

# Pan-STARRS Image Processing Pipeline

Vers. IPP 1.1

## **Tutorial** pantasks - ippMonitor - dvo

14 March 2007

# I) ACCOUNT PREPARATION

For this tutorial you need an account on `panstarrs.ifa.hawaii.edu`

changing to your preferred shell

```
chsh
```

Log onto the po-node cluster of your choice,

```
ssh MyName@po10
```

to avoid password logins, generate a key in your `.ssh` directory

```
ssh-keygen -t dsa
```

and add it to your `authorized_keys` file

```
cat MyName_dsa.pub >> authorized_keys
```

## 1) **SETTING UP YOUR PATH...**

...to use the installed panstarrs cluster versions of the IPP software

To set up your shell, you must add the appropriate directories to your `PATH` and `LD_LIBRARY_PATH` environment variables. If you want to use the hard-coded alala ipp-1.0 installation, use the following commands:

for tcsh:

```
setenv PATH /home/panstarrs/MyName/psconfig/ipp-1.1.linux/bin:${PATH}
setenv LD_LIBRARY_PATH /home/panstarrs/MyName/psconfig/ipp-1.1.linux/lib:${LD_LIBRARY_PATH}
```

for bash:

```
export PATH=/home/panstarrs/MyName/psconfig/ipp-1.1.linux/bin:$PATH
export LD_LIBRARY_PATH=/home/panstarrs/MyName/psconfig/ipp-1.1.linux/lib:$LD_LIBRARY_PATH
```

For the `alala` machines, which is a 64bit hardware, you need to changes these by subsituting `'lin64'` for `'linux'` above.

## 2) **PSCONFIG SYSTEM**

Alternatively, you may use the `psconfig` system, which lets you automatically set the hardware architecture and also lets you choose dyanmically between different installation versions.

Unfortunately, `psconfig` uses scripts which are written in `csh` and not translated to base. Thus it is not an valid option if you use base.

To use `psconfig`, you need to add three lines to your

`.cshrc`:

```
set PSCONFDIR = ~MyName/psconfig
alias psconfig "source ???????????/psconfig"
psconfig ipp-1.1
```

`.bashrc`

```
alias psconfig="source /home/panstarrs/MyName/ipp-1.1/psconfig/psconfig.bash"
```

*psconfig ipp-1.1*

### 3) SETTING UP THE CONFIGURATION FILE

copy config files to your own config/recipe-directory

```
mkdir ~/ippconfig/  
cp -p -r ~/psconfig/share/ippconfig/simtest ~/ippconfig/  
cp -p -r ~/psconfig/share/ippconfig/recipes ~/ippconfig/
```

create working directory of your choice

#### a) editing .ipprc

```
cp -p ~/psconfig/share/ippconfig/ipprc.config ~/.ipprc  
emacs ~/.ipprc
```

Change the path to your own config-files and recipes

```
PATH STR /home/panstarrs/MyName/ippconfig:$HOME/.ipp:.
```

Add one or more working directories for your output files:

These are used to represent the `path://DATAPATH` values in file names.

For example, you may create a `/data/ipp000.1/MyName/simtest` directory for yourself, and add a row of the form:

```
# place your data directories here and refer to as path://PATH/remainder  
DATAPATH METADATA  
SIMTEST STR /data/ipp000.1/MyName/simtest  
End
```

and you can refer to it using

```
path://SIMTEST
```

database account:

```
DBSERVER STR alala # Database host name (for psDBInit)  
DBNAME STR ipp # Database name (for psDBInit)  
DBUSER STR ipp # Database user name (for psDBInit)  
DBPASSWORD STR ipp # Database password (for psDBInit)
```

(note that these are NOT your username and passwords for ippMonitor access)

The location of the camera configuration file relative to the `PATH` is stored in

```
### Setups for each camera system  
CAMERAS METADATA  
SIMTEST STR simtest/camera.config  
END
```

The location of the recipes relative to the `PATH` is

```
RECIPES METADATA # Site-level recipes  
PPIMAGE STR recipes/ppImage.config # Image reduction  
PPMERGE STR recipes/ppMerge.config # Image combination  
PPSTATS STR recipes/ppStats.config # Image statistics  
PSPHOT STR recipes/psphot.config # Photometry  
PSASTRO STR recipes/psastro.config # Astrometry
```

*PPSTAC*                    *STR*                    *recipes/ppStac.config*    # *Combination*  
*END*

## b) defining rejection levels for detrend creation in camera.config

*emacs ipconfig/simtest/camera.config*

```
# Rejection levels for detrend creation
REJECTION METADATA
TYPE LIMITS FILTER EXPECTED IMFILE.MEAN IMFILE.STDEV
EXP.MEAN EXP.STDEV EXP.MEANSTDEV ENSEMBLE.MEAN ENSEMBLE.STDEV
ENSEMBLE.MEANSTDEV IMFILE.SN EXP.SN IMFILE.MEANSTDEV
BIAS LIMITS * 0 1 20
0.5 20 0 3 20
0 0 0.5
DARK LIMITS * 0 1 0
0.5 0 3 20
0 0 0.5
SHUTTER LIMITS * 0 0 0 0
0 0 20.0
FLAT LIMITS * 0 0 0 0
0 0 0
3 0 0
END
```

## II) PANTASKS

### 1) ***RUNNING PANTASKS***

cd to the working directory of your choice

```
mkdir /data/ipp000.1/MyName/simtest
cd /data/ipp000.1/MyName/simtest
```

and start pantasks.

```
pantasks
no file /home/panstarrs/MyName/.pantasksrc

Welcome to pantasks - parallel task scheduler
```

for a manual see

<http://kiawe.ifa.hawaii.edu/Elixir/Ohana/IPP-subsystems/psched/>

#### a) **some examples**

```
pantasks: $a = 1
pantasks: echo $a
1
pantasks: $a = 1.1
pantasks: echo $a
1.1
pantasks: $a = 5.6*3.4
pantasks: echo $a
19.0400009155
pantasks: $s = sdfsdjfkf
pantasks: echo $s
sdfsdjfkf
pantasks: create x 0 100 0.1
pantasks: set y = x^2
pantasks: echo x[1]
0
pantasks: create x 0 100 0.1
pantasks: set y = x^2
pantasks: lim x y
pantasks: clear
pantasks: plot x y
pantasks: plot x y -c red
pantasks: plot x y -c red -pt 5
pantasks: plot x y -c red -pt 7
pantasks: plot x y -c red -x 2 -pt 7 -sz 4
pantasks: mcreate image 512 512
```

history is saved in file `.pantasks`

## 2) RESET THE DATABASE AND INITIALIZE THE SIMULATION:

```
cd /data/ipp000.1/MyName/simtest
pantasks
```

Now load the simulation module

```
pantasks: module sim.pro
```

(stored in `~/psconfig/share/pantasks/modules/sim.pro`)

create some data:

```
pantasks: exec mkdir -p /data/ipp000.1/MyName/simtest/raw
```

```
pantasks: mkbiases
generating 10 bias images
```

```
pantasks: mkdarks
generating 20 dark images
```

```
pantasks: mkshutter
generating 10 shutter images
```

```
pantasks: mkflats
generating 20 flat images in 2 filters
```

```
pantasks: mkobjects
generating 10 object images in 2 filters
```

to show the files created (find files and list them sorted by creation date):

```
pantasks: !find . -type f | xargs ls -ltr --time-style="+%H:%M:%S"
-rw-r--r-- 1 MyName users 4199040 09:37:56 ./raw/bias.00.fits
...
-rw-r--r-- 1 MyName users 4199040 09:38:13 ./raw/bias.09.fits
-rw-r--r-- 1 MyName users 4199040 09:38:14 ./raw/dark.00.fits
...
-rw-r--r-- 1 MyName users 4199040 09:38:46 ./raw/dark.19.fits
-rw-r--r-- 1 MyName users 4199040 09:38:48 ./raw/shutter.00.fits
...
-rw-r--r-- 1 MyName users 4199040 09:39:02 ./raw/shutter.09.fits
-rw-r--r-- 1 MyName users 4199040 09:39:03 ./raw/flat.00.fits
...
-rw-r--r-- 1 MyName users 4199040 09:39:36 ./raw/flat.19.fits
-rw-r--r-- 1 MyName users 4199040 09:39:38 ./raw/obj.00.fits
...
-rw-r--r-- 1 MyName users 4199040 09:39:53 ./raw/obj.09.fits
```

reset the database (ask administrator for a database account!):

```
pantasks: exec pxadmin -delete -dbname MyDataBase
*** delete the chip tables? ***
*** to delete the tables, answer YES, and give password ***
*** WARNING: this action is permanent ***

delete the chip tables (YES/[n]): YES
enter dbh connection password: ipp
```

or?

```
pantasks: exec pxadmin -delete -dbname MyDataBase -trace psLib.db 10
```

where `MyDataBase` is the name of your test database.



```
pantasks: exec pxadmin -create -dbname MyDataBase
```

## inject data to the database

```
pantasks: exec mkdir -p /data/ipp000.1/MyName/simtest/proc
pantasks: exec ipp_serial_inject.pl
           /data/ipp000.1/MyName/simtest/raw/*.fits --workdir
           /data/ipp000.1/MyName/simtest/proc --dbname MyDataBase
```

```
Running [/home/panstarrs/MyName/psconfig/ipp-1.1.linux/bin/ppStats -concept FPA.OBSTYPE -concept
FPA.TELESCOPE -concept FPA.INSTRUMENT /data/ipp000.1/MyName/simtest/raw/bias.00.fits]...
```

```
2007-03-09 07:49:45Z|po10 |I|psModules.config
Camera SIMTEST, format SIMTEST matches header.
FPA.OBSTYPE STR BIAS # Type of observation
FPA.TELESCOPE STR simscope # Camera used
FPA.INSTRUMENT STR SIMTEST # Camera used
```

```
Chip METADATA # Results for chip
Cell METADATA # Results for cell
ROBUST_MEDIAN F32 499.9653
ROBUST_STDEV F32 4.981598
END
END
```

```
Running [/home/panstarrs/MyName/psconfig/ipp-1.1.linux/bin/pxinject -newExp -exp_id bias.00
-inst SIMTEST -telescope simscope -imfiles 1 -workdir path://SIMTEST/proc -dbname MyDataBase]...
```

```
exp_tag STR bias.00.1
```

```
Running [/home/panstarrs/MyName/psconfig/ipp-1.1.linux/bin/pxinject -newImfile -exp_tag
bias.00.1 -class fpa -class_id fpa -uri path://SIMTEST/raw/bias.00.fits -dbname MyDataBase]...
```

```
...
...
...
```

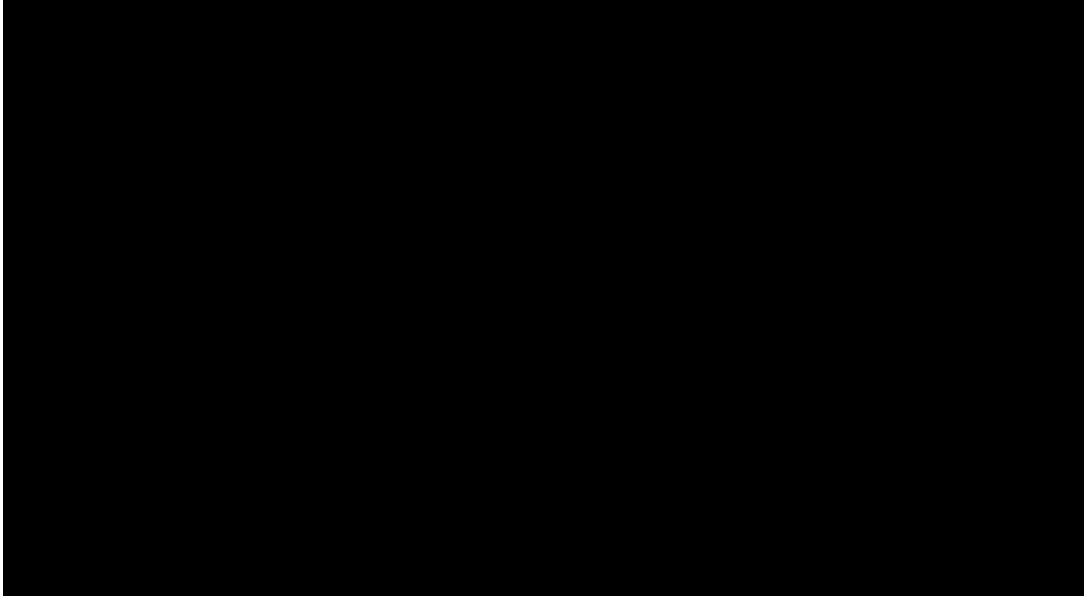
```
70 files injected.
```

### 3) **MONITOR TOOL - THE IPP STATUS PAGES**

From the following pages, you may examine summary information about the IPP processing results.

<http://kiawe.ifa.hawaii.edu/ippMonitor>

*Welcome to the IPP status pages.*



In order to continue, it is necessary to login as an authorized IPP user.

Login

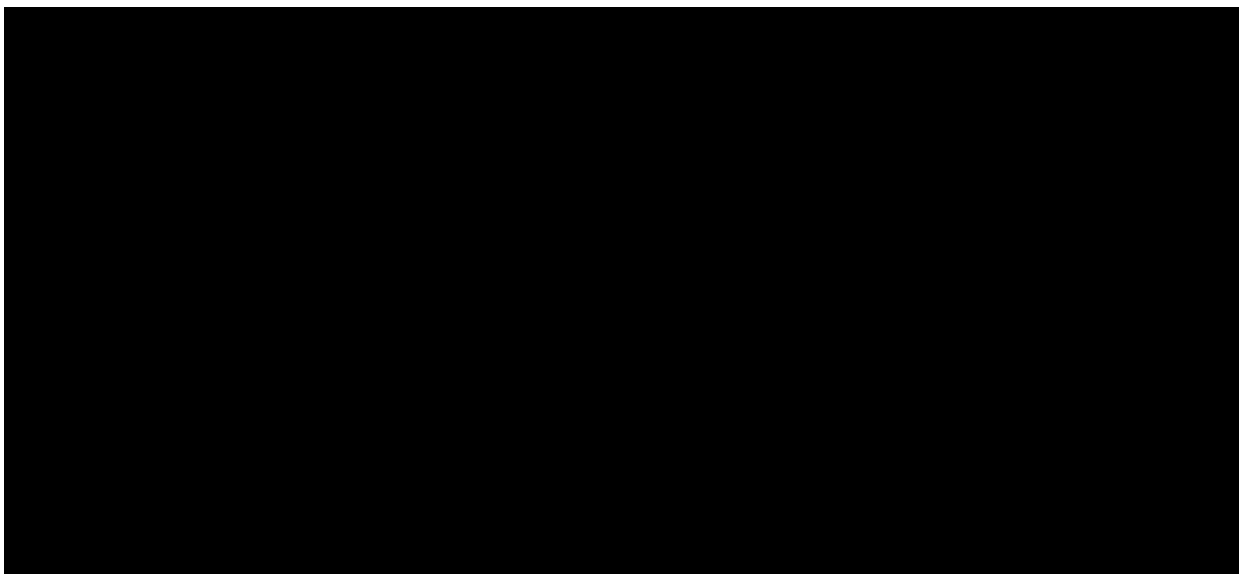
*eugene aloha*

Please select the project of interest

*MyDataBase*

which is the name of your database

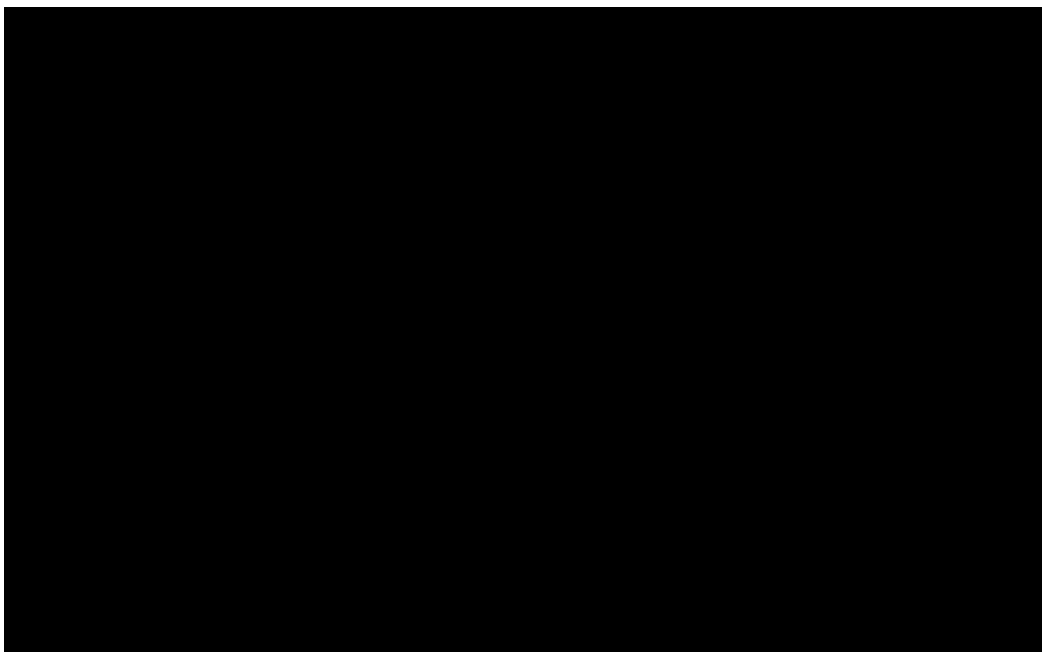
### ***New Exposures:***



#### **SQL commands:**

```
SELECT exp_id,exp_tag,camera,telescope,imfiles FROM newExp LIMIT 40 OFFSET 0
```

### ***New Imfile Tables:***



```
SELECT exp_tag,class,class_id,uri FROM newImfile LIMIT 40 OFFSET 0
```

## 4) LOADING THE **PAN-STARRS IPP** TASK SCHEDULER MODULES

framework for parallizing

```
pantasks: module pantasks.pro
pantasks: status
```

```
Scheduler is stopped
Controller is stopped
```

```
no defined tasks
```

```
no defined jobs
```

stored in `~ipp/psconfig/share/pantasks/modules/pantasks.pro`

### a) loading image defintions

set global parameters for the simulated images:

```
pantasks: module images.pro
```

### b) adding your database to the namelist

```
pantasks: $DB:n = 0
pantasks: list DB -add MyDataBase
pantasks: echo $DB:0
MyDataBase
```

### c) connecting to the controller

enable parallel mode

```
pantasks: $parallel = 1
```

disconnect controller

```
pantasks: controller exit true
```

add a processing machine or two:

```
pantasks: controller host add NODE
```

where NODE is one of the po cluster machines. repeat as needed.

Note that it is better not to use the login machine....

```
pantasks: controller host add pol1
starting controller connection
Connected
HostID: 0
```

```
pantasks: controller host add pol2
HostID: 1
```

```
pantasks: controller status
```

```
job stack PENDING: 0 objects
job stack BUSY: 0 objects
job stack DONE: 0 objects
job stack KILL: 0 objects
job stack EXIT: 0 objects
job stack CRASH: 0 objects
host stack OFF: 0 objects
host stack DOWN: 0 objects
host stack IDLE: 2 objects
0 pol1 0.0.0.0
1 pol2 0.0.0.1
host stack BUSY: 0 objects
host stack DONE: 0 objects
```

e.g. see also the macro `init.cluster.po` in `pantasks.pro`

## d) control process running

```
pantasks: status
pantasks: $VERBOSE = 0
pantasks: task -stats
pantasks: task -list
pantasks: !ps aux
pantasks: register.status
```

## e) halt processing

```
pantasks: halt
```

## f) writing your own module file tutorial.pro

```
pantasks: input /home/panstarrs/MyName/tutorial.pro
```

```
$dbname = MyDataBase
```

```
macro init.sim
  module sim.pro
```

```
$simdir = `ipp_datapath.pl path://SIMTEST`
echo $simdir
```

```
exec mkdir -p $simdir/raw
```

```
mkbiases
mkdarks
mkshutter
mkflats
mkobjects
```

```
exec pxadmin -delete -dbname $dbname
exec pxadmin -create -dbname $dbname
exec mkdir -p $simdir/proc
exec ipp_serial_inject.pl $simdir/raw/*.fits --workdir path://SIMTEST/proc --
dbname $dbname
```

```
end
```

```
module pantasks.pro
module images.pro
$DB:n = 0
list DB -add $dbname
echo $DB:0
```

```
macro init.cluster
  $parallel = 1
  controller exit true
  controller host add poll
  controller host add poll2s
  controller status
end
```

```
macro run.register
  module register.pro
  run
end
```

```
macro load.detrend
  module detrend.process.pro
  module detrend.stack.pro
  module detrend.norm.pro
  module detrend.resid.pro
  module detrend.reject.pro
  status
end
```

```
macro run.bias
  exec dettool -definebyquery -inst SIMTEST -filter NONE -det_type bias
  -select_exp_type bias -workdir path://SIMTEST/mkbias.0 -dbname $dbname
  run
  status
end
```

```
macro run.dark
  exec dettool -definebyquery -inst SIMTEST -filter NONE -det_type dark
  -select_exp_type dark -workdir path://SIMTEST/mkdark.0 -dbname $dbname
  run
  status
end
```

```
macro run.shutter
  exec dettool -definebyquery -inst SIMTEST -filter NONE -det_type shutter
  -select_exp_type shutter -workdir path://SIMTEST/mkshutter.0 -dbname $dbname
  run
  status
end
```

```
macro run.flat
  exec dettool -definebyquery -inst SIMTEST -filter V -det_type flat
  -select_exp_type flat -select_filter V -workdir path://SIMTEST/mkflat.1 -dbname
  $dbname
  run
  status
end
```

```
macro run.chip
  module chip.pro
  run
  status
end
```



## 5) REGISTER (FORMER PHASE 0)

Now load the "register" modules

```
pantasks: module register.pro
```

```
pantasks: status
```

```
Scheduler is stopped  
Controller is running
```

```
Task Status
```

| AV Name                 | Njobs | Ngood | Nfail | Ntime | Command   |
|-------------------------|-------|-------|-------|-------|-----------|
| ++ register.imfile.load | 0     | 0     | 0     | 0     | (dynamic) |
| ++ register.imfile.run  | 0     | 0     | 0     | 0     | (dynamic) |
| ++ register.exp.load    | 0     | 0     | 0     | 0     | (dynamic) |
| ++ register.exp.run     | 0     | 0     | 0     | 0     | (dynamic) |

```
no defined jobs
```

running all tasks defined

```
pantasks: run
```

```
pantasks: status
```

```
Scheduler is running  
Controller is running
```

```
Task Status
```

| AV Name                 | Njobs | Ngood | Nfail | Ntime | Command            |
|-------------------------|-------|-------|-------|-------|--------------------|
| ++ register.imfile.load | 2     | 2     | 0     | 0     | regtool            |
| ++ register.imfile.run  | 4     | 1     | 0     | 0     | register_imfile.pl |
| ++ register.exp.load    | 2     | 2     | 0     | 0     | regtool            |
| ++ register.exp.run     | 0     | 0     | 0     | 0     | (dynamic)          |

```
Jobs
```

|                        |   |                    |           |
|------------------------|---|--------------------|-----------|
| 3: register.imfile.run | 4 | register_imfile.pl | (807d718) |
| 3: register.imfile.run | 5 | register_imfile.pl | (807c710) |
| 3: register.imfile.run | 8 | register_imfile.pl | (8072998) |

after all 70 files are processed stop the scheduler

```
pantasks: stop
```

```
pantasks: status
```

```
Scheduler is stopped, harvesting jobs  
Controller is running
```

```
Task Status
```

| AV Name                 | Njobs | Ngood | Nfail | Ntime | Command            |
|-------------------------|-------|-------|-------|-------|--------------------|
| ++ register.imfile.load | **    | **    | 0     | 0     | regtool            |
| ++ register.imfile.run  | 70    | 70    | 0     | 0     | register_imfile.pl |
| ++ register.exp.load    | **    | **    | 0     | 0     | regtool            |
| ++ register.exp.run     | 70    | 70    | 0     | 0     | register_exp.pl    |



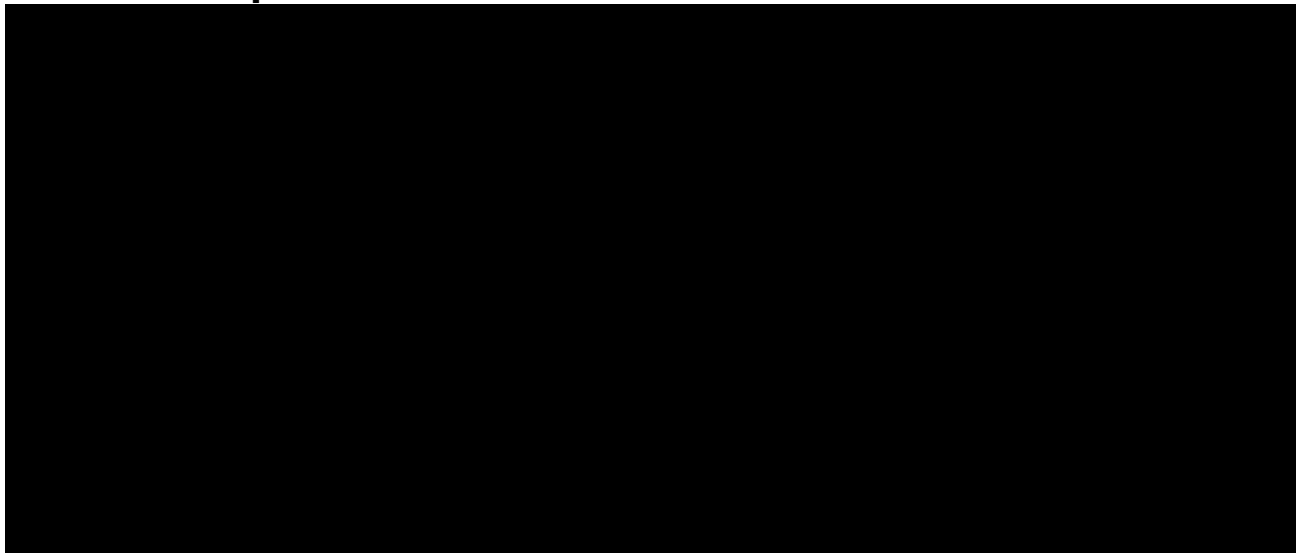
```
no defined jobs
```

```
pantasks: !find -type f | xargs ls -ltr --time-style="+%H:%M:%S"
```

```
-rw-r--r-- 1 MyName users      0 09:54:54 ./register/register.imfile.log  
-rw-r--r-- 1 MyName users      0 09:54:54 ./register/register.exp.log  
-rw-r--r-- 1 MyName users  1693 09:54:59 ./proc/bias.00.1/reg.fpa.log  
-rw-r--r-- 1 MyName users  1564 09:55:04 ./proc/bias.00.1/bias.00.1.reg.log  
...  
-rw-r--r-- 1 MyName users  1694 09:55:17 ./proc/dark.00.11/reg.fpa.log  
-rw-r--r-- 1 MyName users  1566 09:55:32 ./proc/dark.00.11/dark.00.11.reg.log  
...  
-rw-r--r-- 1 MyName users  1692 09:55:57 ./proc/flat.00.31/reg.fpa.log  
-rw-r--r-- 1 MyName users  1564 09:56:20 ./proc/flat.00.31/flat.00.31.reg.log  
...
```

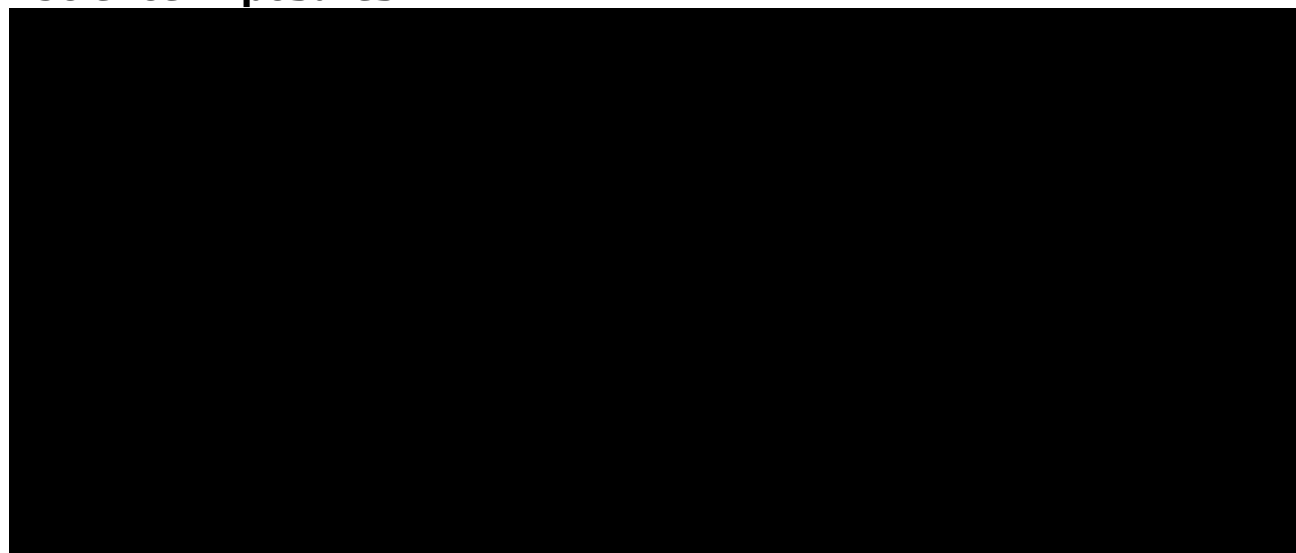
```
-rw-r--r-- 1 MyName users 1693 09:56:38 ./proc/obj.00.51/reg.fpa.log
-rw-r--r-- 1 MyName users 1555 09:57:09 ./proc/obj.00.51/obj.00.51.reg.log
...
-rw-r--r-- 1 MyName users 1706 09:56:57 ./proc/shutter.00.61/reg.fpa.log
-rw-r--r-- 1 MyName users 1581 09:57:21 ./proc/shutter.00.61/shutter.00.61.reg.log
...
```

## Raw Detrend Exposures



```
SELECT exp_tag,telescope,camera,exp_type,filter,dateobs,exp_time,airmass,bg,bg_stdev,bg_mean_stdev  
FROM rawExp WHERE rawExp.exp_type != 'OBJECT' LIMIT 40 OFFSET 0
```

## Raw Science Exposures



```
SELECT exp_tag,telescope,camera,exp_type,filter,ra,decl,object,airmass,exp_time,bg,bg_stdev FROM  
rawExp WHERE rawExp.exp_type = 'OBJECT' LIMIT 40 OFFSET 0
```

## Imfile Tables: Raw Image File



```
SELECT exp_tag,class_id,bg,bg_stdev,bg_mean_stdev,uri FROM rawImfile LIMIT 40 OFFSET 0
```

## a) detailed register/Phase0 code description

please go to next chapter if you are not interested in

### **phase0.pro**

see `~ipp/psconfig/share/pantasks/modules/phase0.pro`

commands in phase0.pro

```
book init p0PendingImfile
dictionary book defined in
  ~ipp/src.alala/ipp-1.0/Ohana/src/opihi/cmd.data/book.c
  ~ipp/src.alala/ipp-1.0/Ohana/src/opihi/cmd.data/book_commands.c
  ~ipp/src.alala/ipp-1.0/Ohana/src/opihi/lib.data/book.c
```

```
$p0PendingImfile_DB = 0
```

```
task          phase0.imfile.load
  task.exec
    p0tool
  end
```

```
task          phase0.imfile.run
  task.exec
    ipp_datapath.pl
    phase0_imfile.pl
  end
```

builds up internal lists

```
task.exit    timeout
end
```

p0tool = unix command

### **ipp\_datapath.pl**

see `~ipp/psconfig/ipp-1.0.linux/bin/ipp_datapath.pl`

```
use PS::IPP::Config;
class: ipp/psconfig/ipp-1.0.linux/lib/PS/IPP/Config.pm

my $ipprc = PS::IPP::Config->new();
constructor: sub new() in Config.pm

die "No filename specified.\n" if scalar @ARGV != 1;

print $ipprc->convert_filename_absolute(shift @ARGV) . "\n";
method: sub convert_filename_absolute in Config.pm

1;
```

### **Config.pm**

see `~ipp/psconfig/ipp-1.0.linux/lib/PS/IPP/Config.pm`

### **sub convert\_filename\_absolute**

```
use URI;
class: /usr/lib/perl5/vendor_perl/5.8.8/URI.pm

sub convert_filename_absolute
{
    my $uri      = URI->new($name)
    my $scheme   = $uri->scheme();
    my $host     = $uri->host();
    my $path     = $uri->path();
    my $authority = $uri->authority();
    my @segments = $uri->path_segments();
}
```

### **phase0\_imfile.pl**

see `~ipp/psconfig/ipp-1.0.linux/bin/phase0_imfile.pl`

## 6) CREATING MASTER DETREND IMAGES

### a) bias

manually staging: now bias run, now dark run.....

example is comment out in `~ipp/psconfig/share/pantasks/modules/sim.pro`

```
### create a bias detrun:  
# exec dettool -pretend -definebyquery -inst SIMPLE -filter NONE -det_type bias  
-select_exp_type bias -workdir path://SIMTEST/mkbias.0 -dbname MyDataBase
```

to show options try

```
dettool
```

querying a certain set of frames and producing a table in the database

```
pantasks: exec dettool -pretend -definebyquery -inst SIMTEST -filter NONE  
-det_type bias -select_exp_type bias -workdir  
path://SIMTEST/mkbias.0 -dbname MyDataBase
```

```
pantasks: exec dettool -definebyquery -inst SIMTEST -filter NONE  
-det_type bias -select_exp_type bias -workdir  
path://SIMTEST/mkbias.0 -dbname MyDataBase
```

```
detRun MULTI
```

```
detRun METADATA
```

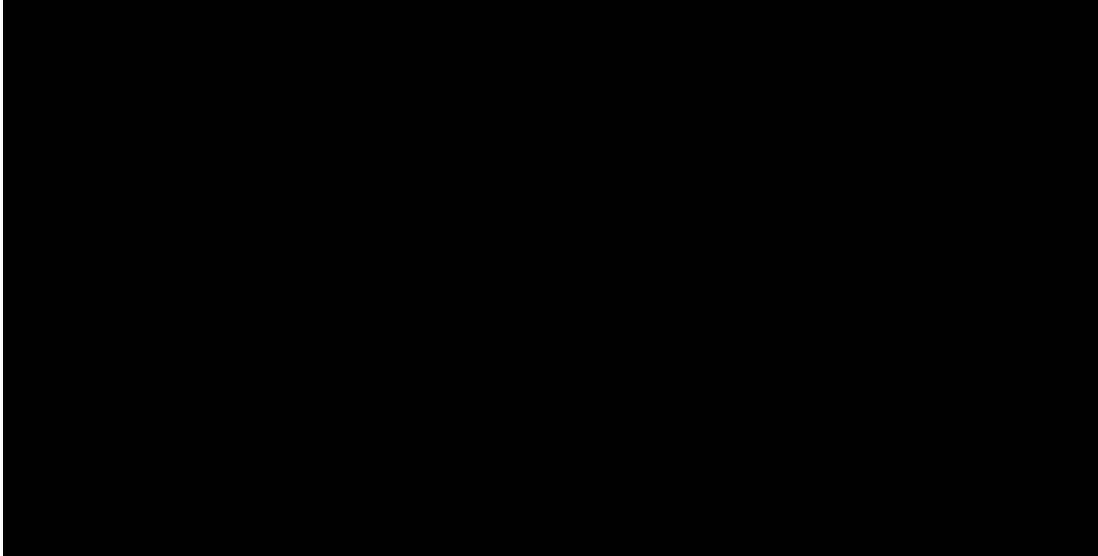
|              |     |                         |
|--------------|-----|-------------------------|
| det_id       | STR | 1                       |
| iteration    | S32 | 0                       |
| det_type     | STR | bias                    |
| mode         | STR | master                  |
| state        | STR | run                     |
| workdir      | STR | path://SIMTEST/mkbias.0 |
| camera       | STR | SIMTEST                 |
| telescope    | STR | NULL                    |
| exp_type     | STR | NA                      |
| filter       | STR | NONE                    |
| airmass_min  | F32 | 0                       |
| airmass_max  | F32 | 0                       |
| exp_time_min | F32 | 0                       |
| exp_time_max | F32 | 0                       |
| ccd_temp_min | F32 | 0                       |
| ccd_temp_max | F32 | 0                       |
| posang_min   | F64 | 2.83051016776917e-269   |
| posang_max   | F64 | 2.83060259372122e-269   |
| registered   | TAI | 2007-03-13T20:07:56Z    |
| time_begin   | TAI | NULL                    |
| time_end     | TAI | NULL                    |
| use_begin    | TAI | NULL                    |
| use_end      | TAI | NULL                    |
| solang_min   | F32 | 0                       |
| solang_max   | F32 | 0                       |
| label        | STR | NULL                    |
| parent       | S32 | 0                       |

```
END
```

## Detrend Steps

The pages in this section allow you to examine the master detrend images and the processing steps involved in their creation. You may search through the detrend images which have been accepted by the detrend analysis system by selecting the Master Detrend Images tab.

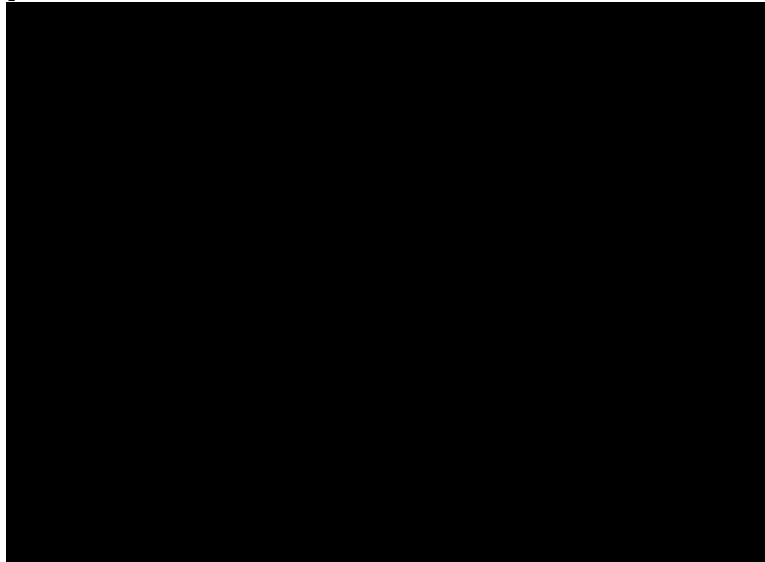
## Detrend Runs



```
SELECT det_id,iteration,det_type,state,mode,filter,registered,use_begin,use_end FROM detRun LIMIT 40 OFFSET 0
```

different runs  
distinguish between **master** - or - **verify** mode

## Input Detrend Exp



## loading and running the detrend process

```
pantasks: module detrend.process.pro
```

```
pantasks: status
```

```
Scheduler is stopped, harvesting jobs  
Controller is running
```

### Task Status

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command            |
|----------------------------|-------|-------|-------|-------|--------------------|
| ++ register.imfile.load    | **    | **    | 0     | 0     | regtool            |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl |
| ++ register.exp.load       | **    | **    | 0     | 0     | regtool            |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl    |
| ++ dettool.process.load    | 0     | 0     | 0     | 0     | (dynamic)          |
| ++ dettool.process.run     | 0     | 0     | 0     | 0     | (dynamic)          |
| ++ dettool.processexp.load | 0     | 0     | 0     | 0     | (dynamic)          |
| ++ dettool.processexp.run  | 0     | 0     | 0     | 0     | (dynamic)          |

```
no defined jobs
```

```
pantasks: run
```

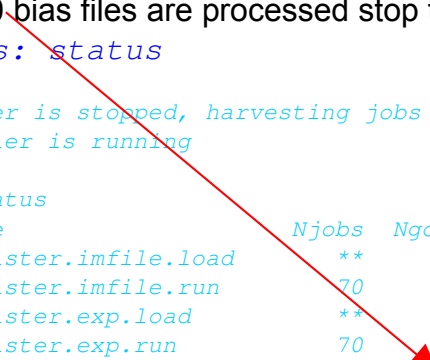
after all 10 bias files are processed stop the scheduler

```
pantasks: status
```

```
Scheduler is stopped, harvesting jobs  
Controller is running
```

### Task Status

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | **    | **    | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | **    | **    | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 10    | 10    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 10    | 10    | 0     | 0     | detrend_process_exp.pl    |

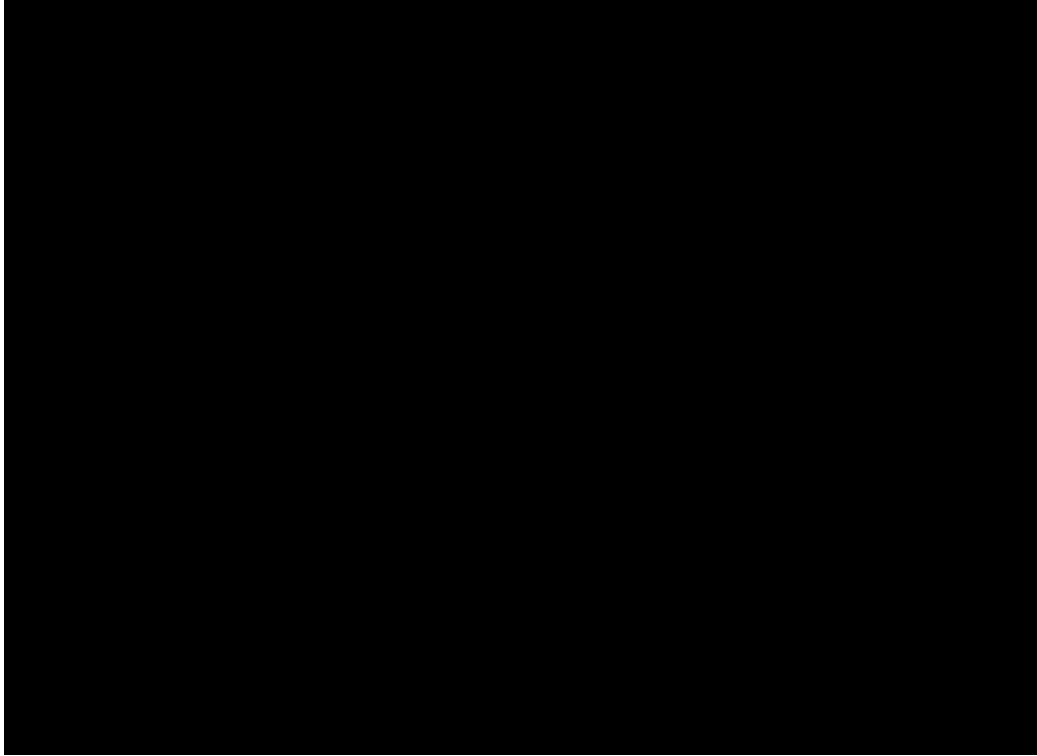


```
no defined jobs
```

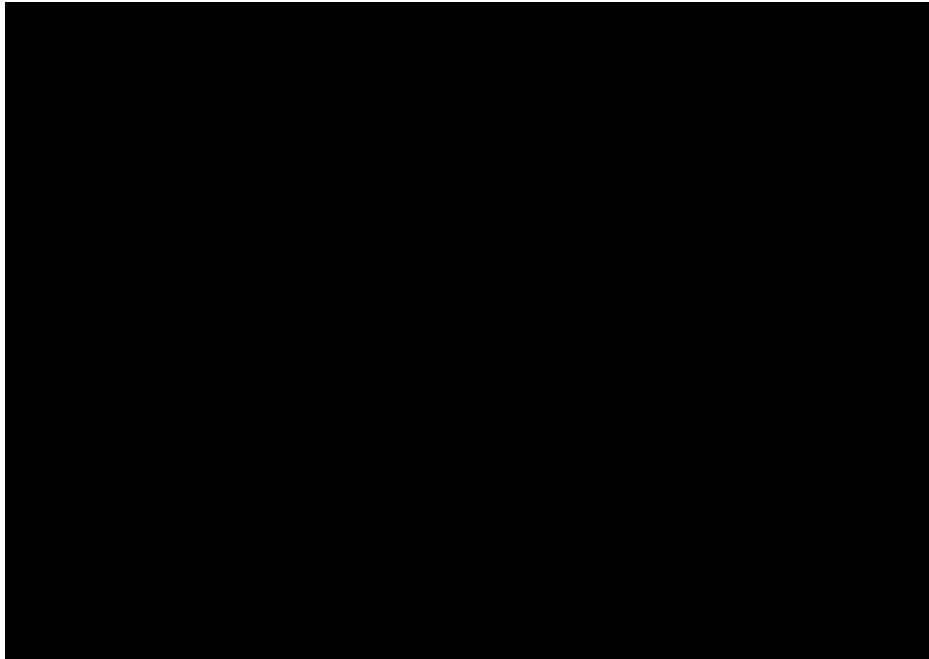
```
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/detproc.imfile.log  
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/detproc.exp.log  
-rw-r--r-- 1 MyName users 4199040 10:17:41 ./mkbias.0/bias.00.1/bias.00.1.detproc.1.fits  
-rw-r--r-- 1 MyName users   8640 10:17:41 ./mkbias.0/bias.00.1/bias.00.1.detproc.1.b2.fits  
-rw-r--r-- 1 MyName users  72000 10:17:41 ./mkbias.0/bias.00.1/bias.00.1.detproc.1.b1.fits  
-rw-r--r-- 1 MyName users   1278 10:17:45 ./mkbias.0/bias.00.1/detproc.1.fpa.log  
-rw-r--r-- 1 MyName users   3069 10:17:53 ./mkbias.0/bias.00.1/bias.00.1.detproc.1.b1.jpg  
-rw-r--r-- 1 MyName users    630 10:17:54 ./mkbias.0/bias.00.1/bias.00.1.detproc.1.b2.jpg  
-rw-r--r-- 1 MyName users   3320 10:17:56 ./mkbias.0/bias.00.1/detproc.1.0.log  
...  
-rw-r--r-- 1 MyName users 4199040 10:18:15 ./mkbias.0/bias.09.10/bias.09.10.detproc.1.fits  
-rw-r--r-- 1 MyName users   8640 10:18:15 ./mkbias.0/bias.09.10/bias.09.10.detproc.1.b2.fits  
-rw-r--r-- 1 MyName users  72000 10:18:15 ./mkbias.0/bias.09.10/bias.09.10.detproc.1.b1.fits  
-rw-r--r-- 1 MyName users   1287 10:18:17 ./mkbias.0/bias.09.10/detproc.1.fpa.log  
-rw-r--r-- 1 MyName users   2990 10:18:28 ./mkbias.0/bias.09.10/bias.09.10.detproc.1.b1.jpg  
-rw-r--r-- 1 MyName users    630 10:18:29 ./mkbias.0/bias.09.10/bias.09.10.detproc.1.b2.jpg  
-rw-r--r-- 1 MyName users   3338 10:18:31 ./mkbias.0/bias.09.10/detproc.1.0.log
```



## Proc Detrend Exp



## Imfile Tables: det Processed Imfile



```
SELECT det_id,exp_tag,class_id,bg,bg_stdev,bg_mean_stdev FROM detProcessedImfile LIMIT 40 OFFSET 0
```

```
pantasks: module detrend.stack.pro
```

```
pantasks: status
```

```
Scheduler is running  
Controller is running
```

```
Task Status
```

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | **    | **    | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | **    | **    | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 10    | 10    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 10    | 10    | 0     | 0     | detrend_process_exp.pl    |
| ++ dettool.stack.load      | 0     | 0     | 0     | 0     | (dynamic)                 |
| ++ dettool.stack.run       | 0     | 0     | 0     | 0     | (dynamic)                 |

```
no defined jobs
```

```
pantasks: run
```

```
pantasks: status
```

```
Scheduler is stopped, harvesting jobs  
Controller is running
```

```
Task Status
```

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | **    | **    | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | **    | **    | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 10    | 10    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 10    | 10    | 0     | 0     | detrend_process_exp.pl    |
| ++ dettool.stack.load      | **    | **    | 0     | 0     | dettool                   |
| ++ dettool.stack.run       | 1     | 1     | 0     | 0     | detrend_stack.pl          |

```
no defined jobs
```

```
pantasks: stop
```

```
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/detstack.log  
-rw-r--r-- 1 MyName users 4201920 10:18:48 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.1.0.fpa.fits  
-rw-r--r-- 1 MyName users   8050 10:18:50 ./mkbias.0/SIMTEST.bias.1/detstack.1.0.fpa.log
```

## Imfile Tables: det Stacked Imfile



```
SELECT det_id,class_id,bg,bg_stdev,bg_mean_stdev,iteration FROM detStackedImfile LIMIT 40 OFFSET 0
```

`pantasks: module detrend.norm.pro`

`pantasks: status`

Task Status

| AV Name                               | Njobs | Ngood | Nfail | Ntime | Command   |
|---------------------------------------|-------|-------|-------|-------|-----------|
| <code>++ dettool.normstat.load</code> | 0     | 0     | 0     | 0     | (dynamic) |
| <code>++ dettool.normstat.run</code>  | 0     | 0     | 0     | 0     | (dynamic) |
| <code>++ dettool.norm.load</code>     | 0     | 0     | 0     | 0     | (dynamic) |
| <code>++ dettool.norm.run</code>      | 0     | 0     | 0     | 0     | (dynamic) |
| <code>++ dettool.normexp.load</code>  | 0     | 0     | 0     | 0     | (dynamic) |
| <code>++ dettool.normexp.run</code>   | 0     | 0     | 0     | 0     | (dynamic) |

`pantasks: run`

`pantasks: status`

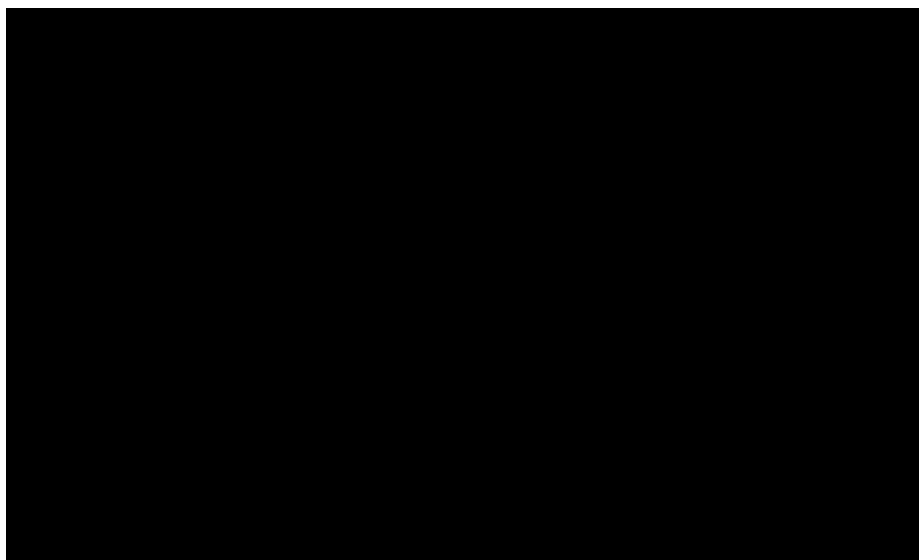
Task Status

| AV Name                               | Njobs | Ngood | Nfail | Ntime | Command               |
|---------------------------------------|-------|-------|-------|-------|-----------------------|
| <code>++ dettool.normstat.load</code> | **    | **    | 0     | 0     | dettool               |
| <code>++ dettool.normstat.run</code>  | 1     | 1     | 0     | 0     | detrend_norm_calc.pl  |
| <code>++ dettool.norm.load</code>     | **    | **    | 0     | 0     | dettool               |
| <code>++ dettool.norm.run</code>      | 1     | 1     | 0     | 0     | detrend_norm_apply.pl |
| <code>++ dettool.normexp.load</code>  | **    | **    | 0     | 0     | dettool               |
| <code>++ dettool.normexp.run</code>   | 1     | 1     | 0     | 0     | detrend_norm_exp.pl   |

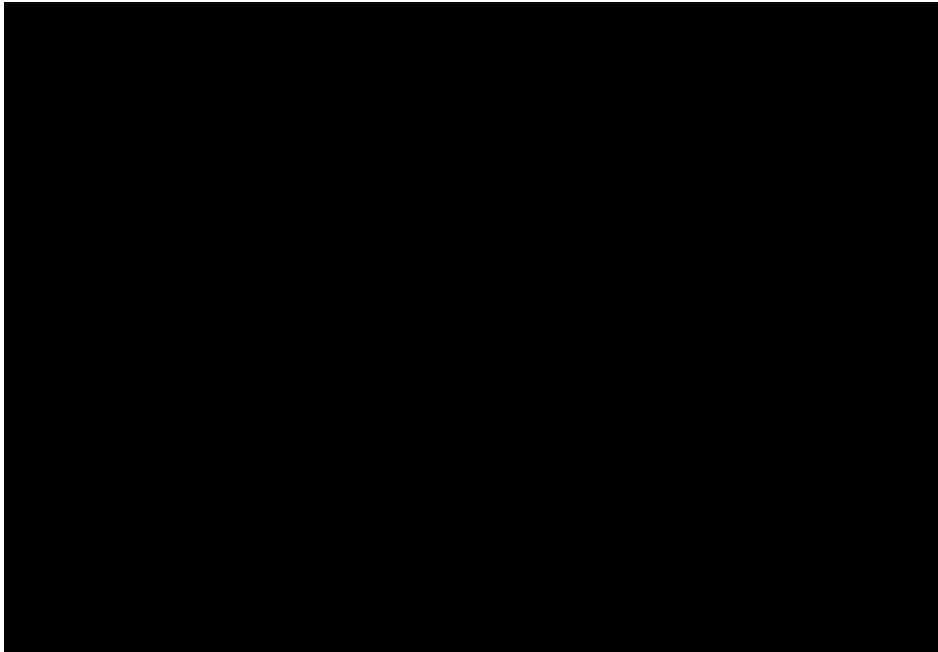
no defined jobs

`pantasks: stop`

```
-rw-r--r-- 1 MyName users      0 10:17:34 ./detrend/dettool.normstat.log
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/dettool.normexp.log
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/dettool.norm.log
-rw-r--r-- 1 MyName users 4201920 10:19:12 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.norm.1.0.fits
-rw-r--r-- 1 MyName users   8640 10:19:12 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.norm.1.0.b2.fits
-rw-r--r-- 1 MyName users  72000 10:19:12 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.norm.1.0.b1.fits
-rw-r--r-- 1 MyName users   1308 10:19:14 ./mkbias.0/SIMTEST.bias.1/norm.1.0.fpa.log
-rw-r--r-- 1 MyName users   3074 10:19:22 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.norm.1.0.b1.jpg
-rw-r--r-- 1 MyName users    630 10:19:23 ./mkbias.0/SIMTEST.bias.1/SIMTEST.bias.norm.1.0.b2.jpg
-rw-r--r-- 1 MyName users   3634 10:19:24 ./mkbias.0/SIMTEST.bias.1/norm.1.0.log
```

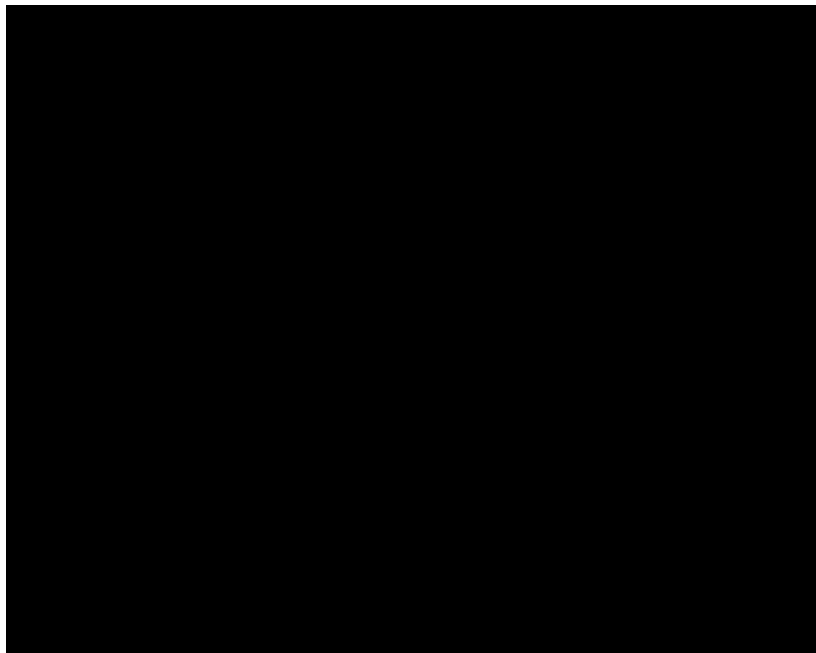


## Imfile Tables: det Normalized Imfile



```
SELECT det_id,class_id,bg,bg_stdev,bg_mean_stdev,iteration FROM detNormalizedImfile LIMIT 40 OFFSET 0
```

## Imfile Tables: detNormalizedStatImfile



```
SELECT det_id,class_id,iteration,norm FROM detNormalizedStatImfile LIMIT 40 OFFSET 0
```

pantasks: module detrend.resid.pro

pantasks: status

Task Status

| AV Name                  | Njobs | Ngood | Nfail | Ntime | Command   |
|--------------------------|-------|-------|-------|-------|-----------|
| ++ dettool.resid.load    | 0     | 0     | 0     | 0     | (dynamic) |
| ++ dettool.resid.run     | 0     | 0     | 0     | 0     | (dynamic) |
| ++ dettool.residexp.load | 0     | 0     | 0     | 0     | (dynamic) |
| ++ dettool.residexp.run  | 0     | 0     | 0     | 0     | (dynamic) |

pantasks: run

pantasks: status

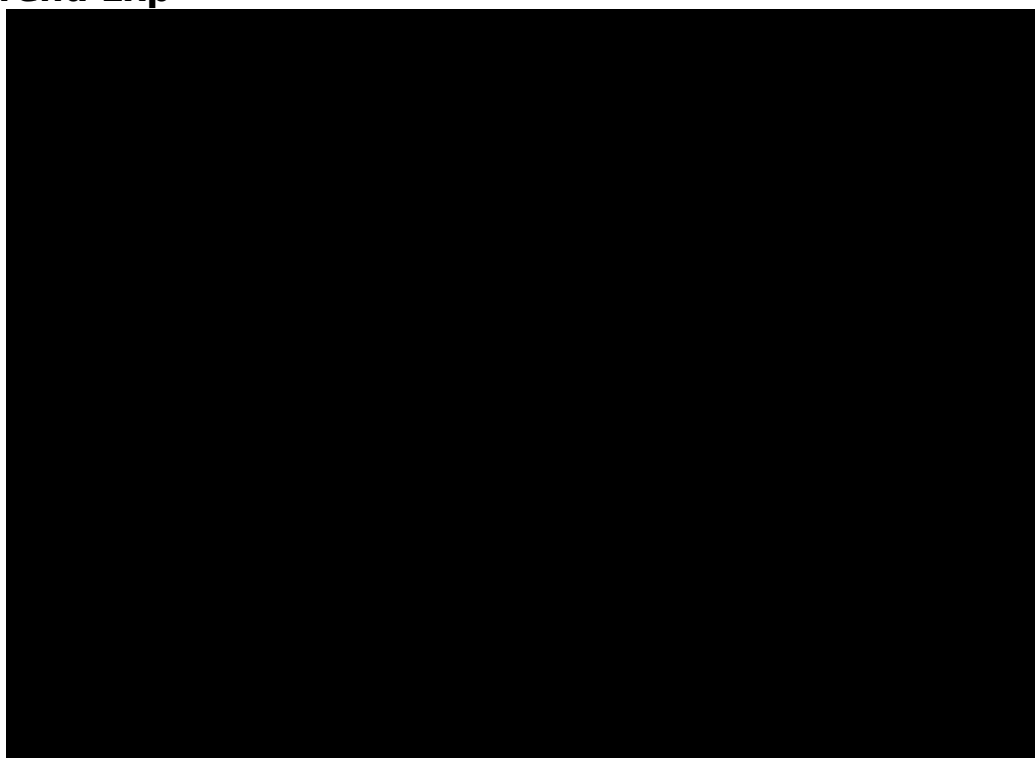
Task Status

| AV Name                  | Njobs | Ngood | Nfail | Ntime | Command                  |
|--------------------------|-------|-------|-------|-------|--------------------------|
| ++ dettool.resid.load    | 18    | 18    | 0     | 0     | dettool                  |
| ++ dettool.resid.run     | 10    | 10    | 0     | 0     | detrend_resid.pl         |
| ++ dettool.residexp.load | 13    | 13    | 0     | 0     | dettool                  |
| ++ dettool.residexp.run  | 10    | 10    | 0     | 0     | detrend_reject_imfile.pl |

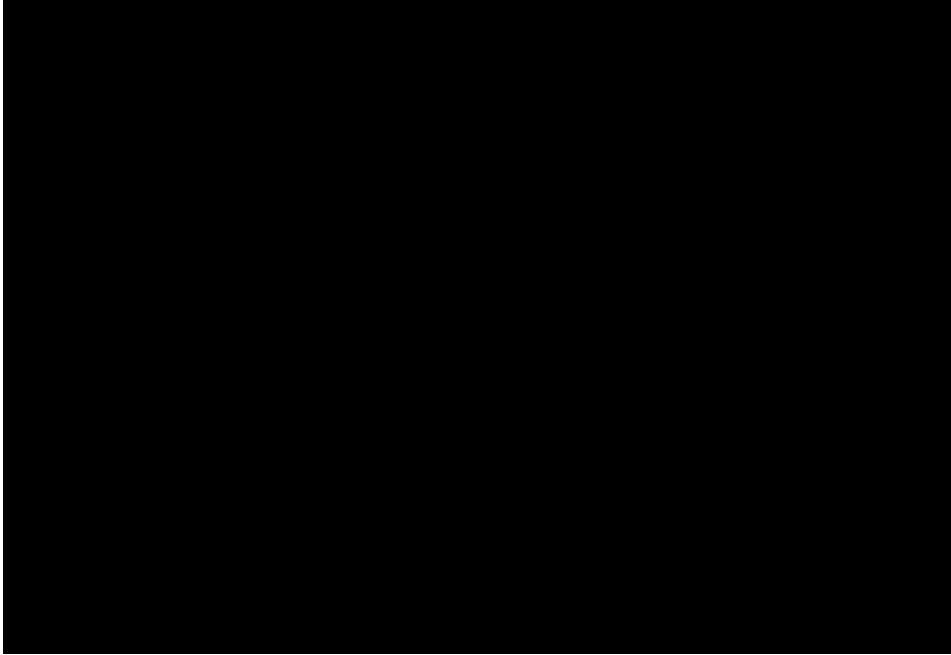
pantasks: stop

```
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/detresid.log
-rw-r--r-- 1 MyName users      0 10:17:35 ./detrend/detresid.exp.log
-rw-r--r-- 1 MyName users 4201920 10:19:25 ./mkbias.0/bias.00.1/bias.00.1.detresid.1.0.fits
-rw-r--r-- 1 MyName users  8640 10:19:25 ./mkbias.0/bias.00.1/bias.00.1.detresid.1.0.b2.fits
-rw-r--r-- 1 MyName users 72000 10:19:25 ./mkbias.0/bias.00.1/bias.00.1.detresid.1.0.b1.fits
-rw-r--r-- 1 MyName users  1516 10:19:27 ./mkbias.0/bias.00.1/detresid.1.0.fpa.log
-rw-r--r-- 1 MyName users  3054 10:19:35 ./mkbias.0/bias.00.1/bias.00.1.detresid.1.0.b1.jpg
-rw-r--r-- 1 MyName users   776 10:19:36 ./mkbias.0/bias.00.1/bias.00.1.detresid.1.0.b2.jpg
-rw-r--r-- 1 MyName users  3635 10:19:39 ./mkbias.0/bias.00.1/detresid.1.0.log
...
-rw-r--r-- 1 MyName users 4201920 10:19:56 ./mkbias.0/bias.09.10/bias.09.10.detresid.1.0.fits
-rw-r--r-- 1 MyName users  8640 10:19:56 ./mkbias.0/bias.09.10/bias.09.10.detresid.1.0.b2.fits
-rw-r--r-- 1 MyName users 72000 10:19:56 ./mkbias.0/bias.09.10/bias.09.10.detresid.1.0.b1.fits
-rw-r--r-- 1 MyName users  1528 10:19:57 ./mkbias.0/bias.09.10/detresid.1.0.fpa.log
-rw-r--r-- 1 MyName users  2957 10:20:08 ./mkbias.0/bias.09.10/bias.09.10.detresid.1.0.b1.jpg
-rw-r--r-- 1 MyName users   802 10:20:09 ./mkbias.0/bias.09.10/bias.09.10.detresid.1.0.b2.jpg
-rw-r--r-- 1 MyName users  3654 10:20:10 ./mkbias.0/bias.09.10/detresid.1.0.log
```

## Resid Detrend Exp



## Imfile Tables: det Resid Imfile



```
SELECT det_id,exp_tag,class_id,bg,bg_stdev,bg_mean_stdev,iteration FROM detResidImfile LIMIT 40  
OFFSET 0
```

```
pantasks: module detrend.reject.pro
```

```
pantasks: status
```

```
Task Status
```

| <i>AV Name</i>                | <i>Njobs</i> | <i>Ngood</i> | <i>Nfail</i> | <i>Ntime</i> | <i>Command</i>   |
|-------------------------------|--------------|--------------|--------------|--------------|------------------|
| <i>++ dettool.reject.load</i> | <i>0</i>     | <i>0</i>     | <i>0</i>     | <i>0</i>     | <i>(dynamic)</i> |
| <i>++ dettool.reject.run</i>  | <i>0</i>     | <i>0</i>     | <i>0</i>     | <i>0</i>     | <i>(dynamic)</i> |

```
pantasks: run
```

```
pantasks: status
```

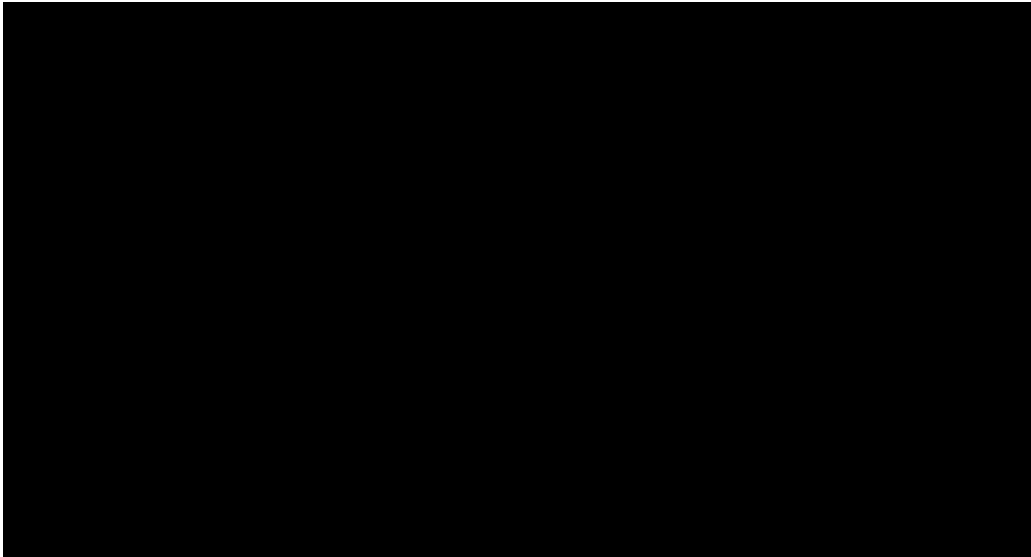
```
Task Status
```

| <i>AV Name</i>                | <i>Njobs</i> | <i>Ngood</i> | <i>Nfail</i> | <i>Ntime</i> | <i>Command</i>               |
|-------------------------------|--------------|--------------|--------------|--------------|------------------------------|
| <i>++ dettool.reject.load</i> | <i>12</i>    | <i>12</i>    | <i>0</i>     | <i>0</i>     | <i>dettool</i>               |
| <i>++ dettool.reject.run</i>  | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_reject_exp.pl</i> |

```
pantasks: stop
```

```
-rw-r--r-- 1 MyName users 0 10:17:35 ./detrend/dettool.reject.log  
-rw-r--r-- 1 MyName users 8759 10:20:26 ./mkbias.0/SIMTEST.bias.1/reject.1.0.log
```

## Master Detrend Frames

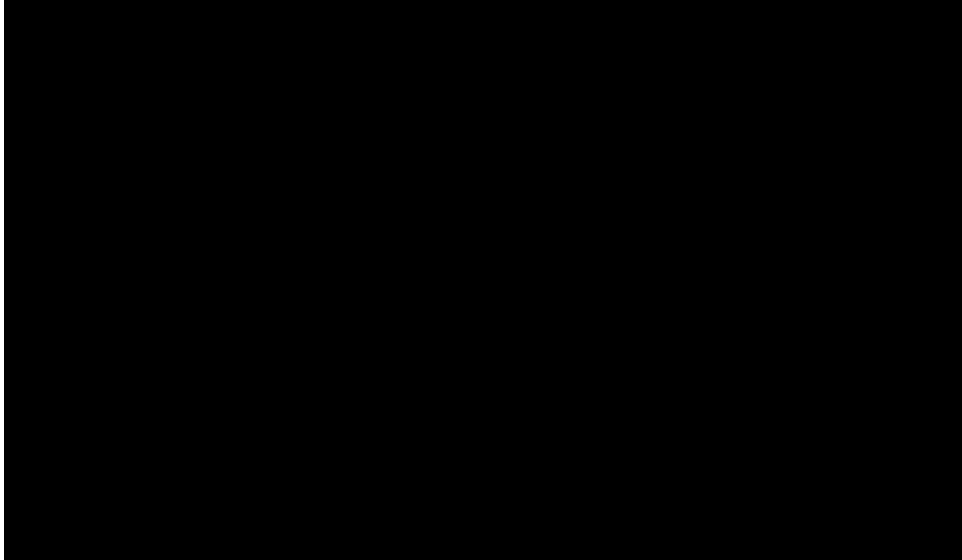


```
SELECT detRunSummary.det_id,detRunSummary.iteration,detRun.det_type,detRunSummary.bg,  
detRunSummary.bg_stdev FROM detRunSummary, detRun WHERE detRunSummary.accept = 1 AND detRun.det_id
```

```
= detRunSummary.det_id AND detRun.iteration = detRunSummary.iteration LIMIT 40 OFFSET 0
```



## Detrend Iterations: detRunSummary



```
SELECT det_id,iteration,accept,bg,bg_stdev FROM detRunSummary LIMIT 40 OFFSET 0
```

keep = 1 after successfully creating a master detrend image

### b) loading all tasks modules once

Now load the basic detrend modules

```
pantasks: load.detrend  
macro load.detrend  
  module detrend.process.pro  
  module detrend.stack.pro  
  module detrend.norm.pro  
  module detrend.resid.pro  
  module detrend.reject.pro  
  status  
end
```

## c) dark

```
pantasks: dettool -definebyquery -inst SIMTEST -filter NONE -det_type
dark -select_exp_type dark -workdir
path://SIMTEST/mkdark.0 -dbname MyDataBase
```

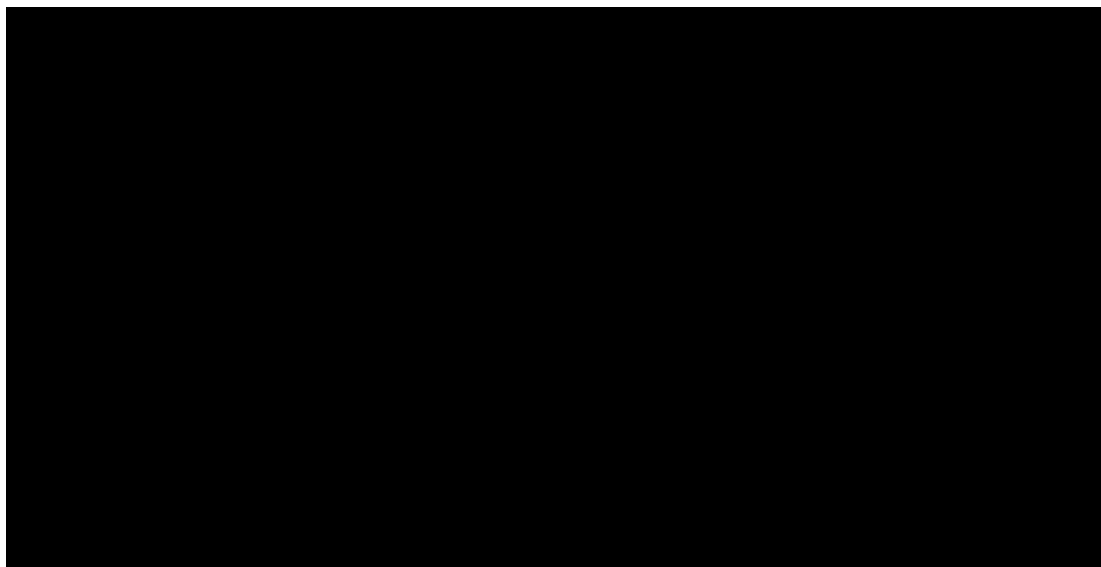
```
detRun MULTI
```

```
detRun METADATA
```

|              |     |                         |
|--------------|-----|-------------------------|
| det_id       | STR | 2                       |
| iteration    | S32 | 0                       |
| det_type     | STR | dark                    |
| mode         | STR | master                  |
| state        | STR | run                     |
| workdir      | STR | path://SIMTEST/mkdark.0 |
| camera       | STR | SIMTEST                 |
| telescope    | STR | NULL                    |
| exp_type     | STR | NA                      |
| filter       | STR | NONE                    |
| airmass_min  | F32 | 0                       |
| airmass_max  | F32 | 0                       |
| exp_time_min | F32 | 0                       |
| exp_time_max | F32 | 0                       |
| ccd_temp_min | F32 | 0                       |
| ccd_temp_max | F32 | 0                       |
| posang_min   | F64 | 2.99945325490164e-269   |
| posang_max   | F64 | 2.99954568085369e-269   |
| registered   | TAI | 2007-03-13T21:32:30Z    |
| time_begin   | TAI | NULL                    |
| time_end     | TAI | NULL                    |
| use_begin    | TAI | NULL                    |
| use_end      | TAI | NULL                    |
| solang_min   | F32 | 0                       |
| solang_max   | F32 | 0                       |
| label        | STR | NULL                    |
| parent       | S32 | 0                       |

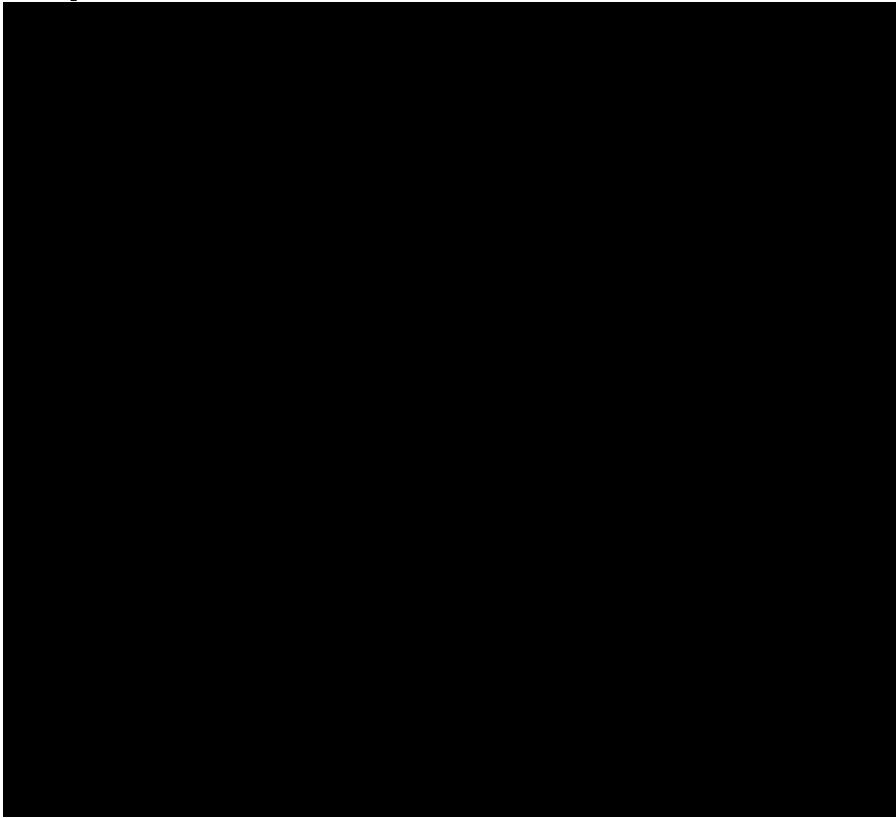
```
END
```

## Detrend Runs



```
SELECT det_id,iteration,det_type,state,mode,filter,registered,use_begin,use_end FROM detRun LIMIT
40 OFFSET 0
```

# Input Detrend Exp



```
SELECT det_id,exp_tag,iteration,include FROM detInputExp WHERE det_id = '2' LIMIT 40 OFFSET 0
```

## *pantasks: status*

```
Scheduler is running  
Controller is running
```

### *Task Status*

| <i>AV Name</i>                    | <i>Njobs</i> | <i>Ngood</i> | <i>Nfail</i> | <i>Ntime</i> | <i>Command</i>                   |
|-----------------------------------|--------------|--------------|--------------|--------------|----------------------------------|
| <i>++ register.imfile.load</i>    | <i>148</i>   | <i>148</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.imfile.run</i>     | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_imfile.pl</i>        |
| <i>++ register.exp.load</i>       | <i>149</i>   | <i>149</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.exp.run</i>        | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_exp.pl</i>           |
| <i>++ dettool.process.load</i>    | <i>107</i>   | <i>107</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.process.run</i>     | <i>10</i>    | <i>10</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_imfile.pl</i> |
| <i>++ dettool.processexp.load</i> | <i>111</i>   | <i>111</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.processexp.run</i>  | <i>10</i>    | <i>10</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_exp.pl</i>    |
| <i>++ dettool.stack.load</i>      | <i>105</i>   | <i>105</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.stack.run</i>       | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_stack.pl</i>          |
| <i>++ dettool.normstat.load</i>   | <i>98</i>    | <i>98</i>    | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normstat.run</i>    | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_calc.pl</i>      |
| <i>++ dettool.norm.load</i>       | <i>110</i>   | <i>110</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.norm.run</i>        | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_apply.pl</i>     |
| <i>++ dettool.normexp.load</i>    | <i>106</i>   | <i>106</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normexp.run</i>     | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_exp.pl</i>       |
| <i>++ dettool.resid.load</i>      | <i>109</i>   | <i>109</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.resid.run</i>       | <i>10</i>    | <i>10</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_resid.pl</i>          |
| <i>++ dettool.residexp.load</i>   | <i>109</i>   | <i>109</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.residexp.run</i>    | <i>10</i>    | <i>10</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_reject_imfile.pl</i>  |
| <i>++ dettool.reject.load</i>     | <i>104</i>   | <i>104</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.reject.run</i>      | <i>1</i>     | <i>1</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_reject_exp.pl</i>     |

```
no defined jobs
```

pantasks: run

pantasks: status

Scheduler is stopped, harvesting jobs  
Controller is running

Task Status

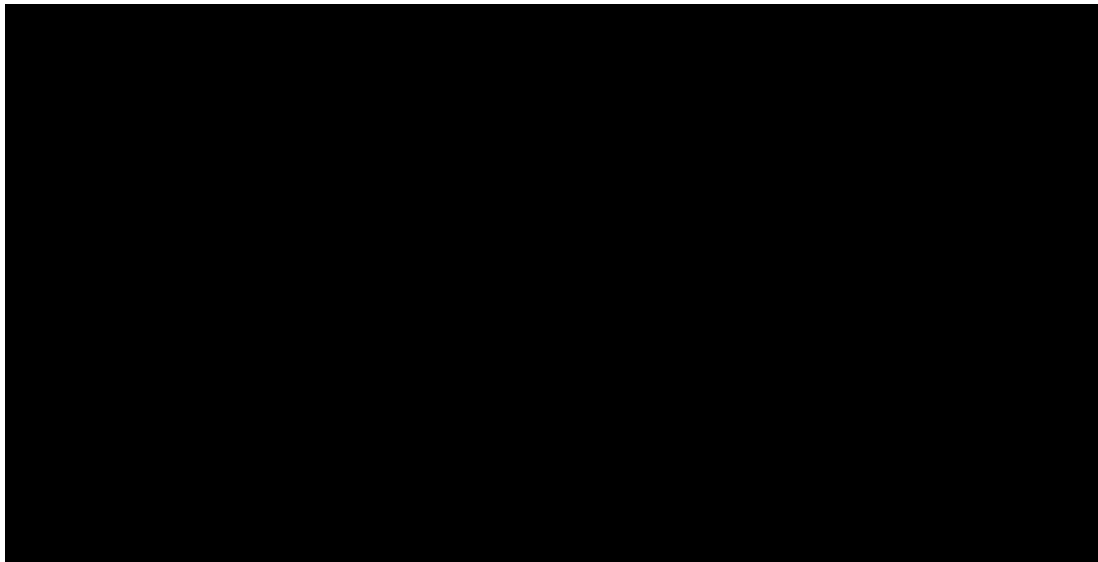
| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | 249   | 249   | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | 258   | 258   | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | 212   | 212   | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 30    | 30    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | 216   | 216   | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 30    | 30    | 0     | 0     | detrend_process_exp.pl    |
| ++ dettool.stack.load      | 210   | 210   | 0     | 0     | dettool                   |
| ++ dettool.stack.run       | 2     | 2     | 0     | 0     | detrend_stack.pl          |
| ++ dettool.normstat.load   | 201   | 201   | 0     | 0     | dettool                   |
| ++ dettool.normstat.run    | 2     | 2     | 0     | 0     | detrend_norm_calc.pl      |
| ++ dettool.norm.load       | 216   | 216   | 0     | 0     | dettool                   |
| ++ dettool.norm.run        | 2     | 2     | 0     | 0     | detrend_norm_apply.pl     |
| ++ dettool.normexp.load    | 210   | 210   | 0     | 0     | dettool                   |
| ++ dettool.normexp.run     | 2     | 2     | 0     | 0     | detrend_norm_exp.pl       |
| ++ dettool.resid.load      | 202   | 202   | 0     | 0     | dettool                   |
| ++ dettool.resid.run       | 30    | 30    | 0     | 0     | detrend_resid.pl          |
| ++ dettool.residexp.load   | 209   | 209   | 0     | 0     | dettool                   |
| ++ dettool.residexp.run    | 30    | 30    | 0     | 0     | detrend_reject_imfile.pl  |
| ++ dettool.reject.load     | 207   | 207   | 0     | 0     | dettool                   |
| ++ dettool.reject.run      | 2     | 2     | 0     | 0     | detrend_reject_exp.pl     |

no defined jobs

pantasks: stop

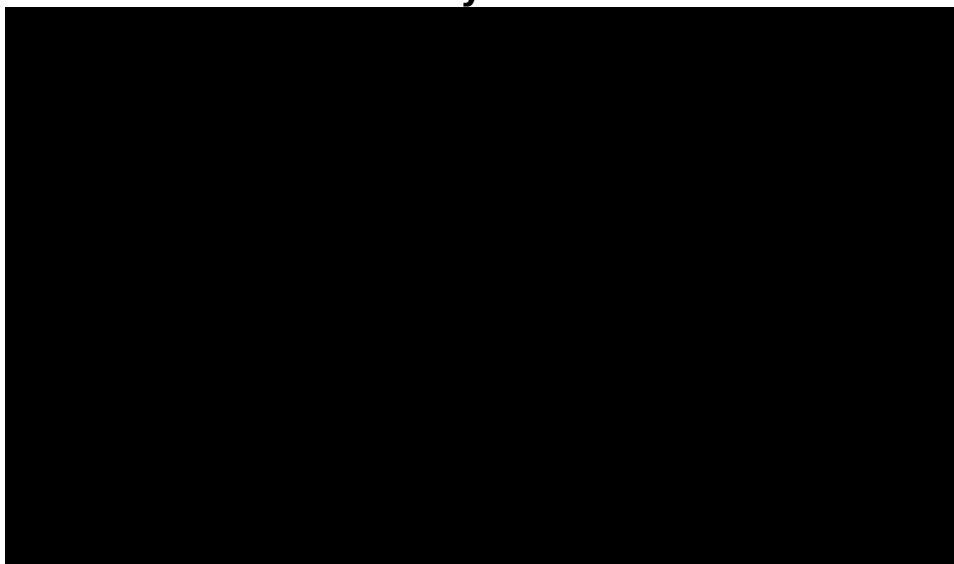
```
-rw-r--r-- 1 MyName users 4201920 11:37:01 ./mkdark.0/dark.00.11/dark.00.11.detproc.2.fits
-rw-r--r-- 1 MyName users 8640 11:37:01 ./mkdark.0/dark.00.11/dark.00.11.detproc.2.b2.fits
-rw-r--r-- 1 MyName users 72000 11:37:01 ./mkdark.0/dark.00.11/dark.00.11.detproc.2.b1.fits
-rw-r--r-- 1 MyName users 1601 11:37:05 ./mkdark.0/dark.00.11/detproc.2.fpa.log
-rw-r--r-- 1 MyName users 2986 11:37:13 ./mkdark.0/dark.00.11/dark.00.11.detproc.2.b1.jpg
-rw-r--r-- 1 MyName users 630 11:37:15 ./mkdark.0/dark.00.11/dark.00.11.detproc.2.b2.jpg
-rw-r--r-- 1 MyName users 3337 11:37:16 ./mkdark.0/dark.00.11/detproc.2.0.log
.....
-rw-r--r-- 1 MyName users 4201920 11:38:31 ./mkdark.0/dark.19.30/dark.19.30.detproc.2.fits
-rw-r--r-- 1 MyName users 8640 11:38:31 ./mkdark.0/dark.19.30/dark.19.30.detproc.2.b2.fits
-rw-r--r-- 1 MyName users 72000 11:38:31 ./mkdark.0/dark.19.30/dark.19.30.detproc.2.b1.fits
-rw-r--r-- 1 MyName users 1602 11:38:33 ./mkdark.0/dark.19.30/detproc.2.fpa.log
-rw-r--r-- 1 MyName users 2972 11:38:47 ./mkdark.0/dark.19.30/dark.19.30.detproc.2.b1.jpg
-rw-r--r-- 1 MyName users 630 11:38:48 ./mkdark.0/dark.19.30/dark.19.30.detproc.2.b2.jpg
-rw-r--r-- 1 MyName users 3337 11:38:50 ./mkdark.0/dark.19.30/detproc.2.0.log
.....
-rw-r--r-- 1 MyName users 4201920 11:39:24 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.2.0.fpa.fits
-rw-r--r-- 1 MyName users 15146 11:39:26 ./mkdark.0/SIMTEST.dark.2/detstack.2.0.fpa.log
-rw-r--r-- 1 MyName users 4201920 11:39:41 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.norm.2.0.fits
-rw-r--r-- 1 MyName users 8640 11:39:41 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.norm.2.0.b2.fits
-rw-r--r-- 1 MyName users 72000 11:39:41 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.norm.2.0.b1.fits
-rw-r--r-- 1 MyName users 1309 11:39:43 ./mkdark.0/SIMTEST.dark.2/norm.2.0.fpa.log
-rw-r--r-- 1 MyName users 3055 11:39:47 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.norm.2.0.b1.jpg
-rw-r--r-- 1 MyName users 630 11:39:48 ./mkdark.0/SIMTEST.dark.2/SIMTEST.dark.norm.2.0.b2.jpg
-rw-r--r-- 1 MyName users 3636 11:39:49 ./mkdark.0/SIMTEST.dark.2/norm.2.0.log
.....
-rw-r--r-- 1 MyName users 4201920 11:39:58 ./mkdark.0/dark.00.11/dark.00.11.detresid.2.0.fits
-rw-r--r-- 1 MyName users 8640 11:39:58 ./mkdark.0/dark.00.11/dark.00.11.detresid.2.0.b2.fits
-rw-r--r-- 1 MyName users 72000 11:39:58 ./mkdark.0/dark.00.11/dark.00.11.detresid.2.0.b1.fits
-rw-r--r-- 1 MyName users 1528 11:40:00 ./mkdark.0/dark.00.11/detresid.2.0.fpa.log
-rw-r--r-- 1 MyName users 3005 11:40:15 ./mkdark.0/dark.00.11/dark.00.11.detresid.2.0.b1.jpg
-rw-r--r-- 1 MyName users 799 11:40:16 ./mkdark.0/dark.00.11/dark.00.11.detresid.2.0.b2.jpg
-rw-r--r-- 1 MyName users 3711 11:40:19 ./mkdark.0/dark.00.11/detresid.2.0.log
.....
-rw-r--r-- 1 MyName users 4201920 11:41:11 ./mkdark.0/dark.19.30/dark.19.30.detresid.2.0.fits
-rw-r--r-- 1 MyName users 8640 11:41:11 ./mkdark.0/dark.19.30/dark.19.30.detresid.2.0.b2.fits
-rw-r--r-- 1 MyName users 72000 11:41:11 ./mkdark.0/dark.19.30/dark.19.30.detresid.2.0.b1.fits
-rw-r--r-- 1 MyName users 1527 11:41:13 ./mkdark.0/dark.19.30/detresid.2.0.fpa.log
-rw-r--r-- 1 MyName users 2969 11:41:32 ./mkdark.0/dark.19.30/dark.19.30.detresid.2.0.b1.jpg
-rw-r--r-- 1 MyName users 794 11:41:33 ./mkdark.0/dark.19.30/dark.19.30.detresid.2.0.b2.jpg
-rw-r--r-- 1 MyName users 3710 11:41:36 ./mkdark.0/dark.19.30/detresid.2.0.log
.....
-rw-r--r-- 1 MyName users 16903 11:41:58 ./mkdark.0/SIMTEST.dark.2/reject.2.0.log
```

## Master Detrend Frames



```
SELECT detRunSummary.det_id,detRunSummary.iteration,detRun.det_type,detRunSummary.bg,  
detRunSummary.bg_stdev FROM detRunSummary, detRun WHERE detRunSummary.accept = 1 AND detRun.det_id  
= detRunSummary.det_id AND detRun.iteration = detRunSummary.iteration LIMIT 40 OFFSET 0
```

## Detrend Iterations: detRunSummary



```
SELECT det_id,iteration,accept,bg,bg_stdev FROM detRunSummary LIMIT 40 OFFSET 0
```

## 7) SHUTTER

```
pantasks: exec dettool -definebyquery -inst SIMTEST -filter NONE
           -det_type shutter -select_exp_type shutter -workdir
           path://SIMTEST/mkshutter.0 -dbname MyDataBase
```

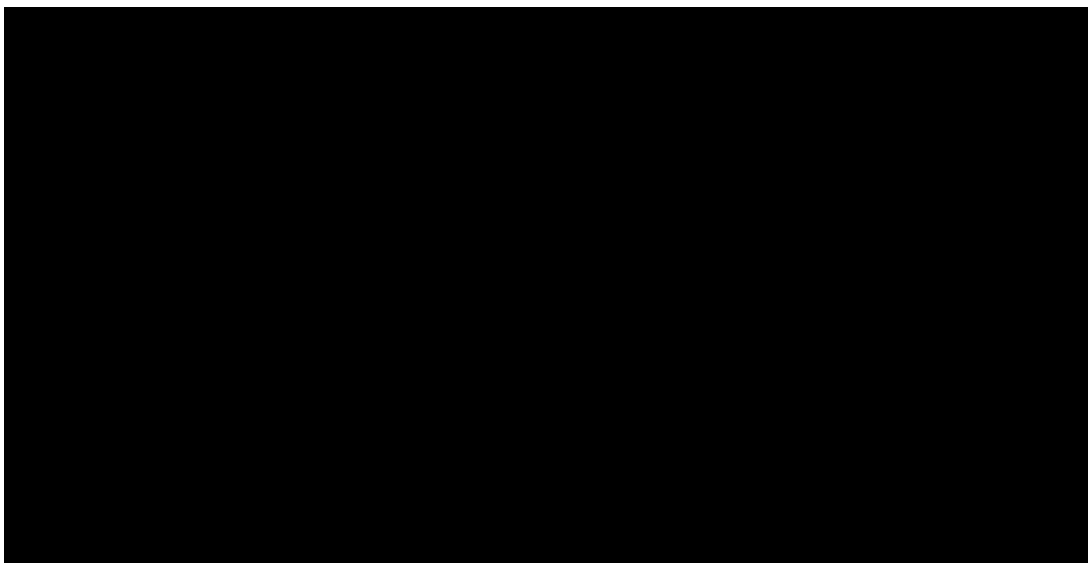
```
detRun MULTI
```

```
detRun METADATA
```

|              |     |                            |
|--------------|-----|----------------------------|
| det_id       | STR | 3                          |
| iteration    | S32 | 0                          |
| det_type     | STR | shutter                    |
| mode         | STR | master                     |
| state        | STR | run                        |
| workdir      | STR | path://SIMTEST/mkshutter.0 |
| camera       | STR | SIMTEST                    |
| telescope    | STR | NULL                       |
| exp_type     | STR | NA                         |
| filter       | STR | NONE                       |
| airmass_min  | F32 | 0                          |
| airmass_max  | F32 | 0                          |
| exp_time_min | F32 | 0                          |
| exp_time_max | F32 | 0                          |
| ccd_temp_min | F32 | 0                          |
| ccd_temp_max | F32 | 0                          |
| posang_min   | F64 | 2.8305101678103e-269       |
| posang_max   | F64 | 2.83060259376235e-269      |
| registered   | TAI | 2007-03-13T21:52:28Z       |
| time_begin   | TAI | NULL                       |
| time_end     | TAI | NULL                       |
| use_begin    | TAI | NULL                       |
| use_end      | TAI | NULL                       |
| solang_min   | F32 | 0                          |
| solang_max   | F32 | 0                          |
| label        | STR | NULL                       |
| parent       | S32 | 0                          |

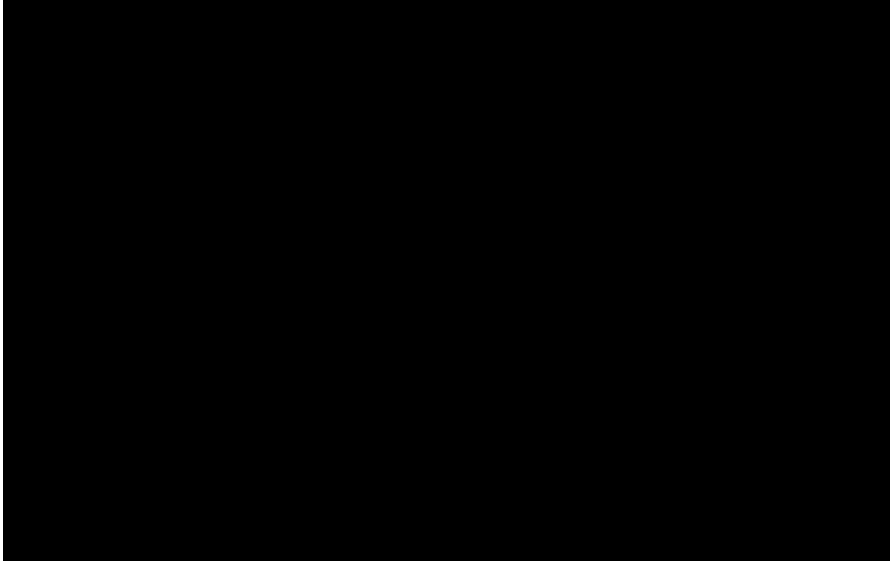
```
END
```

## Detrend Runs



```
SELECT det_id,iteration,det_type,state,mode,filter,registered,use_begin,use_end FROM detRun LIMIT
40 OFFSET 0
```

# Input Detrend Exp



```
SELECT det_id,exp_tag,iteration,include FROM detInputExp WHERE det_id = '3' LIMIT 40 OFFSET 0
```

*pantasks: status*

*Scheduler is running  
Controller is running*

*Task Status*

| <i>AV Name</i>                    | <i>Njobs</i> | <i>Ngood</i> | <i>Nfail</i> | <i>Ntime</i> | <i>Command</i>                   |
|-----------------------------------|--------------|--------------|--------------|--------------|----------------------------------|
| <i>++ register.imfile.load</i>    | <i>249</i>   | <i>249</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.imfile.run</i>     | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_imfile.pl</i>        |
| <i>++ register.exp.load</i>       | <i>258</i>   | <i>258</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.exp.run</i>        | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_exp.pl</i>           |
| <i>++ dettool.process.load</i>    | <i>212</i>   | <i>212</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.process.run</i>     | <i>30</i>    | <i>30</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_imfile.pl</i> |
| <i>++ dettool.processexp.load</i> | <i>216</i>   | <i>216</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.processexp.run</i>  | <i>30</i>    | <i>30</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_exp.pl</i>    |
| <i>++ dettool.stack.load</i>      | <i>210</i>   | <i>210</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.stack.run</i>       | <i>2</i>     | <i>2</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_stack.pl</i>          |
| <i>++ dettool.normstat.load</i>   | <i>201</i>   | <i>201</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normstat.run</i>    | <i>2</i>     | <i>2</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_calc.pl</i>      |
| <i>++ dettool.norm.load</i>       | <i>216</i>   | <i>216</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.norm.run</i>        | <i>2</i>     | <i>2</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_apply.pl</i>     |
| <i>++ dettool.normexp.load</i>    | <i>210</i>   | <i>210</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normexp.run</i>     | <i>2</i>     | <i>2</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_exp.pl</i>       |
| <i>++ dettool.resid.load</i>      | <i>202</i>   | <i>202</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.resid.run</i>       | <i>30</i>    | <i>30</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_resid.pl</i>          |
| <i>++ dettool.residexp.load</i>   | <i>209</i>   | <i>209</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.residexp.run</i>    | <i>30</i>    | <i>30</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_reject_imfile.pl</i>  |
| <i>++ dettool.reject.load</i>     | <i>207</i>   | <i>207</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.reject.run</i>      | <i>2</i>     | <i>2</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_reject_exp.pl</i>     |

*no defined jobs*

```
pantasks: run
```

```
pantasks: status
```

```
Scheduler is stopped, harvesting jobs  
Controller is running
```

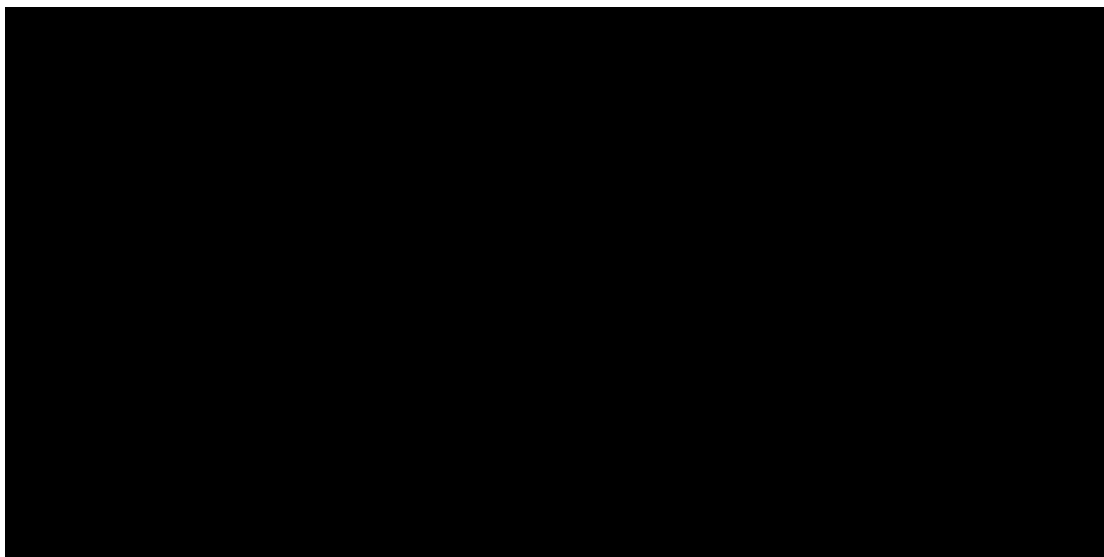
#### Task Status

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | 296   | 296   | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | 307   | 307   | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | 256   | 256   | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 40    | 40    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | 258   | 258   | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 40    | 40    | 0     | 0     | detrend_process_exp.pl    |
| ++ dettool.stack.load      | 252   | 252   | 0     | 0     | dettool                   |
| ++ dettool.stack.run       | 3     | 3     | 0     | 0     | detrend_stack.pl          |
| ++ dettool.normstat.load   | 248   | 248   | 0     | 0     | dettool                   |
| ++ dettool.normstat.run    | 3     | 3     | 0     | 0     | detrend_norm_calc.pl      |
| ++ dettool.norm.load       | 264   | 264   | 0     | 0     | dettool                   |
| ++ dettool.norm.run        | 3     | 3     | 0     | 0     | detrend_norm_apply.pl     |
| ++ dettool.normexp.load    | 258   | 258   | 0     | 0     | dettool                   |
| ++ dettool.normexp.run     | 3     | 3     | 0     | 0     | detrend_norm_exp.pl       |
| ++ dettool.resid.load      | 248   | 248   | 0     | 0     | dettool                   |
| ++ dettool.resid.run       | 40    | 40    | 0     | 0     | detrend_resid.pl          |
| ++ dettool.residexp.load   | 254   | 254   | 0     | 0     | dettool                   |
| ++ dettool.residexp.run    | 40    | 40    | 0     | 0     | detrend_reject_imfile.pl  |
| ++ dettool.reject.load     | 255   | 255   | 0     | 0     | dettool                   |
| ++ dettool.reject.run      | 3     | 3     | 0     | 0     | detrend_reject_exp.pl     |

```
pantasks: stop
```

```
-rw-r--r-- 1 MyName users 4201920 11:59:02 ./mkshutter.0/shutter.00.61/shutter.00.61.detresid.3.0.fits  
-rw-r--r-- 1 MyName users 8640 11:59:02 ./mkshutter.0/shutter.00.61/shutter.00.61.detresid.3.0.b2.fits  
-rw-r--r-- 1 MyName users 72000 11:59:02 ./mkshutter.0/shutter.00.61/shutter.00.61.detresid.3.0.b1.fits  
-rw-r--r-- 1 MyName users 1473 11:59:04 ./mkshutter.0/shutter.00.61/detresid.3.0.fpa.log  
-rw-r--r-- 1 MyName users 630 11:59:12 ./mkshutter.0/shutter.00.61/shutter.00.61.detresid.3.0.b2.jpg  
-rw-r--r-- 1 MyName users 3041 11:59:12 ./mkshutter.0/shutter.00.61/shutter.00.61.detresid.3.0.b1.jpg  
-rw-r--r-- 1 MyName users 3826 11:59:14 ./mkshutter.0/shutter.00.61/detresid.3.0.log  
.....  
-rw-r--r-- 1 MyName users 4201920 11:59:33 ./mkshutter.0/shutter.09.70/shutter.09.70.detresid.3.0.fits  
-rw-r--r-- 1 MyName users 8640 11:59:33 ./mkshutter.0/shutter.09.70/shutter.09.70.detresid.3.0.b2.fits  
-rw-r--r-- 1 MyName users 72000 11:59:33 ./mkshutter.0/shutter.09.70/shutter.09.70.detresid.3.0.b1.fits  
-rw-r--r-- 1 MyName users 1473 11:59:35 ./mkshutter.0/shutter.09.70/detresid.3.0.fpa.log  
-rw-r--r-- 1 MyName users 630 11:59:46 ./mkshutter.0/shutter.09.70/shutter.09.70.detresid.3.0.b2.jpg  
-rw-r--r-- 1 MyName users 3090 11:59:46 ./mkshutter.0/shutter.09.70/shutter.09.70.detresid.3.0.b1.jpg  
-rw-r--r-- 1 MyName users 3825 11:59:48 ./mkshutter.0/shutter.09.70/detresid.3.0.log  
  
-rw-r--r-- 1 MyName users 9528 12:00:09 ./mkshutter.0/SIMTEST.shutter.3/reject.3.0.log
```

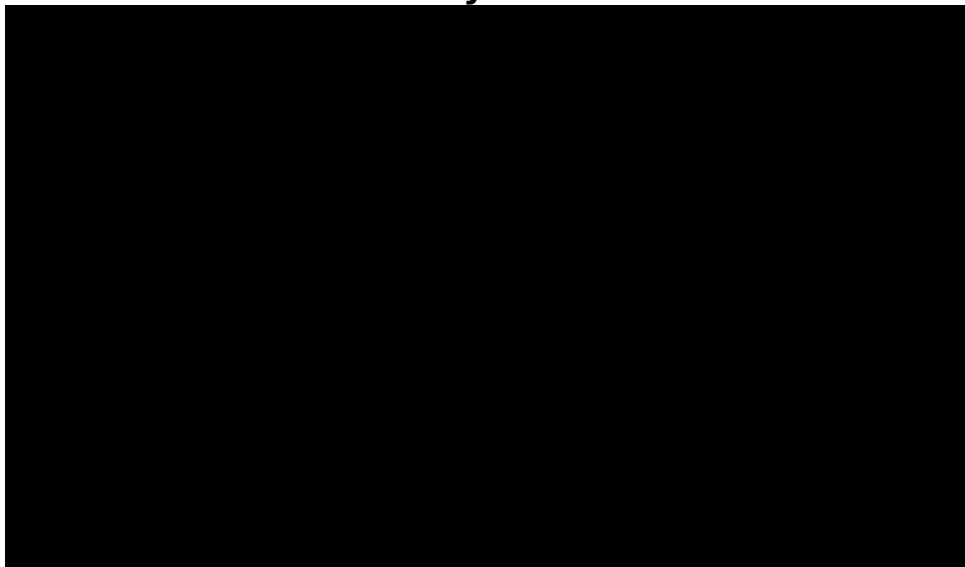
## Master Detrend Frames





```
SELECT detRunSummary.det_id,detRunSummary.iteration,detRun.det_type,detRunSummary.bg,  
detRunSummary.bg_stdev FROM detRunSummary, detRun WHERE detRunSummary.accept = 1 AND detRun.det_id  
= detRunSummary.det_id AND detRun.iteration = detRunSummary.iteration LIMIT 40 OFFSET 0
```

## Detrend Iterations: detRunSummary



```
SELECT det_id,iteration,accept,bg,bg_stdev FROM detRunSummary LIMIT 40 OFFSET 0
```

## 8) FLAT

```
pantasks: exec dettool -definebyquery -inst SIMTEST -filter V -det_type  
flat -select_exp_type flat -select_filter V -workdir  
path://SIMTEST/mkflat.1 -dbname MyDataBase
```

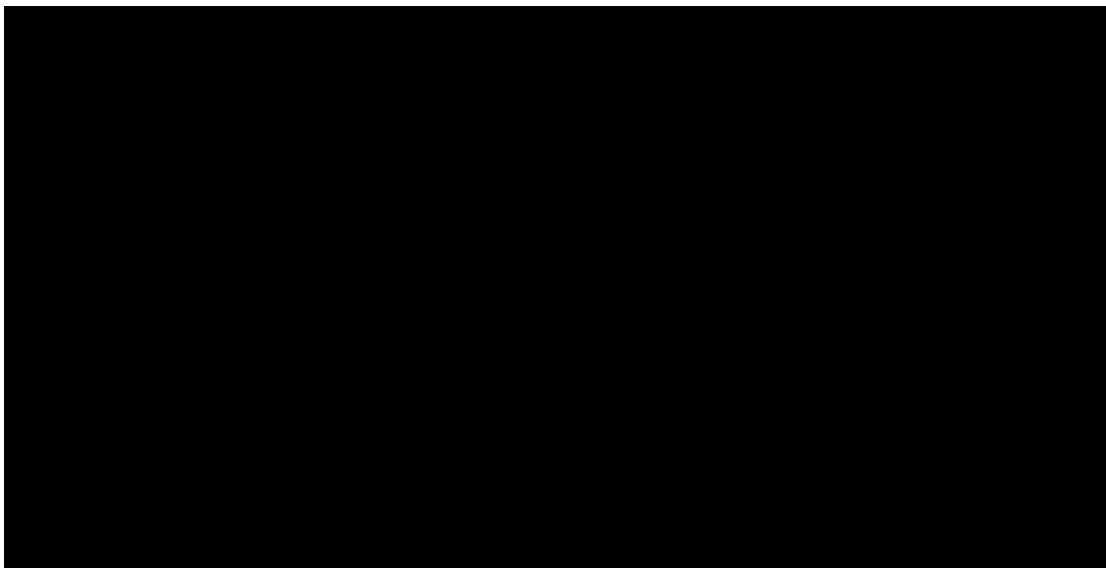
```
detRun MULTI
```

```
detRun METADATA
```

|              |     |                         |
|--------------|-----|-------------------------|
| det_id       | STR | 4                       |
| iteration    | S32 | 0                       |
| det_type     | STR | flat                    |
| mode         | STR | master                  |
| state        | STR | run                     |
| workdir      | STR | path://SIMTEST/mkflat.1 |
| camera       | STR | SIMTEST                 |
| telescope    | STR | NULL                    |
| exp_type     | STR | NA                      |
| filter       | STR | V                       |
| airmass_min  | F32 | 0                       |
| airmass_max  | F32 | 0                       |
| exp_time_min | F32 | 0                       |
| exp_time_max | F32 | 0                       |
| ccd_temp_min | F32 | 0                       |
| ccd_temp_max | F32 | 0                       |
| posang_min   | F64 | 2.99945325490322e-269   |
| posang_max   | F64 | 2.99954568085527e-269   |
| registered   | TAI | 2007-03-13T22:01:53Z    |
| time_begin   | TAI | NULL                    |
| time_end     | TAI | NULL                    |
| use_begin    | TAI | NULL                    |
| use_end      | TAI | NULL                    |
| solang_min   | F32 | 0                       |
| solang_max   | F32 | 0                       |
| label        | STR | NULL                    |
| parent       | S32 | 0                       |

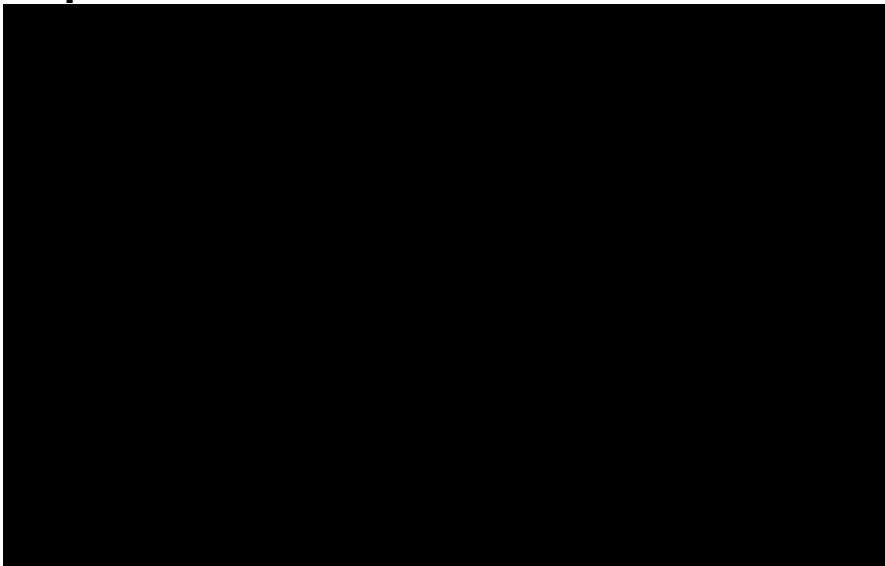
```
END
```

## Detrend Runs



```
SELECT det_id,iteration,det_type,state,mode,filter,registered,use_begin,use_end FROM detRun LIMIT  
40 OFFSET 0
```

## Input Detrend Exp



```
SELECT det_id,exp_tag,iteration,include FROM detInputExp WHERE det_id = '4' LIMIT 40 OFFSET 0
```

### *pantasks: status*

| <i>Task Status</i>                |              |              |              |              |                                  |
|-----------------------------------|--------------|--------------|--------------|--------------|----------------------------------|
| <i>AV Name</i>                    | <i>Njobs</i> | <i>Ngood</i> | <i>Nfail</i> | <i>Ntime</i> | <i>Command</i>                   |
| <i>++ register.imfile.load</i>    | <i>296</i>   | <i>296</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.imfile.run</i>     | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_imfile.pl</i>        |
| <i>++ register.exp.load</i>       | <i>307</i>   | <i>307</i>   | <i>0</i>     | <i>0</i>     | <i>regtool</i>                   |
| <i>++ register.exp.run</i>        | <i>70</i>    | <i>70</i>    | <i>0</i>     | <i>0</i>     | <i>register_exp.pl</i>           |
| <i>++ dettool.process.load</i>    | <i>256</i>   | <i>256</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.process.run</i>     | <i>40</i>    | <i>40</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_imfile.pl</i> |
| <i>++ dettool.processexp.load</i> | <i>258</i>   | <i>258</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.processexp.run</i>  | <i>40</i>    | <i>40</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_process_exp.pl</i>    |
| <i>++ dettool.stack.load</i>      | <i>252</i>   | <i>252</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.stack.run</i>       | <i>3</i>     | <i>3</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_stack.pl</i>          |
| <i>++ dettool.normstat.load</i>   | <i>248</i>   | <i>248</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normstat.run</i>    | <i>3</i>     | <i>3</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_calc.pl</i>      |
| <i>++ dettool.norm.load</i>       | <i>264</i>   | <i>264</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.norm.run</i>        | <i>3</i>     | <i>3</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_apply.pl</i>     |
| <i>++ dettool.normexp.load</i>    | <i>258</i>   | <i>258</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.normexp.run</i>     | <i>3</i>     | <i>3</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_norm_exp.pl</i>       |
| <i>++ dettool.resid.load</i>      | <i>248</i>   | <i>248</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.resid.run</i>       | <i>40</i>    | <i>40</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_resid.pl</i>          |
| <i>++ dettool.residexp.load</i>   | <i>254</i>   | <i>254</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.residexp.run</i>    | <i>40</i>    | <i>40</i>    | <i>0</i>     | <i>0</i>     | <i>detrend_reject_imfile.pl</i>  |
| <i>++ dettool.reject.load</i>     | <i>255</i>   | <i>255</i>   | <i>0</i>     | <i>0</i>     | <i>dettool</i>                   |
| <i>++ dettool.reject.run</i>      | <i>3</i>     | <i>3</i>     | <i>0</i>     | <i>0</i>     | <i>detrend_reject_exp.pl</i>     |

```
pantasks: run
pantasks: status
```

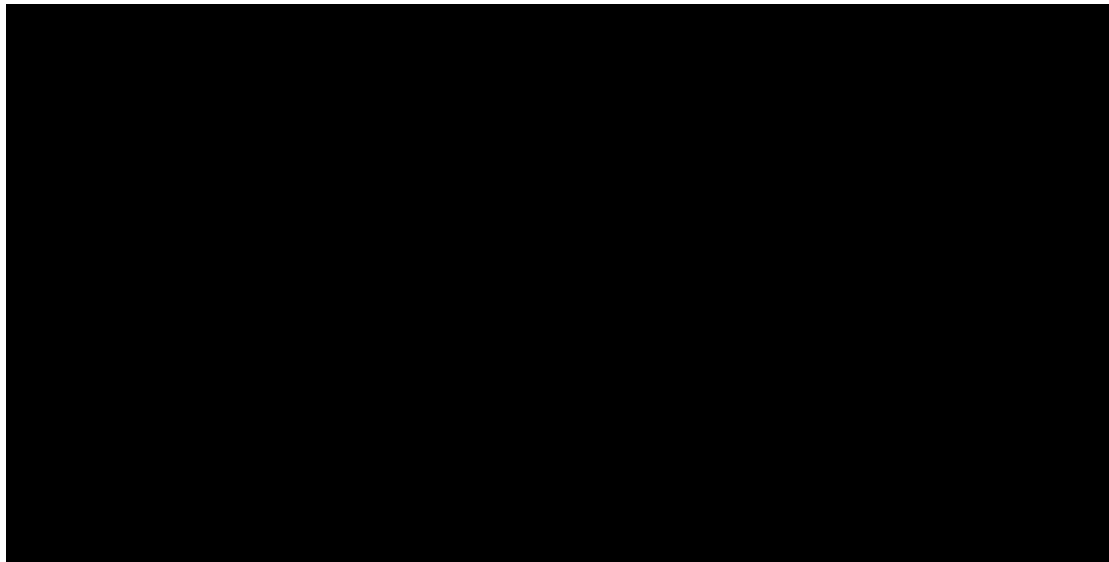
#### Task Status

| AV Name                    | Njobs | Ngood | Nfail | Ntime | Command                   |
|----------------------------|-------|-------|-------|-------|---------------------------|
| ++ register.imfile.load    | 366   | 366   | 0     | 0     | regtool                   |
| ++ register.imfile.run     | 70    | 70    | 0     | 0     | register_imfile.pl        |
| ++ register.exp.load       | 380   | 379   | 0     | 0     | regtool                   |
| ++ register.exp.run        | 70    | 70    | 0     | 0     | register_exp.pl           |
| ++ dettool.process.load    | 324   | 323   | 0     | 0     | dettool                   |
| ++ dettool.process.run     | 50    | 50    | 0     | 0     | detrend_process_imfile.pl |
| ++ dettool.processexp.load | 329   | 328   | 0     | 0     | dettool                   |
| ++ dettool.processexp.run  | 50    | 50    | 0     | 0     | detrend_process_exp.pl    |
| ++ dettool.stack.load      | 322   | 321   | 0     | 0     | dettool                   |
| ++ dettool.stack.run       | 4     | 4     | 0     | 0     | detrend_stack.pl          |
| ++ dettool.normstat.load   | 320   | 319   | 0     | 0     | dettool                   |
| ++ dettool.normstat.run    | 4     | 4     | 0     | 0     | detrend_norm_calc.pl      |
| ++ dettool.norm.load       | 331   | 330   | 0     | 0     | dettool                   |
| ++ dettool.norm.run        | 4     | 4     | 0     | 0     | detrend_norm_apply.pl     |
| ++ dettool.normexp.load    | 328   | 327   | 0     | 0     | dettool                   |
| ++ dettool.normexp.run     | 4     | 4     | 0     | 0     | detrend_norm_exp.pl       |
| ++ dettool.resid.load      | 313   | 312   | 0     | 0     | dettool                   |
| ++ dettool.resid.run       | 50    | 50    | 0     | 0     | detrend_resid.pl          |
| ++ dettool.residexp.load   | 323   | 322   | 0     | 0     | dettool                   |
| ++ dettool.residexp.run    | 50    | 50    | 0     | 0     | detrend_reject_imfile.pl  |
| ++ dettool.reject.load     | 319   | 319   | 0     | 0     | dettool                   |
| ++ dettool.reject.run      | 4     | 4     | 0     | 0     | detrend_reject_exp.pl     |

```
pantasks: stop
```

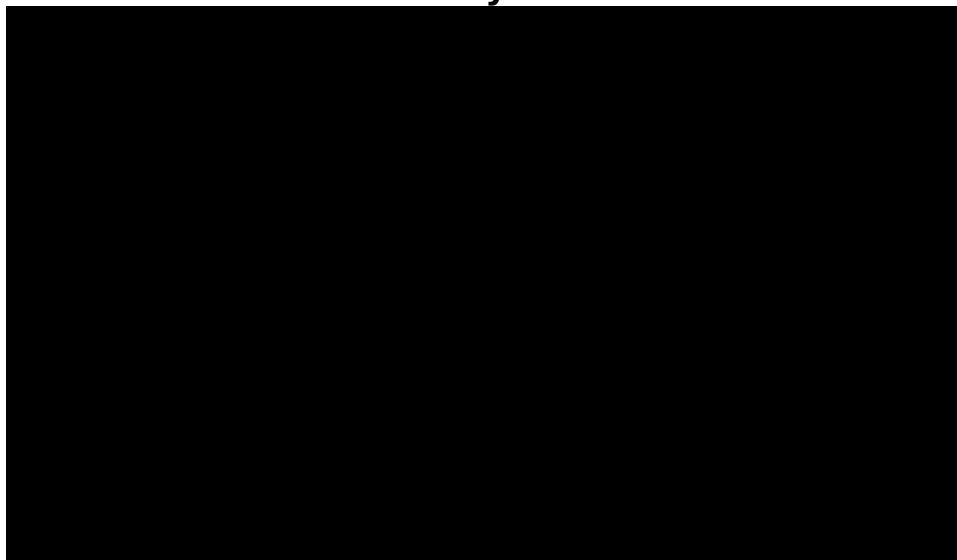
```
-rw-r--r-- 1 MyName users 4201920 12:06:24 ./mkflat.1/flat.00.31/flat.00.31.detproc.4.fits
-rw-r--r-- 1 MyName users 8640 12:06:24 ./mkflat.1/flat.00.31/flat.00.31.detproc.4.b2.fits
-rw-r--r-- 1 MyName users 72000 12:06:24 ./mkflat.1/flat.00.31/flat.00.31.detproc.4.b1.fits
-rw-r--r-- 1 MyName users 1629 12:06:25 ./mkflat.1/flat.00.31/detproc.4.fpa.log
-rw-r--r-- 1 MyName users 630 12:06:42 ./mkflat.1/flat.00.31/flat.00.31.detproc.4.b2.jpg
-rw-r--r-- 1 MyName users 3061 12:06:42 ./mkflat.1/flat.00.31/flat.00.31.detproc.4.b1.jpg
-rw-r--r-- 1 MyName users 3337 12:06:44 ./mkflat.1/flat.00.31/detproc.4.0.log
.....
-rw-r--r-- 1 MyName users 4201920 12:07:06 ./mkflat.1/flat.09.40/flat.09.40.detproc.4.fits
-rw-r--r-- 1 MyName users 8640 12:07:06 ./mkflat.1/flat.09.40/flat.09.40.detproc.4.b2.fits
-rw-r--r-- 1 MyName users 72000 12:07:06 ./mkflat.1/flat.09.40/flat.09.40.detproc.4.b1.fits
-rw-r--r-- 1 MyName users 1629 12:07:07 ./mkflat.1/flat.09.40/detproc.4.fpa.log
-rw-r--r-- 1 MyName users 2929 12:07:23 ./mkflat.1/flat.09.40/flat.09.40.detproc.4.b1.jpg
-rw-r--r-- 1 MyName users 630 12:07:24 ./mkflat.1/flat.09.40/flat.09.40.detproc.4.b2.jpg
-rw-r--r-- 1 MyName users 3336 12:07:25 ./mkflat.1/flat.09.40/detproc.4.0.log
.....
-rw-r--r-- 1 MyName users 4201920 12:07:34 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.4.0.fpa.fits
-rw-r--r-- 1 MyName users 8108 12:07:35 ./mkflat.1/SIMTEST.flat.4/detstack.4.0.fpa.log
-rw-r--r-- 1 MyName users 4201920 12:08:00 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.norm.4.0.fits
-rw-r--r-- 1 MyName users 8640 12:08:00 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.norm.4.0.b2.fits
-rw-r--r-- 1 MyName users 72000 12:08:00 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.norm.4.0.b1.fits
-rw-r--r-- 1 MyName users 1312 12:08:02 ./mkflat.1/SIMTEST.flat.4/norm.4.0.fpa.log
-rw-r--r-- 1 MyName users 2966 12:08:08 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.norm.4.0.b1.jpg
-rw-r--r-- 1 MyName users 630 12:08:09 ./mkflat.1/SIMTEST.flat.4/SIMTEST.flat.norm.4.0.b2.jpg
-rw-r--r-- 1 MyName users 3755 12:08:11 ./mkflat.1/SIMTEST.flat.4/norm.4.0.log
.....
-rw-r--r-- 1 MyName users 4201920 12:08:09 ./mkflat.1/flat.00.31/flat.00.31.detresid.4.0.fits
-rw-r--r-- 1 MyName users 8640 12:08:09 ./mkflat.1/flat.00.31/flat.00.31.detresid.4.0.b2.fits
-rw-r--r-- 1 MyName users 72000 12:08:09 ./mkflat.1/flat.00.31/flat.00.31.detresid.4.0.b1.fits
-rw-r--r-- 1 MyName users 1521 12:08:11 ./mkflat.1/flat.00.31/detresid.4.0.fpa.log
-rw-r--r-- 1 MyName users 2988 12:08:19 ./mkflat.1/flat.00.31/flat.00.31.detresid.4.0.b1.jpg
-rw-r--r-- 1 MyName users 630 12:08:20 ./mkflat.1/flat.00.31/flat.00.31.detresid.4.0.b2.jpg
-rw-r--r-- 1 MyName users 3783 12:08:22 ./mkflat.1/flat.00.31/detresid.4.0.log
.....
-rw-r--r-- 1 MyName users 4201920 12:08:38 ./mkflat.1/flat.09.40/flat.09.40.detresid.4.0.fits
-rw-r--r-- 1 MyName users 8640 12:08:38 ./mkflat.1/flat.09.40/flat.09.40.detresid.4.0.b2.fits
-rw-r--r-- 1 MyName users 72000 12:08:38 ./mkflat.1/flat.09.40/flat.09.40.detresid.4.0.b1.fits
-rw-r--r-- 1 MyName users 1525 12:08:40 ./mkflat.1/flat.09.40/detresid.4.0.fpa.log
-rw-r--r-- 1 MyName users 2966 12:08:54 ./mkflat.1/flat.09.40/flat.09.40.detresid.4.0.b1.jpg
-rw-r--r-- 1 MyName users 630 12:08:55 ./mkflat.1/flat.09.40/flat.09.40.detresid.4.0.b2.jpg
-rw-r--r-- 1 MyName users 3792 12:08:57 ./mkflat.1/flat.09.40/detresid.4.0.log
.....
-rw-r--r-- 1 MyName users 9038 12:09:11 ./mkflat.1/SIMTEST.flat.4/reject.4.0.log
```

## Master Detrend Frames



```
SELECT detRunSummary.det_id,detRunSummary.iteration,detRun.det_type,detRunSummary.bg,  
detRunSummary.bg_stdev FROM detRunSummary, detRun WHERE detRunSummary.accept = 1 AND detRun.det_id  
= detRunSummary.det_id AND detRun.iteration = detRunSummary.iteration LIMIT 40 OFFSET 0
```

## Detrend Iterations: det Run Summary



```
SELECT det_id,iteration,accept,bg,bg_stdev FROM detRunSummary LIMIT 40 OFFSET 0
```

## 9) CHIP - FORMER PHASE 2

### Raw science exposures:

```
SELECT exp_tag,telescope,camera,exp_type,filter,ra,decl,object,airmass,exp_time,bg,bg_stdev FROM
rawExp WHERE rawExp.exp_type = 'OBJECT' LIMIT 40 OFFSET 0
```

### emacs ipconfig/simtest/pplImage.config

```
# Overscan, bias, dark, shutter, flat-field, fringe, photom, astrom
PPIMAGE_OBDSFRA METADATA
OVERSCAN      BOOL      FALSE      # Overscan subtraction
BIAS          BOOL      TRUE       # Bias subtraction
DARK          BOOL      TRUE       # Dark subtraction
SHUTTER       BOOL      TRUE       # Shutter correction
FLAT          BOOL      TRUE       # Flat-field normalisation
MASK          BOOL      FALSE      # Mask bad pixels
FRINGE        BOOL      FALSE      # Fringe subtraction
PHOTOM        BOOL      FALSE      # Source identification and photometry
ASTROM.CHIP   BOOL      FALSE      # Astrometry per chip?
ASTROM.MOSAIC BOOL      FALSE      # Astrometry for mosaic?
END
```

```
pantasks: module chip.pro
pantasks: status
```

```
Task Status
AV Name          Njobs  Ngood  Nfail  Ntime  Command
++ register.imfile.load    367    367    0      0  regtool
++ register.imfile.run     70     70    0      0  register_imfile.pl
++ register.exp.load      381    381    0      0  regtool
++ register.exp.run       70     70    0      0  register_exp.pl
++ dettool.process.load   325    325    0      0  dettool
++ dettool.process.run    50     50    0      0  detrend_process_imfile.pl
++ dettool.processexp.load 329    329    0      0  dettool
++ dettool.processexp.run  50     50    0      0  detrend_process_exp.pl
++ dettool.stack.load    322    322    0      0  dettool
++ dettool.stack.run      4      4     0      0  detrend_stack.pl
++ dettool.normstat.load  320    320    0      0  dettool
++ dettool.normstat.run   4      4     0      0  detrend_norm_calc.pl
++ dettool.norm.load     331    331    0      0  dettool
++ dettool.norm.run       4      4     0      0  detrend_norm_apply.pl
++ dettool.normexp.load  328    328    0      0  dettool
++ dettool.normexp.run    4      4     0      0  detrend_norm_exp.pl
++ dettool.resid.load     313    313    0      0  dettool
++ dettool.resid.run      50     50    0      0  detrend_resid.pl
++ dettool.residexp.load  323    323    0      0  dettool
++ dettool.residexp.run   50     50    0      0  detrend_reject_imfile.pl
++ dettool.reject.load    320    320    0      0  dettool
++ dettool.reject.run     4      4     0      0  detrend_reject_exp.pl
++ chip.imfile.load       0      0     0      0  (dynamic)
++ chip.imfile.run        0      0     0      0  (dynamic)
```

```
pantasks: run
pantasks: status
```

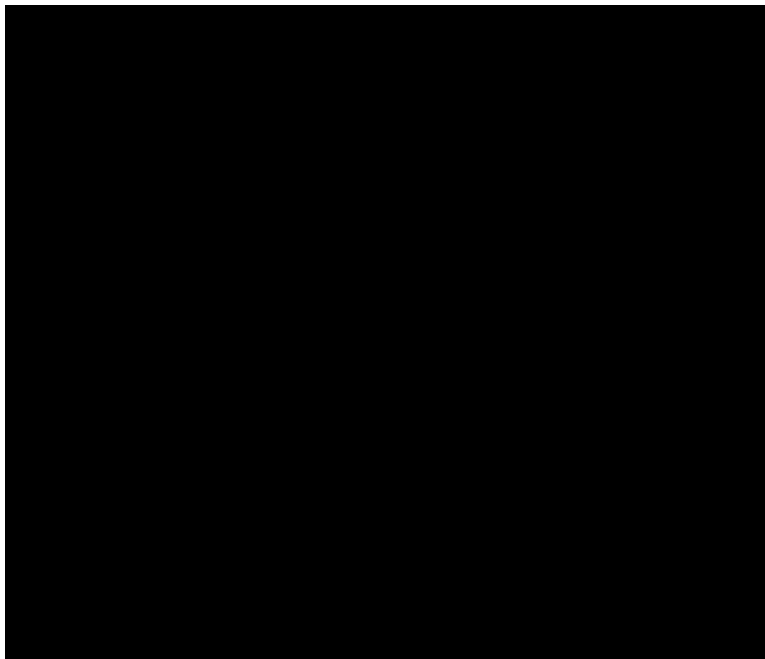
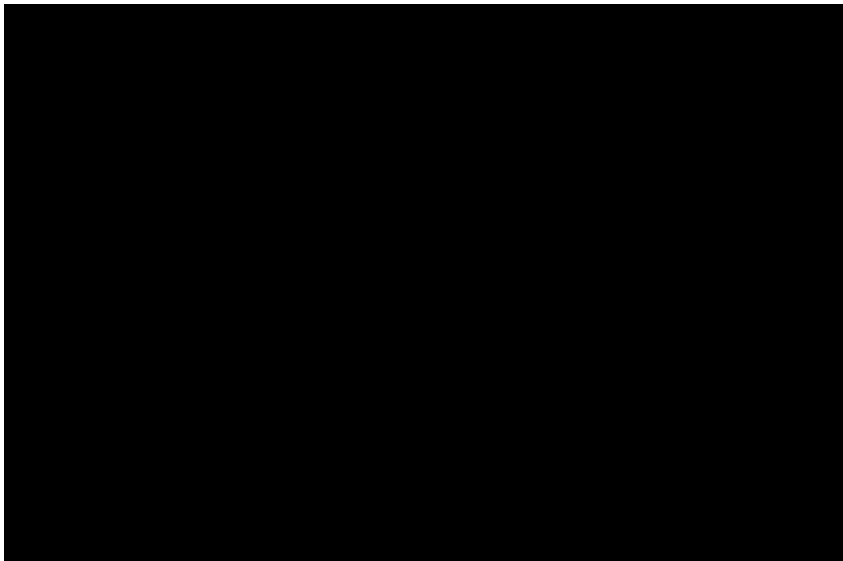
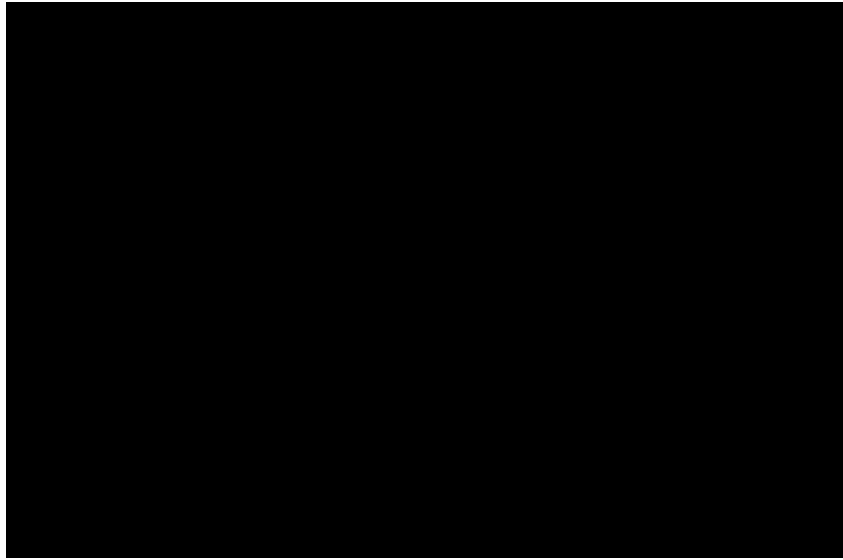
```
Task Status
AV Name          Njobs  Ngood  Nfail  Ntime  Command
++ register.imfile.load   393    393    0      0  regtool
++ register.imfile.run    70     70    0      0  register_imfile.pl
++ register.exp.load     408    408    0      0  regtool
++ register.exp.run      70     70    0      0  register_exp.pl
++ dettool.process.load   352    352    0      0  dettool
++ dettool.process.run    50     50    0      0  detrend_process_imfile.pl
++ dettool.processexp.load 354    354    0      0  dettool
++ dettool.processexp.run  50     50    0      0  detrend_process_exp.pl
++ dettool.stack.load    344    344    0      0  dettool
++ dettool.stack.run      4      4     0      0  detrend_stack.pl
++ dettool.normstat.load  342    342    0      0  dettool
++ dettool.normstat.run   4      4     0      0  detrend_norm_calc.pl
++ dettool.norm.load     356    356    0      0  dettool
++ dettool.norm.run       4      4     0      0  detrend_norm_apply.pl
++ dettool.normexp.load  353    353    0      0  dettool
++ dettool.normexp.run    4      4     0      0  detrend_norm_exp.pl
++ dettool.resid.load     335    335    0      0  dettool
++ dettool.resid.run      50     50    0      0  detrend_resid.pl
++ dettool.residexp.load  346    346    0      0  dettool
++ dettool.residexp.run   50     50    0      0  detrend_reject_imfile.pl
++ dettool.reject.load    345    345    0      0  dettool
++ dettool.reject.run     4      4     0      0  detrend_reject_exp.pl
++ chip.imfile.load       25     25    0      0  chiptool
++ chip.imfile.run        5      5     0      0  chip_imfile.pl
```

```
pantasks: stop
```

```
-rw-r--r-- 1 MyName users      0 12:18:49 ./chip/chip.imfile.log
-rw-r--r-- 1 MyName users 4201920 12:19:02 ./proc/obj.00.51/obj.00.51.chip.fits
-rw-r--r-- 1 MyName users   8640 12:19:02 ./proc/obj.00.51/obj.00.51.chip.b2.fits
-rw-r--r-- 1 MyName users  72000 12:19:02 ./proc/obj.00.51/obj.00.51.chip.b1.fits
```

```
-rw-r--r-- 1 MyName users    1916 12:19:05 ./proc/obj.00.51/chip.fpa.log
.....
-rw-r--r-- 1 MyName users 4201920 12:19:19 ./proc/obj.04.55/obj.04.55.chip.fits
-rw-r--r-- 1 MyName users    8640 12:19:19 ./proc/obj.04.55/obj.04.55.chip.b2.fits
-rw-r--r-- 1 MyName users    72000 12:19:19 ./proc/obj.04.55/obj.04.55.chip.b1.fits
-rw-r--r-- 1 MyName users    1916 12:19:21 ./proc/obj.04.55/chip.fpa.log
```





### III) PHASE DIFFERENCES

#### ***P1 Processing Exp:***

Guide stars...., analysis of guide cells (stars), drift of the centroid, guide kernel  
rough astrometry of guide stars (Hipparcos Tycho Cat)

#### ***P2: single file***

#### ***P3: multiple file***

complete mosaic analysis

since different ways to represent the data, e.g. MEGACAM (all detectors and amp in single file),  
GPC (multiple files 60 to 64 files)

## IV) DVO:

### **dvo (desktop virtual observatory)**

... is a way of representing objects, track relationships between objects found and images....

... does only queries

... uses the Ophi command-line interpreter used as the front-end

(see <http://kiawe.ifa.hawaii.edu/Elixir/Ohana/Ophi-Programs/>)

... is a macro language

... uses the same language as pantasks

### **1) COPYING THE CONFIGURATION FILE**

```
cp ~ipp/psconfig/share/ippconfig/dvo.site ~/.ptolemyrc
```

```
more ~/.ptolemyrc
```

```
.....
CONFDIR                /home/panstarrs/ipp/psconfig/share/ippconfig
.....
PHOTCODE_FILE          $CONFDIR/dvo.photcodes
GSCFILE                 $CONFDIR/GSCregions.tbl
.....
```

### **2) CONFIGURATION TABLE**

The Configuration table provides different methods to ask for magnitude based on different calibrations.

It contains the list of valid photometry codes.

```
more ~ipp/psconfig/share/ippconfig/dvo.photcodes
```

| #           | code | name | type | zero | airmass | offset | c1   | c2   | slope | <color> |
|-------------|------|------|------|------|---------|--------|------|------|-------|---------|
| equivalence |      |      |      |      |         |        |      |      |       |         |
| 1           | g    |      | pri  | 0.0  | -       | -      | 1003 | 1004 | 0.016 | - 1050  |
| 2           | r    |      | sec  | 0.0  | -       | -      | 1003 | 1004 | 0.008 | - 1050  |
| 3           | i    |      | sec  | 0.0  | -       | -      | 1003 | 1004 | 0.028 | - 1050  |
| 4           | z    |      | sec  | 0.0  | -       | -      | 1003 | 1004 | 0.107 | - 1050  |
| 5           | y    |      | sec  | 0.0  | -       | -      | -    | -    | -     | - 1050  |

There should be one **code** for each combination of CCD, filter, and telescope (and possibly additional ones if filter transmission reduces with time).

The code on each line is a unique number, while the **name** is a representative name.

The **type** defines how the photometry is treated.

There can only be one **primary** photocode.

There should only be a few **secondary** photocodes: these are the calibrated values for stars.

The dependent photocodes are those which are equivalent to a primary or secondary photocode, and are equated after photometric solutions: c1,c2, slope

Reference photocodes are for anything without a dynamic solution: the reference values are provided externally.

e.g. specific measurements for MEGACAM photocodes:

| #           | code         | name | type | zero   | airmass | offset | c1 | c2 | slope | <color> |
|-------------|--------------|------|------|--------|---------|--------|----|----|-------|---------|
| equivalence |              |      |      |        |         |        |    |    |       |         |
| 100         | MEGACAM.u.00 | dep  | dep  | 25.280 | -0.35   | -      | -  | -  | -     | 1       |

*zero* is a nominal ZP, but ZP can change over time, IPP uses a time dependent "offset ZP"

### 3) STARTING DVO:

```
dvo
no file /home/panstarrs/MyName/.dvorc

Welcome to DVO - desktop virtual observatory

dvo: exit
```

### 4) LOADING CATALOGUE

refer to different databases:

```
dvo: catdir
USAGE: catdir (name)
      (name) may be a path or 'default'
      current: default
dvo: catdir /data/alala.0/ipp/ippRefs/catdir.merge
```

database directory contains subdirectories with files with multiple fits tables:

```
dvo: !ls /data/alala.0/ipp/ippRefs/catdir.merge
Images.dat      n0000  n1500  n3000  n4500  n6000  n7500  s0000  s1500  s3000  s4500  s6000  s7500
SkyTable.fits  n0730  n2230  n3730  n5230  n6730  n8230  s0730  s2230  s3730  s5230  s6730  s8230
dvo: !ls /data/alala.0/ipp/ippRefs/catdir.merge/n0000/0001.cpt
dvo: !ls /data/alala.0/ipp/ippRefs/catdir.merge/SkyTable.fits
```

### 5) VECTOR SPAN

```
dvo: create x 0 1000
dvo: create x 0 1000 0.1
dvo: vectors
      N      name      size
      0      x        10000
dvo: echo x[99]
9.90000057
```

### 6) PLOTTING SOME DATA

```
dvo: region 0 0 90 sin
0 0 center of field (x and y)
90 radius in viewport
projections: sin ait tan gls par
dvo: cgrid
      current style (0): -x 0 -c black -pt 0 -lt 0 -lw 1.000000 -sz 1.000000
dvo: region 0 0 90 ait; cgrid

dvo: region 0 0 0.5 tan; cgrid
dvo: pmeasure -all -m 10 15

dvo: help style

      style -- many options

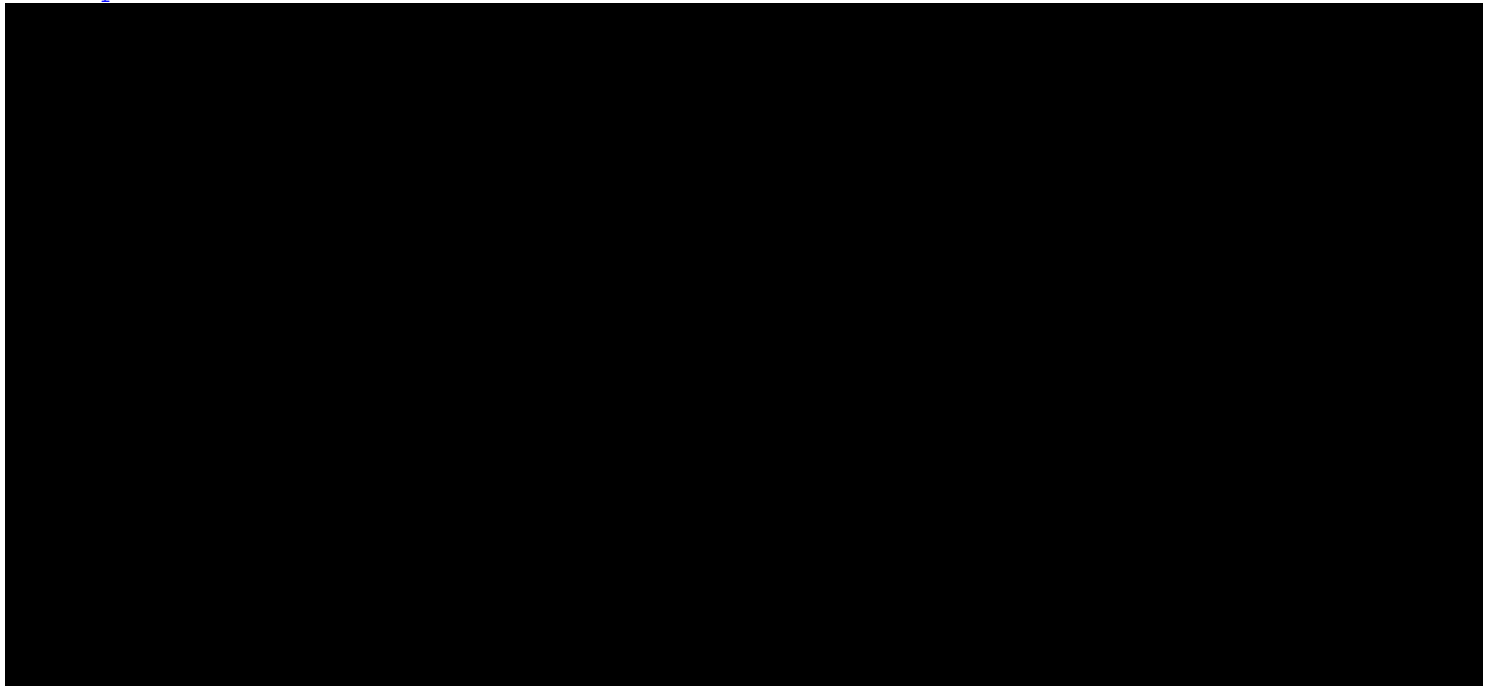
      define or check the Kapa plotting style.  without any command-line arguments,
      style prints the current style.
```

option definitions:

```
-n window number (0-4), can also be used to change active window.
-pt point style:
    0 = filled box
    1 = open box
    2 = +
    3 = X
    4 = filled triangle
    5 = blank
    6 = open triangle
    7 = open circle
    100 = connect pair of points
-x plotting method:
    0 = connect
    1 = histogram
    2 = points
-lt line type:
    0 = solid
    1 = dashed
    2 = dotted??
-lw line weight (0-10)
-sz point size
-c color:
    black, white, red, orange,
    yellow, green, blue, indigo, violet
-eb errorbar with no top
+eb errorbar with top
```

See also: plot, box

```
dvo: style -pt 7
dvo: clear
dvo: pmeasure -all -m 10 15
```



shows one dot for every measurements

```
dvo: region 0 4 0.1 tan; cgrid
current style (0): -x 0 -c black -pt 7 -lt 0 -lw 1.000000 -sz 1.000000
dvo: clear; pmeasure -all -m 10 12
dvo: clear; pmeasure -all -m 10 13
dvo: clear; pmeasure -all -m 10 14
dvo: clear; pmeasure -all -m 10 15
```

```
dvo: clear; pmeasure -all -m 10 16
```

navigate through in graphical way:

```
dvo: module navigate
```

```
dvo: $MAG = 14
```

```
dvo: $dMAG = 2
```

```
dvo: $RAD = 0.2
```

```
dvo: navigate
```

```
current style (0): -x 0 -c black -pt 7 -lt 0 -lw 1.000000 -sz 1.000000  
limits: -0.191667 0.191667 -0.100000 0.100000 [-a] [-n Xgraph]
```

```
'm' measure
```

```
m 0.059259 -0.018519
```

```
mag, dmag: 14, 2
```

```
star: 6685
```

```
359.94040 3.98149 5 of 5 0.0 0
```

```
g r i z y
```

```
-1.000 -1.000 -1.000 -1.000 -1.000
```

```
-1.000 -1.000 -1.000 -1.000 -1.000
```

```
NaN NaN NaN NaN NaN
```

```
13.232 13.232 0.026 2000/08/29,06:55:52 -0.05 0.10 0 0 2011 2MASS_J
```

```
12.541 12.541 0.024 2000/08/29,06:55:52 -0.05 0.10 0 0 2012 2MASS_H
```

```
12.371 12.371 0.026 2000/08/29,06:55:52 -0.05 0.10 0 0 2013 2MASS_K
```

```
17.284 17.284 0.043 2000/01/01,00:00:00 0.10 -0.18 0 0 1000 USNO_BLUE
```

```
15.239 15.239 0.043 2000/01/01,00:00:00 0.10 -0.18 0 0 1001 USNO_RED
```

```
m 0.007778 -0.034074
```

```
mag, dmag: 14, 2
```

```
star: 6693
```

```
359.99188 3.96622 5 of 5 0.0 0
```

```
g r i z y
```

```
-1.000 -1.000 -1.000 -1.000 -1.000
```

```
-1.000 -1.000 -1.000 -1.000 -1.000
```

```
NaN NaN NaN NaN NaN
```

```
13.229 13.229 0.025 2000/08/29,06:55:52 -0.09 0.09 0 0 2011 2MASS_J
```

```
12.699 12.699 0.027 2000/08/29,06:55:52 -0.09 0.09 0 0 2012 2MASS_H
```

```
12.569 12.569 0.024 2000/08/29,06:55:52 -0.09 0.09 0 0 2013 2MASS_K
```

```
16.239 16.239 0.043 2000/01/01,00:00:00 0.14 -0.14 0 0 1000 USNO_BLUE
```

```
14.649 14.649 0.043 2000/01/01,00:00:00 0.10 -0.14 0 0 1001 USNO_RED
```

```
'h' help
```

```
Arrow Keys - pan in that direction
```

```
PgUp,PgDn - zoom in/out a factor of 1.2
```

```
Home,End - zoom in/out a factor of 2
```

```
1 - zoom in factor of 2 at the cursor
```

```
2 - zoom in factor of 1.2 at the cursor
```

```
3 - recenter at cursor
```

```
4 - zoom out factor of 1.2 at the cursor
```

```
5 - zoom out factor of 2 at the cursor
```

```
6 - zoom out factor of 10 at the cursor
```

```
z - zoom to radius (requires 2nd keystroke)
```

```
f - show full sky
```

```
q - quit
```

```
S - toggle auto-plotting of stars
```

```
A - toggle auto-plotting of image borders
```

```
g - toggle skygrid on/off
```

```
c - plot status catalog boundaries
```

```
C - list catalog at cursor location
```

```
i - list info about images touching cursor location
```

```
I - list info about images, with pixel coords of cursor position
```

```
j - adjust mag scale, +0.5
```

```
k - adjust mag scale, -0.5
```

```
J - adjust dmag scale, /1.25
```

```
K - adjust dmag scale, *1.25
```

```
r - plot detected asteroids (rocks)
```

```
l - plot HST GSC
```

```
L - plot Landolt stars
```

```
m - list measurements for stars within 1 pixel of cursor
```

```
M - list measurements for stars within 1.8 arcsec of cursor
```

```

p - ****(don't know what this does)
s - ****(don't know what this does)
t - plot light curve for star within 2 arcsec of cursor position
T - plot 'galaxy' light curve for star within 2 arcsec of cursor position
u - ****(don't know what this does)
x - plot stars scaled by magnitude Chisq
X - plot stars by magnitude scatter
y - ****(don't know what this does)
@ - execute macro `user_macro`
: - ****input a line and execute (not yet implemented)
'x' eXit

```

## 7) EXTRACT SOME DATA:

3 different commands

`dvo: mextract`

```

USAGE: mextract (value) [options]
value: measure.parameter or photcode

```

`dvo: avextract`

```

USAGE: avextract (value) [options]
value: average.parameter or photcode

```

`dvo: imextract`

```

USAGE: imextract (value) [-region] [-time start range] [-photcode photcode]

```

extracting a vector:

`dvo: region 0 4 2 tan;`

`dvo: mextract ra`

`dvo: vectors`

| N | name | size    |
|---|------|---------|
| 4 | ra   | 2032114 |

`dvo: region 0 4 1 tan;`

`dvo: mextract ra`

`dvo: vectors`

| N | name | size   |
|---|------|--------|
| 4 | ra   | 760253 |

`dvo: region 0 4 0.1 tan;`

`dvo: mextract ra`

`dvo: vectors`

| N | name | size   |
|---|------|--------|
| 4 | ra   | 274090 |

`dvo: region 0 0 0.1`

`dvo: mextract ra`

`dvo: mextract dec`

`dvo: mextract time`

`dvo: mextract mag`

`dvo: vectors`

| N | name | size   |
|---|------|--------|
| 1 | time | 532530 |
| 4 | ra   | 532530 |
| 5 | dec  | 532530 |
| 6 | mag  | 532530 |

case sensitive (e.g. to get average RA)

```
dvo: avextract RA
```

```
dvo: vectors
```

| <i>N</i> | <i>name</i> | <i>size</i> |
|----------|-------------|-------------|
| 1        | time        | 532530      |
| 4        | ra          | 532530      |
| 5        | dec         | 532530      |
| 6        | mag         | 532530      |
| 7        | RA          | 194432      |

different magnitudes:

```
dvo: mextract mag:inst
```

```
dvo: mextract mag:cat
```

```
dvo: mextract mag:rel
```

```
dvo: vectors
```

| <i>N</i> | <i>name</i> | <i>size</i> |
|----------|-------------|-------------|
| 1        | time        | 532530      |
| 4        | ra          | 532530      |
| 5        | dec         | 532530      |
| 6        | mag         | 532530      |
| 7        | RA          | 194432      |
| 8        | mag:inst    | 532530      |
| 9        | mag:cat     | 532530      |
| 10       | mag:rel     | 532530      |

```
dvo: echo ra[]
```

```
532530
```

```
dvo: echo ra[5000]
```

```
1.22971547
```

```
dvo: for i 0 10
```

```
>> echo ra[$i]
```

```
>> end
```

```
0.0108125117  
0.0108125117  
0.0108125117  
0.0106736235  
0.0106736235  
0.0200238228  
0.0200238228  
0.0200238228  
0.0199460443  
0.0199460443
```

```
dvo: ra[7] = 10
```

```
dvo: for i 0 10
```

```
>> echo ra[$i]
```

```
>> end
```

```
0.0108125117  
0.0108125117  
0.0108125117  
0.0106736235  
0.0106736235  
0.0200238228  
0.0200238228  
10  
0.0199460443  
0.0199460443
```

plotting

```
dvo: lim -n 1 ra dec
```

```
dvo: clear
```



```
dvo: box
dvo: plot ra dec -x 2 -pt 7
```

## writing to file

```
dvo: write
  USAGE: write [-append] [-f "format"] file vector vector ...
dvo: write mydata.dat ra dec
dvo: !ls mydata.dat
  mydata.dat
dvo: !more mydata.dat
  0.01081251167 0.08536078036
  0.01081251167 0.08536078036
  ....
dvo: exit
```

## 8) PUT IN SOME DATA IN YOUR OWN CATALOGUE

get e.g. another catalogue

```
cp -r ~ipp/715624o .
cd 715624o
ls 715624o00.*
  715624o00.log 715624o00.smp 715624o00.sx 715624o00.xmp
715624o00.sx      reorganisation of sextractor outputs
715624o00.xmp    header + data
715624o00.smp    header + data
715624o00.log    logfile
```

astrometry on each chip indipendently (not high precision)

```
addstar -D CAMERA megacam
  USAGE: addstar (filename)
  USAGE: addstar -cat (catalog)
  USAGE: addstar -ref (filename)
  USAGE: addstar -fakeimage (ra) (dec) (theta) (name)
  USAGE: addstar -resort (SkyRegion)
```

```
addstar -D CAMERA megacam -help
```

```
USAGE
  addstar (filename)          add specified image (cmp format) to database
  addstar -ref (filename)     add ASCII data (ra dec mag dmag) to database
  addstar -cat (catalog)      add data from catalog (USNO/2MASS/GSC) to database
  addstar -resort (SkyRegion) perform measure sorting for the specified catalog
```

### optional flags:

```
-region ra ra dec dec      : only add data in specified region (-ref mode only)
-p (photcode)              : specify photcode (-ref / -cat / or override header)
-photcode (photcode)      : specify photcode (-ref / -cat / or override header)
-time (YYYY/MM/DD,HH:MM:SS) : specify date/time (override header)
-mosaic (filename)        : identify associated mosaic frame for chip image
-textmode                  : input file is RAW TEXT table, not FITS table
-existing-regions          : only add measurements to existing catalog files
-only-match                 : only add measurements to existing objects
-missed                     : skipped 'missed' entries
-replace                   : replace time/photcode measurements (no duplication)
-closest                    : use closest-star algorithm
-nosort                     : don't re-sort the measure entries (improves speed)
-update                     : only update the new rows (foreces -nosort)
-image                      : only insert image data
```

```

-cal                : perform zero-point calibration
-skyprobe           : specify skyprobe mode
-accept             : accept bad astrometry from header
-accept-astrom      : accept bad astrometry from header
-accept-motion      : accept proper-motion data from reference
-force              : force read of database with inconsistent info
-v                  : verbose mode
-dump (mode)        : output test data
-help               : this list
-h                  : this list

```

putting data in the 'default' database:  
one file

```

addstar -D CAMERA megacam 715624o00.smp
SUCCESS: elapsed time 1.1427 sec for 1843 stars ( 0 matches), 1843 average, 1843
measure

```

all files

```

addstar -D CAMERA megacam "715624o???.smp"
SUCCESS: elapsed time 3.7173 sec for 33790 stars (33954 matches), 46250 average, 82069
measure

```

dvo: catdir

```

USAGE: catdir (name)
      (name) may be a path or 'default'
current: default

```

dvo: imlist

reading images (mode DVO\_MODE\_MEF)

|     |          |         |                   |      |     |      |         |          |
|-----|----------|---------|-------------------|------|-----|------|---------|----------|
| 0   | 280.9777 | 0.5469  | 1062054946.000000 | 1843 | 300 | 1.08 | 0.000   | 0.000    |
| 1   | 280.9777 | 0.5469  | 1062054946.000000 | 1843 | 300 | 1.08 | 0.000   | 0.000    |
| 2   | 280.8692 | 0.5472  | 1062054946.000000 | 1553 | 301 | 1.08 | 0.000   | 0.000    |
| 3   | 280.7599 | 0.5472  | 1062054946.000000 | 1181 | 302 | 1.08 | 0.000   | 0.000    |
| 4   | 280.6504 | 0.5472  | 1062054946.000000 | 1064 | 303 | 1.08 | 0.000   | 0.000    |
| ... |          |         |                   |      |     |      |         |          |
| 67  | 280.6540 | -0.2146 | 1062054946.000000 | 1049 | 330 | 1.08 | 0.000   | 0.000    |
| 68  | 280.5443 | -0.2153 | 1062054946.000000 | 712  | 331 | 1.08 | 0.000   | 0.000    |
| 69  | 280.4347 | -0.2159 | 1062054946.000000 | 524  | 332 | 1.08 | 0.000   | 0.000    |
| 70  | 280.3251 | -0.2159 | 1062054946.000000 | 646  | 333 | 1.08 | 0.000   | 0.000    |
| 71  | 280.2158 | -0.2160 | 1062054946.000000 | 1079 | 334 | 1.08 | 0.000   | 0.000    |
| 72  | 280.1072 | -0.2157 | 1062054946.000000 | 1247 | 335 | 1.08 | 0.000   | 0.000    |
|     | RA       | DEC     | time              |      | AM  |      | reltive | phomtery |

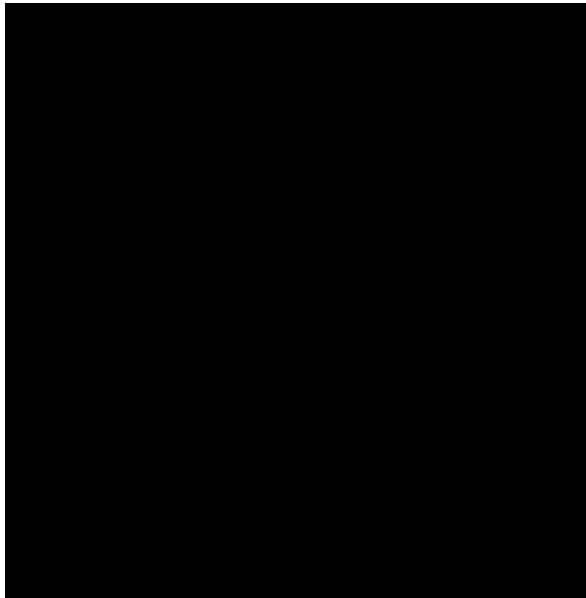
dvo: region 280.4 0.15 1

dvo: images

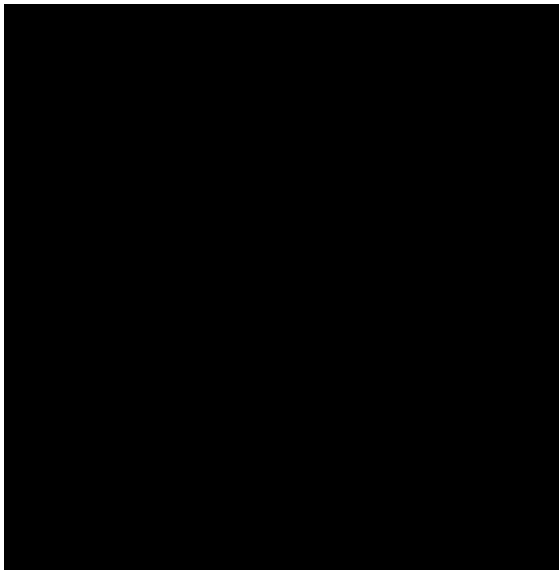
```

current style (0): -x 0 -c black -pt 7 -lt 0 -lw 1.000000 -sz 1.000000
reading images (mode DVO_MODE_MEF)
plotting 37 images

```



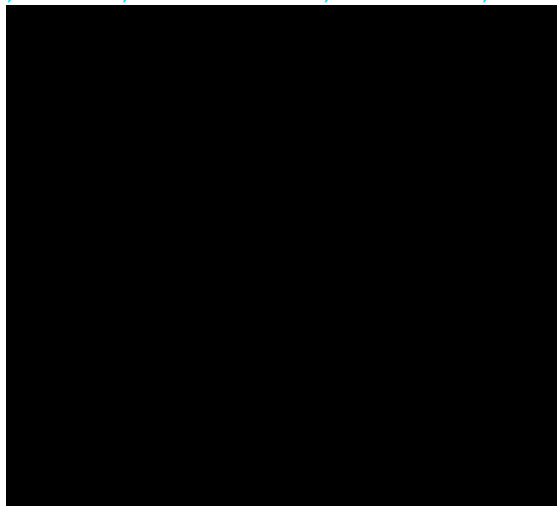
```
dvo: style -pt 7  
dvo: pmeasure -all -m 10 20
```



```
dvo: cur  
  1 -0.537038 -0.140741  
  2 -0.444445 -0.070370  
  q -0.444445 -0.070370  
dvo: echo $R1  
  280.937020661  
dvo: echo $D1  
  0.00925887636367  
dvo: region $R1 $D1 0.1  
dvo: images  
dvo: pmeasure -all -m 10 20
```



```
dvo: clear
dvo: region $R1 $D1 0.1
dvo: mextract xccd
  reading images (mode DVO_MODE_MEF)
dvo: mextract yccd
  reading images (mode DVO_MODE_MEF)
dvo: lim -n 1 xccd yccd
dvo: plot xccd yccd -x 2 -pt 7
dvo: vstat xccd
  mean: 90.2789, stdev: 345.023, min: 0, max: 2080.17, median: 0, mode: 2080.17, Npts: 82069
```

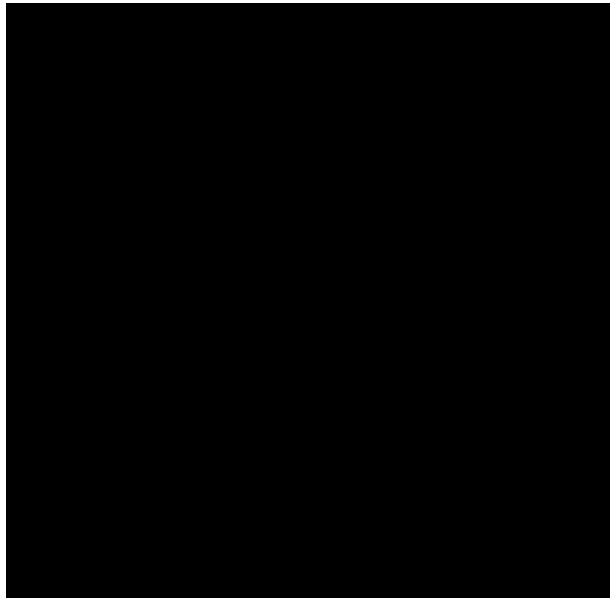


## 9) CMD

```
dvo: catdir /data/alala.0/ipp/ippRefs/catdir.merge
dvo: cmd
  USAGE: cmd F - F : F
dvo: cmd 2MASS_J - 2MASS_H : 2MASS_H
dvo: vectors
  N      name      size
  0      xv      42526
  1      yv      42526
```

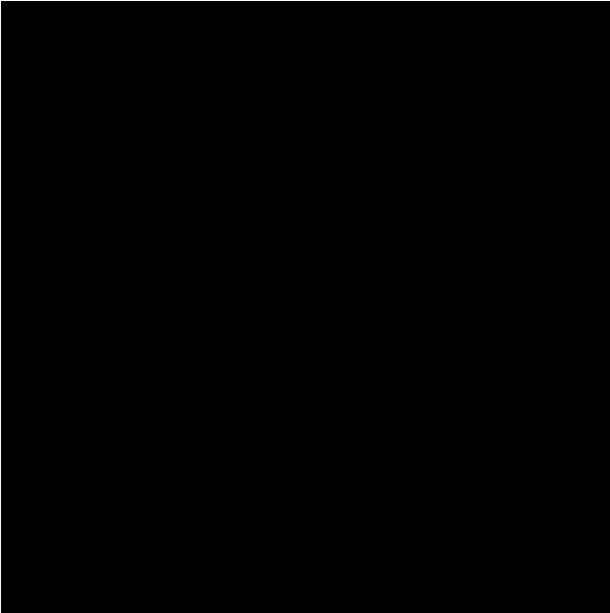
auto limits in window 1:

```
dvo: lim -n 1 xv yv
dvo: clear
dvo: box
dvo: plot xv yv -x 2 -pt 2
```



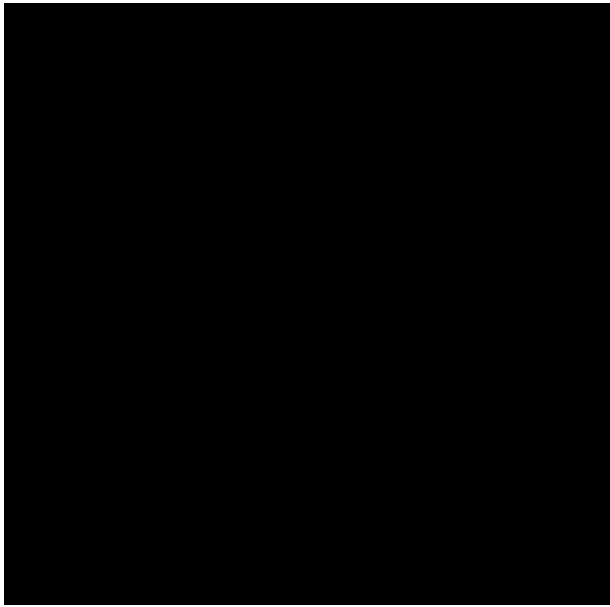
### **subset of vectors**

```
dvo: lim -1 4 18 5; clear; box; plot xv yv
dvo: cur
  1 0.397771 11.374031
  2 1.039729 6.524225
  q 1.039729 6.524225
dvo: subset col = xv if (xv > $X1) && (xv < $X2) && (yv < $Y1) && (yv >
  $Y2)
dvo: subset mag = yv if (xv > $X1) && (xv < $X2) && (yv < $Y1) && (yv >
  $Y2)
dvo: plot -c blue col mag
```



define lower region as linear function:

```
dvo: set y1 = 15 - xv
dvo: subset col = xv if (yv > y1)
dvo: subset mag = yv if (yv > y1)
dvo: plot -c red col mag -n 1
```



## **10) ADDING CATALOGUES:**

```
cat > test.dat
```

```
1 1 2 34
```

```
1 1 2 34
```

```
mag pos err time
```

```
addstar -D RADIUS 2.0 -ref test.dat -photcode GSC -time  
2007/02/13,00:30:00  
2.0 arcsec radius
```

```
USNO
```

```
addstar -D USNO_B_DIR /data/alala.0/elixier/srcdir/refs/usnob/ -D RADIUS  
1.0 -region 0 1 0 1 -photcode USNO_RED -cat USNOB  
ERROR: can't open accelerator file /data/alala.0/elixier/srcdir/refs//090/b0900.acc
```

I  
ipp\_serial\_inject.pl.....10  
P

ppStats.....10  
pxadmin.....8  
pxinject -newExp.....10  
pxinject -newImfile.....10