fully operational and optimized fiber optics link will be ready for routine use by astronomers.

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ESO Workshop on "Primordial Helium"

Some 60 participants attended a workshop on Primordial Helium and related light elements at Garching on February 2–3, 1983.

Theoreticians opened the workshop by stressing the importance of abundance measurements for the primordial elements. They outlined how recent developments in particle physics and cosmology have created great interest in determining accurate primordial abundances.

The various observational approaches to determining Y_P (the primordial helium abundance) were elaborated by many speakers. It was striking to see that from the smallest systems (planets, individual stars) to the largest (extragalactic HII regions) abundances could be obtained with reasonable accuracy. We heard about investigations of the Sun, the atmospheres of Jupiter and Saturn, and young and old stellar systems. Opposite viewpoints were expressed with respect to prospects of obtaining accurate abundance determinations from globular clusters. Possibly the greatest controversy concerned approaches to Y_P using galactic and extragalactic HII regions – this involved observers, specialists in the interpretation of atomic spectra, and theorists of stellar and galactic evolution. New possibilities were investigated, involving supernova remnants, active galactic nuclei, and absorption lines in QSO spectra.

Reviews of the latest results concerning other light elements were also given – deuterium, lithium-7 and helium-3. These were considered, together with the best estimates of Y_P, in a very lively discussion session at the end of the workshop, and theoreticians elaborated their views on the status of the standard Big-Bang Cosmology and explored alternatives.

The proceedings of the workshop will be published by ESO within a few months. *P.A.S. and D.K.*