January 1985: B. Reipurth, J. Andersen/A. Blecha/M. F. Walker, A. Reiz, Ilovaisky/Chevalier/Motch/Angebault, Lindgren/Ardeberg/Maurice/Prévot L.

February 1985: Lindgren/Ardeberg/Maurice/Prévot L., Andersen/Nordström/Olsen, Prévot L. Ardeberg/Lindgren/Maurice, Mayor/Burki, Mayor/Mermilliod, Crane/Capaccioli, de Grijp/Lub/Miley/de Jong.

March 1985: S. Frandsen/B. Thomsen, K. Gyldenkerne/M. Hawkins, de Grijp/Lub/Miley/de Jong, Liller/Alcaino, Ilovaisky/Chevalier/Motch/Angebault.

50 cm Danish Telescope

October 1984: Lindgren/Ardeberg/Maurice/Prévot L., Grenon/Oblak, Lindgren/Ardeberg/Maurice/Prévot L., Grenon/Oblak, Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttebroze.

November 1984: Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttebroze.

December 1984: Schneider/Maitzen/Weiss/Vogt, Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttbroze, Gustafsson/Vilhu/Schoembs, Foing/Bonnet/Crivellari/Beckman/Galleguillos/Lemaire/Gouttebroze, Gustafsson/Vilhu/Schoembs.

January 1984: Baade/Ferlet, L. K. Kristensen.

February 1985: L. K. Kristensen, Sterken, Lindgren/Ardeberg/Maurice/Prévot L., Lodén K.

March 1985: Lodén K., E. H. Olsen.

90 cm Dutch Telescope

October 1984: Trefzger/Pel/Blaauw, van Paradijs/Groot, van Paradijs/Charles/Pakull, van Paradijs/Bath/Charles/Groot, van Paradijs/Bath/Zuiderwijk/Groot.

November 1984: van Paradijs/Groot, van Paradijs/Charles/Pakull, van Paradijs/Bath/Charles/Groot, van Paradijs/Bath/Zuiderwijk/Groot.

December 1984: Diethelm, Lub/de Ruiter.

February 1985: Grenon/Lub, de Zeeuw/Lub/Blaauw/Koninx, van Paradijs/Groot/van Paradijs/Charles/Pakull, van Paradijs/Bath/Charles/Groot.

March 1985: van Paradijs/Groot, van Paradijs/Charles/Pakull, van Paradijs/Bath/Charles/Groot, van Paradijs/Bath/Zuiderwijk/Groot.

61 cm Bochum Telescope

October 1984: Grewing/Bässgen/Kappelmann/Bianchi/Krämer/Gutekunst, Bianchi/Cellino/Grewing/Pakull.

November 1984: Bianchi/Cellino/Grewing/Pakull, Isserstedt.

December 1984: Isserstedt.

January 1985: Isserstedt, Feitzinger.

February 1985: Feitzinger, Musculus.

March 1985: Musculus.

Applications for Observing Time at La Silla

Period 35 (April 1–Oct. 1, 1985)

Please do not forget that your proposals should reach the Section Visiting Astronomers **before October 15, 1984.**

Applications to observe Comet Halley during Period 36 (October 1, 1985 – April 1, 1986) should also be submitted before October 15, 1984.

First QSO Spectra with EFOSC

H. Dekker and S. D'Odorico, ESO

EFOSC, the ESO Faint Object Spectroscopic Camera, will be available to users as of April 1, 1985 at the Cassegrain focus of the 3.6 m telescope.

The instrument was mounted for the first time at the telescope in June 1984 for a short test period. The optical components were not yet fully optimized, and only part of the grisms and filters were available. It was, however, possible to test successfully the instrument functions and to carry out a few observations in direct imaging and spectroscopic modes. The results prove the high efficiency and the versatility of the instrument. A full description of EFOSC will be given in a next issue of the *Messenger.*

We just report here on the spectra of two QSOs in order to provide users with a first hint of the instrument performance. Table 1 summarizes the parameters of the observations. A thinned, back illuminated, RCA CCD was used as a detector; the chip belongs to the most recent production of RCA and it appears to have good charge transfer properties. The format of the spectra is identical to that of the Boller and Chivens spectrograph plus CCD. A long slit is used so that the sky to be subtracted can be sampled on either side of the object spectrum.

The radio source PKS 1256-220 has been identified by Condon et al. (1977) with a 20 magnitude stellar object, on the basis of an accurate radio position (the finding chart is labelled

TABLE 1: OBSERVATIONAL PARAMETERS

Detector characteristic:		512 × 320 pixels, 30 μm in size 40 e⁻/pixel read out noise	
Dispersion:		230 Å/mm, 7 Å/pixel	
Object:		12 56-22	13 34-00
m_v:		20	17
Slit width:	in arc sec	1.5	1.5
	in pixels	2.3	2.3
Exposure time:	(sec)	1800	600
Seeing:	(FWHM)	1.6	1.5
Counts/sec./Å, at λ 5400 Å:		0.24	1.31

1156-220 instead of 1256-220). The spectrum of this object, exposed for 30 minutes, clearly shows two strong emission lines identified with C III] λ1909 and Mg II λ2800 at redshift z = 1.306 (Fig. 1).

UM 590 (1334-00) is a 17 magnitude quasar found in an objective prism survey carried out with the 61 cm aperture Curtis Schmidt telescope at the Cerro Tololo InterAmerican Observatory (MacApline et al., 1981), with a suggested redshift z = 2.85. A 10 minute spectrum (Fig. 1) shows three strong emission lines: Lyα, O IV] λ 1302 and C IV λ 1550 from which a redshift of 2.79 is measured.

References

Condon, J. J., Hicks, P. D., and Jauncey, D. L.: 1977, *Astron. J.* **82,** 692.

MacAlpine, G. M., and Williams, G. A., 1981, *Astrophys. J. Suppl.* **45,** 113.

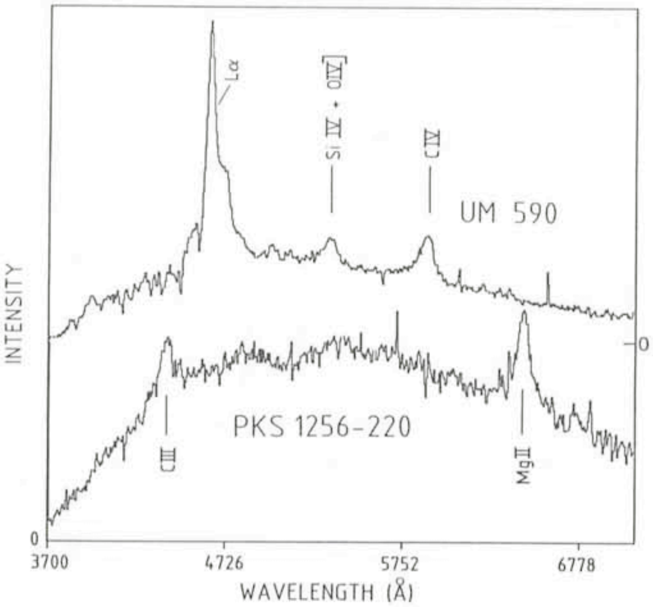

Fig. 1: *The two sky-subtracted, wavelength-calibrated QSO spectra obtained with EFOSC. No flat fielding or spectral response correction has been applied. The plots show rather effectively the good S/N that was achieved in the two observations.* ▶

Study of the Overall Spectrum of the QSO 3C273

T. J.-L. Courvoisier, Space Telescope European Coordinating Facility

Seyfert galaxies, quasars (QSOs) and possibly BL Lac objects have some basic properties in common. We therefore expect them to be different manifestations of the same basic phenomenon and call them Active Galactic Nuclei (AGN). Provided that our estimates of distances based on redshifts are correct, the AGN are the most luminous objects we know. Their luminosities range from 10^{44} ergs/sec for Seyfert nuclei to some 10^{47} ergs/sec for bright quasars (or 10^{11} to 10^{14} $L_\odot$ where $L_\odot$ is the luminosity of the sun). On the other hand, these objects are variable in most of the spectrum on time scales of years and less, which means that they are smaller than a few light years (light weeks for some objects). How to radiate such a large quantity of energy from such a small volume is one of the most puzzling questions of modern astronomy, and as yet unanswered.

The overall spectrum of AGN is very different from that of stars or galaxies. Instead of peaking strongly at one energy (wavelength) characteristic of a temperature, the AGN emit roughly the same quantity of energy in all decades of frequency between the radio and the γ-ray ends of the electromagnetic spectrum (see Fig. 2 for an example). Another common way for AGN to free energy is by means of one or two sided jets.

In order to generate the photon energy distribution of AGN, it is necessary that several regions with very different physical characteristics are involved in emission processes. Two questions must therefore be answered to understand the overall spectra of AGN: 1. Where does the energy come from (in other words, what is the central engine)? And, 2., what are the physical conditions in the different regions and how are they linked together? Or: what is the structure of the emission regions? This paper deals with a theoretical and an observational approach to the second question.

Most of the present conceptions on AGN involve a massive black hole and an accretion disk (see the proceedings of the conference on X-ray and UV Emission from Active Galactic Nuclei, Max-Planck-Institut für Extraterrestrische Physik, Garching, 1984, for an up-to-date survey). The origin of the radiated energy is thus of gravitational nature and the overall spectrum is explained by the structure of the accretion disk and maybe the presence of a hot corona surrounding it. A different view on this question will be presented in the next section and an observation programme to test it will be described at the end of the paper.

The Wind and Shock Model

In the last two years, M. Camenzind (Institute of Theoretical Physics, University of Zurich) and myself have developed a model to explain the overall structure of the emission spectrum of Active Galactic Nuclei (1). Our effort is aimed at understanding individual objects (say, the QSO 3C 273) rather than global properties of broad classes of AGN. The model can be adapted to different sources by varying its free parameters.

The object at the very centre of an active nucleus (the engine) need not be defined in detail for our purpose. It may be the inner part of an accretion disk, a rotating super-massive star (~10^8 $M_\odot$) or a very dense cluster of stars. The radius of this central engine is expected to be of the order of 100 Schwarzschild radii. It is important to note that these objects are radiation pressure dominated and hence marginally stable. In these conditions, a very strong wind accelerated by radiation pressure or magnetohydrodynamic processes is inevitable. The wind velocity will be a few times the escape velocity (approximately 0.1 c) and its kinetic energy comparable to the radiation luminosity of the central object. (The exact ratio is a free parameter in the model). The density in such winds is such that they are optically thick close to their centre and that a photosphere is defined, hiding the central object from direct observation and emitting strongly in the UV.

The outward pressure of the wind decreases with increasing radius, thus, provided the region is surrounded by a magnetic field B (expected to be of the order of a Gauss and a free parameter in the model), there exists a radius R_s where the