



FOCUSING BLUE/RED CHANNEL USING 'SPECFOCUS'

This is a brief tutorial on focusing the MMT Blue and Red Channel spectrographs using the IRAF `specfocus` routine.

1. From the IRAF cl prompt, load the `ccdacq` package:

```
ecl> ccdacq
```

2. Edit the `lampfocuses` parameters.

```
ccdacq> epar lampfocuses
```

I R A F

```

                Image Reduction and Analysis Facility
PACKAGE = ccdacq
  TASK = lampfocuses

nexpo   =          11  Number of exposures
fstart  =          1.8  Starting focus value
fdelta  =          0.1  Focus increment
exptime =          30.  Exposure time (seconds)
complamp= HeAr/Ne  Comparison lamp
objectti=    focus  Object title
(verbose=          yes)
(mode   =          ql)
```

3. Run `lampfocuses`

```

ccdacq> lampfocuses
Number of exposures (1:) (11):
Starting focus value (1.8):
Focus increment (0.1):
```

```

Exposure time (seconds) (0.:16000.) (30.):
Comparison lamp (HeAr/Ne):
Object title (focus):
image `focus0003' will be written to disk...

```

4. Edit the parameters for `specfocus` which is in the `noao`, `obsutil` package:

```
ecl> noao
```

```

artdata.      digiphot.      nobsolete.     onedspec.
astcat.       focas.          nproto.       rv.
astrometry.   imred.          observatory    surfphot.
astutil.      mtlocal.        obsutil.      twodspec.

```

```
noao> obsutil
```

```

bitcount  cgiparse  kpno.      psfmeasure  specfocus  sptime
ccdtime   findgain  pairmass  shutcor     specpars@  star-
focus

```

```
obsutil> epar specfocus
```

Because the focus values are saved in the image header you can use the header keyword `INSFOCUS` for the focus values. You can limit which images to use by using wildcards, e.g., `focus*! [4-8].fits`. You can also use the IRAF `@filename` convention where filename contains a list of images to process.

```

                I R A F
          Image Reduction and Analysis Facility
PACKAGE = obsutil
        TASK = specfocus

images =          focus*.fits  List of images
(focus =          INSFOCUS) Focus values
(corwidth=       20) Correlation width
(level =         0.5) Percent or fraction of peak for width
measuremen
(shifts =        yes) Compute shifts across the dispersion?

(dispaxi=        1) Dispersion axis (long slit only)
(nspectr=       1) Number of spectral samples (long slit only)
(ndisp =         1) Number of dispersion samples
(slit1 =         INDEF) Lower slit edge
(slit2 =         INDEF) Upper slit edge

(logfile=        logfile) Logfile
(mode =          ql)

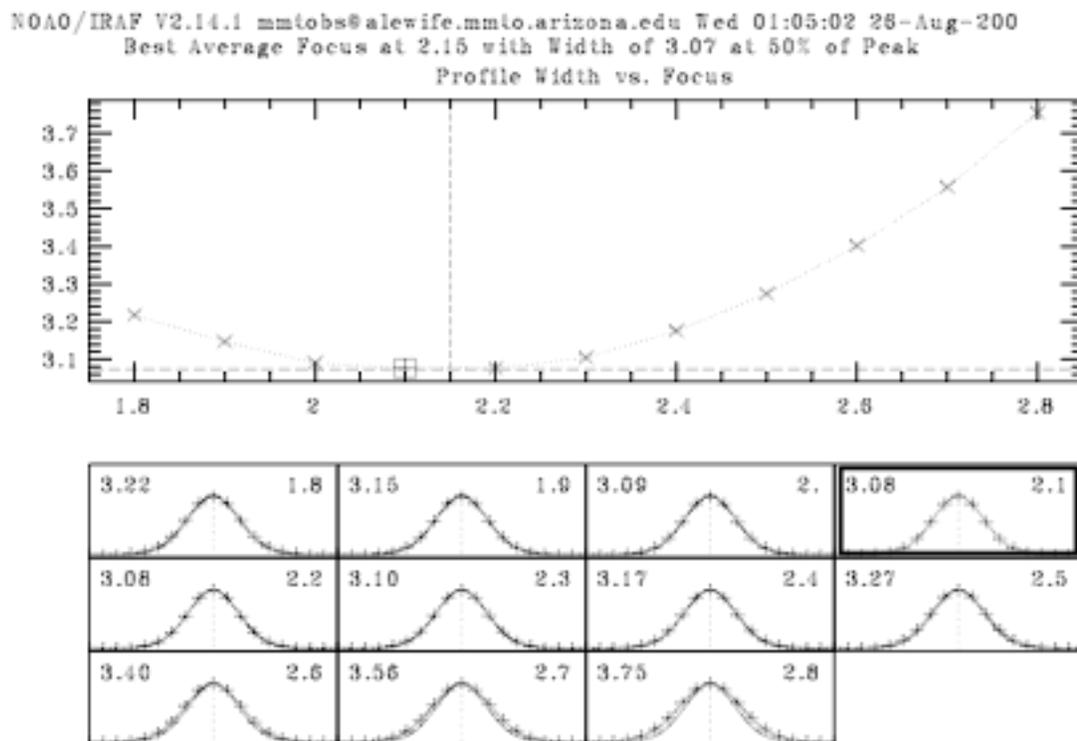
```

5. Run `specfocus`:

```
obsutil> specfocus
```

```
List of images (focus*.fits):
```

The result is the plot shown below:



SPECFOCUS: NOAO/IRAF V2.14.1 mmtobs@alewife.mmt.az.arizona.edu Wed 01:09:04
 26-Aug-2009

Best average focus at 2.15 with average width of 3.07 at 50% of peak

-- Average Over All Samples

Image	Focus	Width
focus0014.fits	1.8	3.22
focus0015.fits	1.9	3.15
focus0016.fits	2.	3.09
focus0017.fits	2.1	3.08
focus0018.fits	2.2	3.08
focus0019.fits	2.3	3.10
focus0020.fits	2.4	3.17
focus0021.fits	2.5	3.27
focus0022.fits	2.6	3.40
focus0023.fits	2.7	3.56
focus0024.fits	2.8	3.75

-- Image focus0017.fits at Focus 2.1 --

6. If you do not pass through focus, adjust the collimator range and repeat the task. **Maximum** focus value is 4.776. Enter the best focus value determined from `specfocus` into the 'focus' box in the control GUI. Click "Configure Spectrograph" at the bottom of the GUI for the new configuration to take effect. Please note that the focus value may change with outside temperature. In our experience, the Blue Channel focus value increases 0.1 units for every 1 degree Fahrenheit decrease.