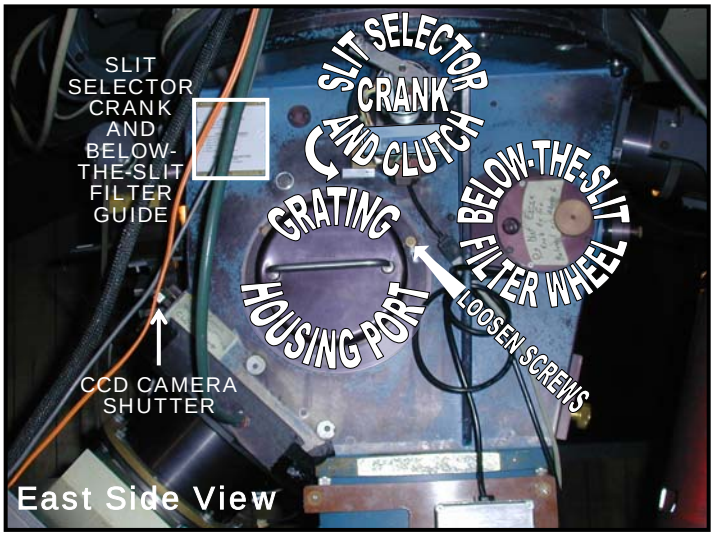
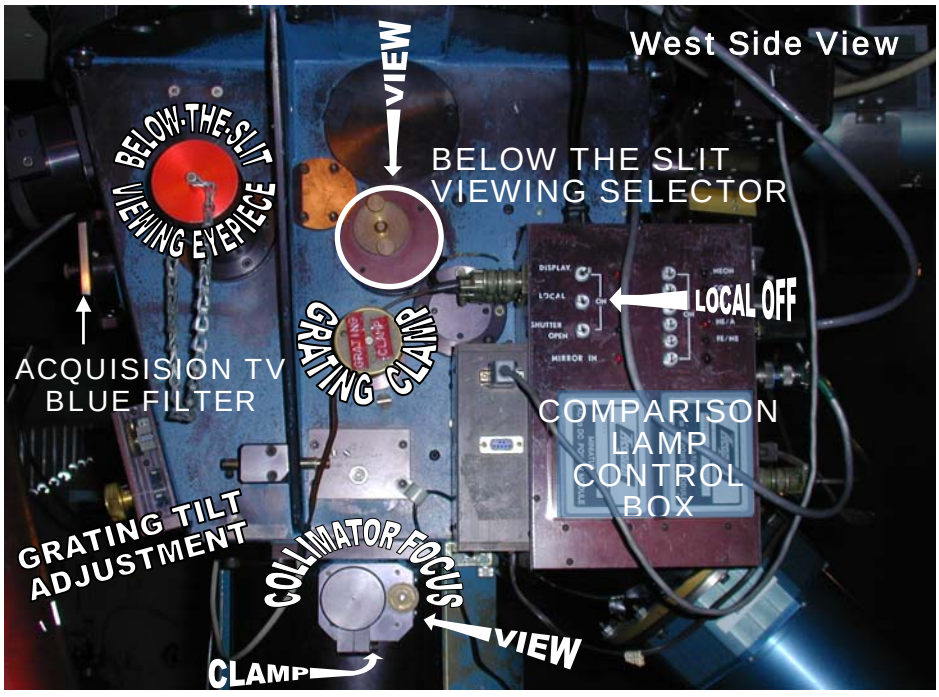
Bok 90'' Boller & Chivens Spectrograph
Start-up Checklist (QSO's)

I. Following the light path (labels in CAPS)

1. **Close CCD CAMERA SHUTTER!!**
2. ABOVE-THE-SLIT FILTER WHEELS
   6 slots on N & S sides
   remove any filters
3. COMPARISON LAMP ASSEMBLY
   remove any filters (except on FeNe)
4. SLIT SELECTOR: **2.5''**
   Don't forget the clutch!
   instructions posted to left
5. GRATING
   loosen screws to remove cover
   300 l/mm, 6692 [red] for QSO's,
   (1st order)
6. BELOW-THE-SLIT FILTER bolt: **Y48**
   instructions posted with slit selector (**4**))
7. GRATING TILT (loosen clamp!)
   -- **HeI 5015Å on CCD column 26**
   -- set initially at 6.78
   -- check with HeAr spectrum
8. ACQUISITION TV BLUE FILTER:
   "out"
9. BELOW-THE-SLIT VIEWING SELECTOR:
   "thru"
10. COMPARISON LAMP CONTROL BOX:
    "local" off
11. COLLIMATOR FOCUS for testing
    initial at 6.0 or 8.0, up from 0.0
12. **Open CCD CAMERA SHUTTER** for tests





II. Setting up Bokobs (shaded sections on 1st night only)

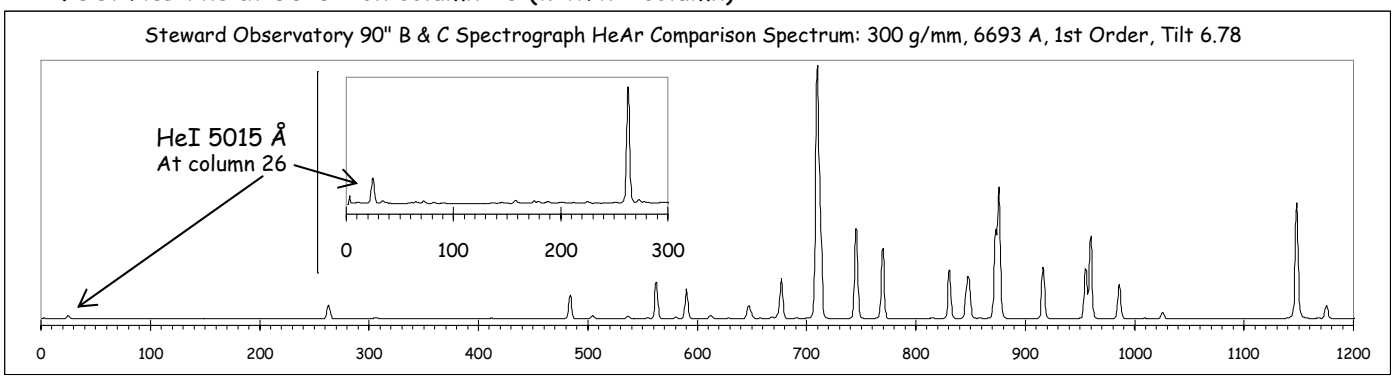
1. Start BOKOBS, Reset? Yes
   login bokobs, password posted on white board.
2. Check disk space, clear if needed (use !rm -fr * in IRAF).
3. Make FITS images >set imtype="fits, noinherit"
   in login.cl file, uncomment "set imtype" line and change to fits, noinherit
4. Make data directory for observers + each night
   `>mkdir /d1/bokobs/OZCy/May01`
   `>cd /d1/bokobs/OZCy/May01` ⇐ ***In both Acquisition & Reduction windows!***
5. Edit parameter lists using printouts (in acquisition window):
   `>epar displ`
   `>instrpars`
   `>detpars` (use >ccdinfo to get info on the chip)
   `>obspars` (rootname & sequence change for test & observing)
   `>telpars` (telname changes for test & observing)
6. Test to see if system is bok is alive
   `>test >>number = 1, type = zero`
   no response ⇒ `>ccdinf`
   no response ⇒ reboot bokccd (icon on top left of screen)
   no response ⇒ hard reboot of bokccd (top right corner of bokccd rack)
   & CCD power supply (on telecope)
   no response ⇒ call Chris!

III. Collimator focus (west side, view setting from lower right))

1. Check parameters
   `>telpars` (telname="test")
   `>obspars` (rootname="t", sequence=1)
2. Run a test image
   `>test >>number = 1, type = zero`
3. Observe HeAr lamp at different focuses from acquisition window
   `>comps >>time = 15s`
   `>>comparison lamp = hear`
   `>>name = focusXX` (e.g. 6, 8, 10 ...)
4. Run nmisc specfocus in reduction window
   `> specfocus a*.fits focus="6x2"` (for starting on 6 & up by 2's)
5. Check focus plot, choose a little below the ideal focus to compensate for night cooling.
6. Observe HeAr lamp at chosen focus (> comps, use for grating tilt test next)

IV. Grating tilt (west side)

1. Get HeI line at 5015Å on column 26 (within 1 column)



V. Zeros

1. Check parameters
   `>obspars` (rootname="n", sequence=XXXX ... from observing program)
2. Run zeros
   ```
   >zeros    >>number = 10
             >>name = zero
   ```
3. Check for weirdness (1st is often weird)
   `>imstat a*`
4. Reboot bokccd if weirdness (inconsistent means) appears.

VI. Quartz Flats

1. Run Quartz Flats
   ```
   >comps    >>number = 10
             >>time = 200s
             >>comparison lamp = quartz
             >>name = quartzflats
   ```
2. Check gradient, weirdness, reboot bokccd if weird.
   `>implot a*`

VII. Darks (best at end of 1st or beginning of 2nd night after camera has been working)

1. Close the CCD camera shutter + Dome Lights OFF

2. Run Darks
   ```
   >darks    >>number = 10      (... at least 7 if time is crunched)
             >>time = 900s      (... longest exposure expected)
   ```

VIII. Focus Telecope

1. Open the CCD camera shutter.

2. Check parameters
   `>telpars` (telname="bok")
3. Get 7th magnitude star (RA=sidereal time, Dec=90-□) on slit
   ```
   >test     >>number = 1
             >>type = object
             >>time = 15 sec  (10 for 6th magnitude)
   ```
   - put spectrum in middle of chip by moving source along slit ... mark

   `>implot test`
   - use "c" to plot columns, check focus (X)
   - reduce focus by 50, bring up to 10 below start, test, come up by 5's, test for best.

IX. Observing

1. Open the CCD camera shutter.

2. Check parameters (`>telpars` (telname="bok"))
3. Play!
   ```
   >observe   >>type = object
              >>title = name
   ```
   `>implot` "c" shows clmns, "C" for #, ":l xx yy" displays lines

   snr = sqrt [(counts@G-band - bkgd) x (# of lines) x (gain)]
   ```
   >comps     >>time = 15
              >>lamp = hear
              >>title = hear
   ```

Close CCD Shuttter for Supper, Sunset, and maybe a snooze ...