OBSERVATIONS OF QSOs AND RELATED OBJECTS WITH EFOSC, THE ESO FAINT OBJECT SPECTROGRAPH AND CAMERA

S. D'Odorico[+], S. Cristiani[+], R.G. Clowes* and C.J. Keable*

[+] European Southern Observatory, Karl-Schwarzschild-Str. 2, D-8046 Garching bei München, Federal Republic of Germany
* Royal Observatory, Blackford Hill, Edinburgh EH9 3HJ, U.K.

EFOSC is a standard ESO instrument operating at the Cassegrain focus of the 3.6 m telescope since April 1st, 1985. A description of its optical design and operating modes is given in Enard and Delabre (1982) and Dekker and D'Odorico (1985). Briefly, it is a focal reducer with spectroscopic capability. The collimator produces a collimated beam with a diameter of 40 mm which passes through a filter and/or grism. The f/2.5 camera focusses the beam on the detector which is at present a thinned, back-illuminated RCA CCD with 320×512 pixels. The pixel size is 30 μm which corresponds to .675" on the sky. There are three remotely controlled wheels in the instrument: the aperture wheel in the focal plane of the telescope, with long slits of different widths, a filter and a grism wheel with 12 positions each. The instrument can be operated in four different modes: direct imaging, slit spectroscopy, grism or multiple object spectroscopy with specially made aperture plates.

In direct imaging, the field is 5'.6×5'.7. The global efficiency at 5500 Å (atmosphere + telescope + filter + instrument + detector) is 32%. A star of m_v = 25th is detected at a S/N ≃ 3 in a 15 m exposure with average seeing (FWHM = 1.5 arcsec).

In spectroscopy, observations of standard stars with a wide slit indicate a global efficiency of 30% at 5500 Å. 1 photon/Å/s is detected at this wavelength from an object of m_v = 18.

In its testing phase, EFOSC has been used for a number of faint QSO observations. In a grism CCD frame, a new QSO of m_v = 20.9 and z = 3.28 was discovered. Two QSO candidates from a CFHT grens plate searched with the AQD technique (Clowes et al., 1984) were confirmed by slit spectroscopy. These results will be reported in more detail elsewhere.

As an example of the performance of EFOSC, we show here a deep direct image (Fig. 1) and a spectrum of a faint galaxy (Fig. 2). These observations were obtained within a program to search for optical counterparts of the absorption systems seen in the high resolution spectra of the BL Lac object 0215+015.

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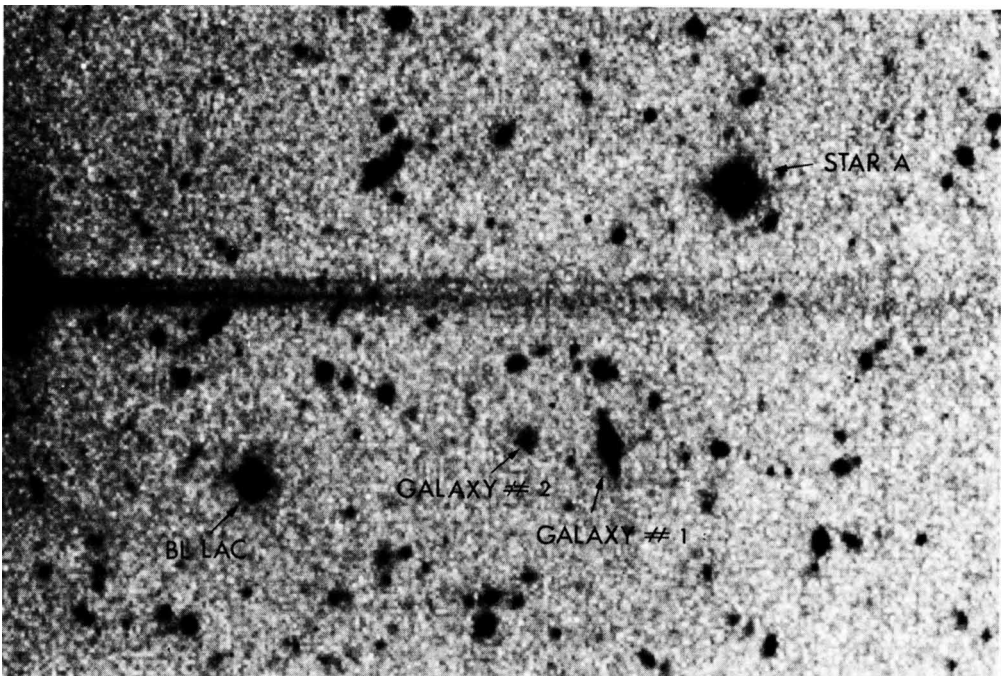

Figure 1. A 10 m exposure through a Gunn r filter of the field of BL Lac object 0215+015, obtained on Sept. 23, 1985. The object brightness has varied by more than two magnitudes in one year. From a V exposure on the same night, the following magnitudes were derived: BL Lac 17.3±.1, star A 16.25±.1, galaxy #1 20.3±.1, galaxy #2 22.4±.2. North at the top, east on the side of the bright star.

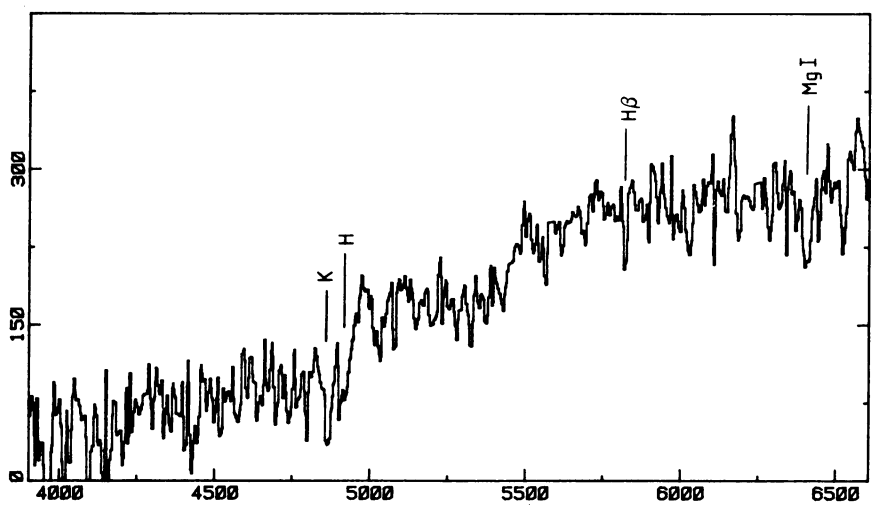

Figure 2. A sky subtracted spectrum of the galaxy #1 in relative intensity units. The exposure time is 30 minutes and the resolution 15 Å. The absorption lines give a redshift z = 0.238±0.001.

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