# Setup

## Demo folder covering desktop, containing:

### Application

### CmdLine folder

#### Command Line Version

#### Command line demo script

### One sample dark file

### Gathered files folder

#### All the darks I need

#### Some bias

### Calibration files

#### A single 1x1 master bias

#### A folder of master bias files, different sizes and temperatures

### Masters output folder

### Incomplete set folder

### Set with different temperatures

# Intro

## What’s this program

## What are dark files

### If you take a long exposure of a target (e.g. a galaxy) noise will build up

#### The longer the exposure, the more noise

### So, we also take a dark: same exposure time, shutter closed & cap on

### Show one

#### So this is only the noise

#### Noise that builds up during a long exposure

### Processing software will Subtract this from your image

### If you have a “auto noise reduction” on a DSLR, it’s doing this automatically

#### For astrophotography, you should turn this off and take your own darks

#### Otherwise the camera is doing a dark frame for every exposure, doubling the time it takes you to capture your images

# Intro to the Program

## Show collection of dark files

### Show that there are some bias files in there, don’t worry about it.

## Show program

### This is a Mac

### There is also a windows version, identical except for Windows UI changes such as location of menu bar

## Run program

## Show preferences

## Show options tab

## Show main screen

# Demo of GUI

## Open files

## Show select-all filter

## Single combine

### Mean

#### Show cosmic ray hits

### Median

#### Show outliers gone

### Sigma

#### Show outliers gone

#### Say (can’t show) better SNR

## Precalibration

### What’s this all about?

#### Fixed noise in each image, therefore in each dark

#### Not a problem – you want that noise subtracted from the main photo

#### But if you want to scale your darks

##### Some image software can do this

##### You need a dark exposed 10 minutes but you have only a 5-minute dark:

###### Image software will double the noise in the dark to estimate what a 10-minute dark would be)

##### Problem: the fixed noise shouldn’t be doubled, only the time-dependent noise

##### So, to make darks scalable, we remove the fixed noise

#### Ideally the fixed noise is represented by Bias files, so we ask MDM to subtract a bias file from each dark before combining them.

#### Don’t need to do this, and should not do this, if not scaling darks

### Let’s try calibration

#### Show pedestal, explain it; don’t demo

#### Show fixed bias option

#### Better: show bias library option

##### Need to have bias of right size

##### Ideally, a bias of about the same temperature as the dark

## Show button disabled if multiple binnings selected

## Show “group by size”

### Re-enables button

### Run it

### Show grouping in console

### Show grouped result files

## Show “group by exposure time”

### Explain width parameter

### Run it

### Show grouping in console

### Show grouped result files

## Show “Group by temperature”

### Show test data

### Run it

### Show grouping in console

### Show grouped result files

## Show disposition option

### Might not have complete sets yet

### Let’s process the complete ones and set them aside

### Options

#### “Ignore less than”

#### “disposition”

### Run that

# Demo of Command Line

## Comment on using this from the source

### Run with python command; or

### Edit main program with location of python interpreter

## Show help output

## Show how to set up in a script

## Example script