LRIS Longslit Real-Time Data Reduction

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I. Getting set up (do once at the beginning of the night)

(a) printenv PGPLOT_FONT to make sure it's the equivalent of /usr/local/pgplot/REAL/grfont.dat

(b) Launch pgdisp with
/usr/local/bin/pgdisp -geometry 692x540+450+0 -lgCrosshair >&! /dev/null &

(c) In a separate window, install Jason's ESI tools package. ftp ftp.ociw.edu, cd /pub/xavier/ESI/ESI_tools.tar.gz . If trouble do make clean, then make. Now need to setenv PGPLOT_FONT /lib/pgplot/grfont.dat to use his version.

(d) Set up IRAF locally, copying over parameter files from UCSD.

(e) Make a directory where analysis will be done. Make a raw subdirectory and set up copymon or equivalent to get raw files put there.

(f) Determine the typical bias value (was 999 last time). *epar imarith* and set to *raw/lris# - bias_avg #*.

(g) *epar apall*. Set clean=yes (since no CR subtraction otherwise), gain=1.29, rdnoise=2.7, low_rej=2, high_rej=2, order=2, have it use ∼10 columns not near a bright skyline, use [-25:-10,10:25] for background section, t_nsum=10, t_step=5,t_order=2. Adjust aperture size for binning being used (or let it resize automatically for high s/n data).

(h) Make sure wavelength ranges of *dispcor* and *scopy* are set equal! Otherwise fnd_DLA blows up for some reason.

(i) Flux calibration - fnu = no gives us flambda as desired. Make a senstivity function - until then use an old one if available. Don't forget to observe the spectrophotometric standard both with and without an order-blocking filter to get a decent flux calibration from the iraf tasks *standard* and *sensfunc*.

(j) Make a wavelength solution. Process the arc the same way we will process the object frames. Perhaps reidentify from an old wavelength solution. Watch out for non-monotonic solutions!

II. Reduce each object and extract spectrum (IRAF)

(a) *imarith raw/esi# output=#.* Check bias_avg periodically to confirm.

(b) *apall #.* Adjust aperture, background section if needed (helps to inspect on a bright skyline), decide on trace order 2 or 3.

(c) *refspec #.ms* To update wavelength solution if needed, use reidentify and put new solution into *epar refspec.*

(d) *dispcor #.ms #.w* finishes wavelength calibration.

(e) *calibrate #.w #.f* flux calibrates.

(f) *scopy #.f[*,1,1] object_f* to make one-D spectrum.

(g) *scopy #.f[*,1,4] object_e* to make error array.

III. Continuum fit (xplot)

(a) **xplot object_f**. h -> histogram mode. zoom is left-mouse, right-mouse. Vertical scale is right-mouse, right-mouse. w -> whole spectrum. space-bar, space-bar picks a region and it prints the data value of your x-position. Then c -> continuum fit mode, d deletes region you just picked. left-mouse adds points. enter a 2-digit order number to fit. s -> save. Can do continuum piecemeal, s after each section. ? gets commands, ESC to stop, 1 to write. Save as con_object_f.fits.

(b) **opim div object_f con_object_f div_object_f** at unix prompt. This creates continuum-divided spectrum.

(c) **opim div object_e con_object_f div_object_e** for new error array.

IV. Search for DLAs (fnd_DLA)

(a) **emacs Input/fnd_DLA.inp &** and put div_object_f.fits in first row. Rest should be blah then 60.0 (dispersion of instrument) then 4000,6600 which is an adjustable wavelength range.

(b) **fnd_DLA**. Use l r to zoom, n for new DLA center, then l r for EW range - it plots a Voigt profile starting at 20.3 or most recent value. c moves the center, $+-$ keys (without shift) change the N_HI value. w -> whole spectrum. P for postscript, x to quit.