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Polarimetric Standard Stars Observed with FORS1 at ESO-VLT

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Abstract. A Paranal Observatory project aims to analyze all the polarimetric standard stars in use at FORS1 to both check they have a constant polarization signal and measure the instrumental polarization. Preliminary results for 3 standards in the FORS1 calibration plans are presented.

1. The Paranal Observatory Project and Preliminary Results

The use of polarimetric facilities at 8m class telescopes requires the establishment of a catalog of relatively faint polarized and unpolarized standard stars. A Paranal observatory project on the polarimetric standard stars in use at VLT+FORS1 aims to check the stability of the polarization signal of the adopted standards, as well as to provide measurements of the instrumental polarization. To this goal all standard star linear polarimetric observations performed since the FORS1 beginning of operations (April 1999) have been retrieved from the ESO archive. For each standard, the Stokes parameters Q and U will be analyzed vs. time. A complete list of both highly polarized and unpolarized standards currently in use at FORS1 is available on-line[1]. Here, we present preliminary results obtained for just the two polarized standards IRAS 09042-4706 and BD-144922, and the unpolarized standard WD1620-391.

Table 1 lists objects which we have already reduced and analyzed, together with a "log" of the observations.

The left panel of Figure 1 shows the average polarized spectra of the standard IRAS 09042-4706. The right panel shows the difference between the average of all spectra taken in 2003 and the spectra obtained at 3 different epochs. There appear to be a marginal variation in the polarization signal of IRAS 09042-4706 from 2001 to 2003. BD-144922 is observed to stay constant within the short time interval of the observations. BD-144922 was also observed at 3 different positions on FORS1 CCD during a same night, thus providing evidence for a spurious polarization signal at the edges of the FORS1 field of view[2] (see Figure 2). The unpolarized standard WD1620-391 confirmed the instrumental polarization in the field center to be less than a few units in 10^{-4}.

[1]http://www.eso.org/instruments/fors1/FORS1_Std/

[2]see also http://www.eso.org/instruments/fors/pola.html for more information about the linear instrumental polarization

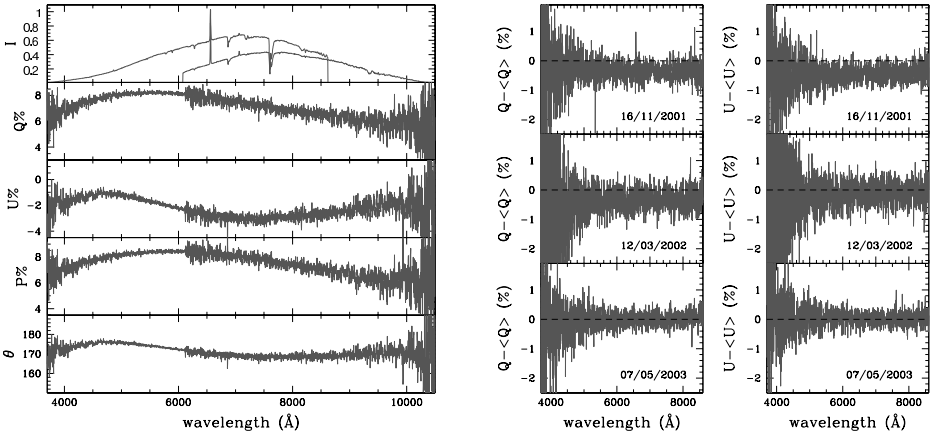

Figure 1. IRAS 09042-4706 polarization signal (left), and its variation in time (right). In the former, the grism 300V (shorter wavelength) and the grism 300I (longer wavelength) data are plotted on the same axes

Table 1. Log of observation for the three objects presented in this paper. The time-range is the period of time over which the observations spread for a given object. In all cases the slit width was 1″.

Name	Type	B	V	# of observations GRISM 300V	GRISM 300I	Time range
IRAS 09042-4706	B0V	13.83	12.12	8	1	Nov 2001 - May 2003
BD-144922	O9.5II	10.45	9.7	6	5	Jul 2002 - Aug 2002
WD1620-391	DA	10.79	11.0	4	4	Jul 2002

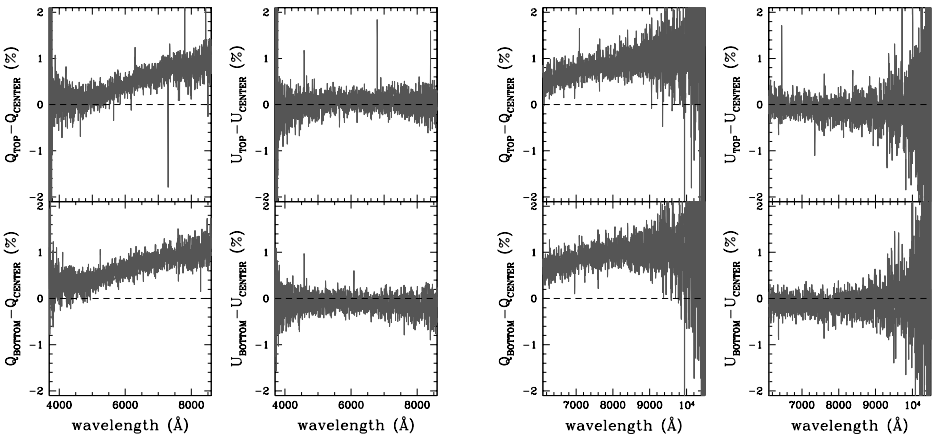

Figure 2. The instrumental spurious polarization at the edges of the CCD. In the upper panels we plot the difference between the observed polarization at the top of the CCD and that at the center. In the bottom panels we plot the difference between the observed polarization at the bottom of the CCD and the center. Left - grism 300V data; right - grism 300I data.