JWST Project

Meeting Notes #2 (due 02/22/23)

Instructor: McCleary *Student: Eddie Berman*

Agenda

1. New results from PSF
2. Go through real data running because I'm a little confused
3. Another Paper
4. Ascent Award
5. Steps toward understanding and making my own PIFF

PSF Results

1 First results from PSF

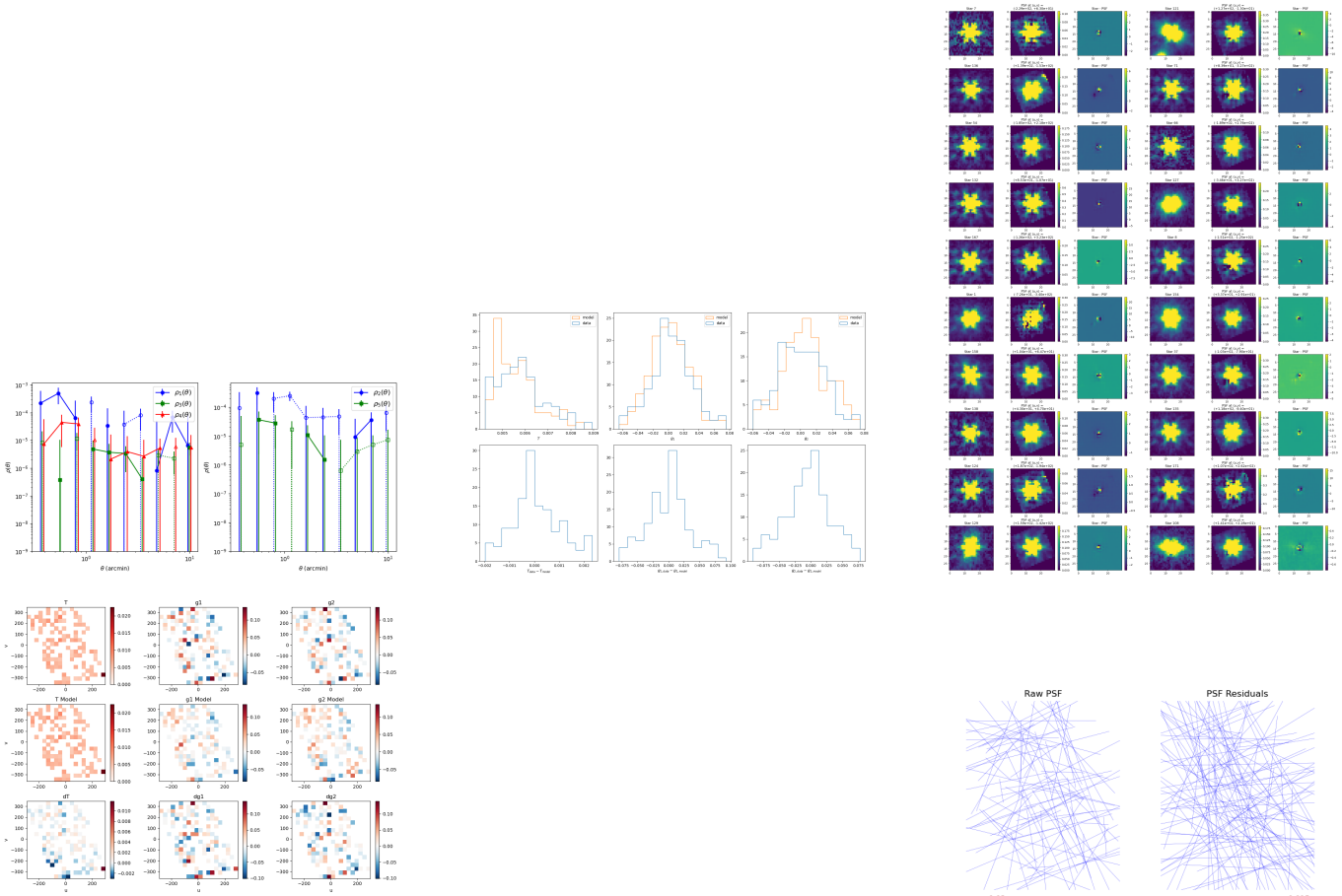
1.1 60mas Max Size Simulated Data

```
# How large should the postage stamp cutouts of the stars be?
    stamp_size: 30

model:
    # This model uses a grid of pixels to model the surface brightness distribution.
    type: PixelGrid
    scale: 0.025       # NIRCam ative pixel scale
    size: 60           # Model is 24 x 24 in these pixels
```

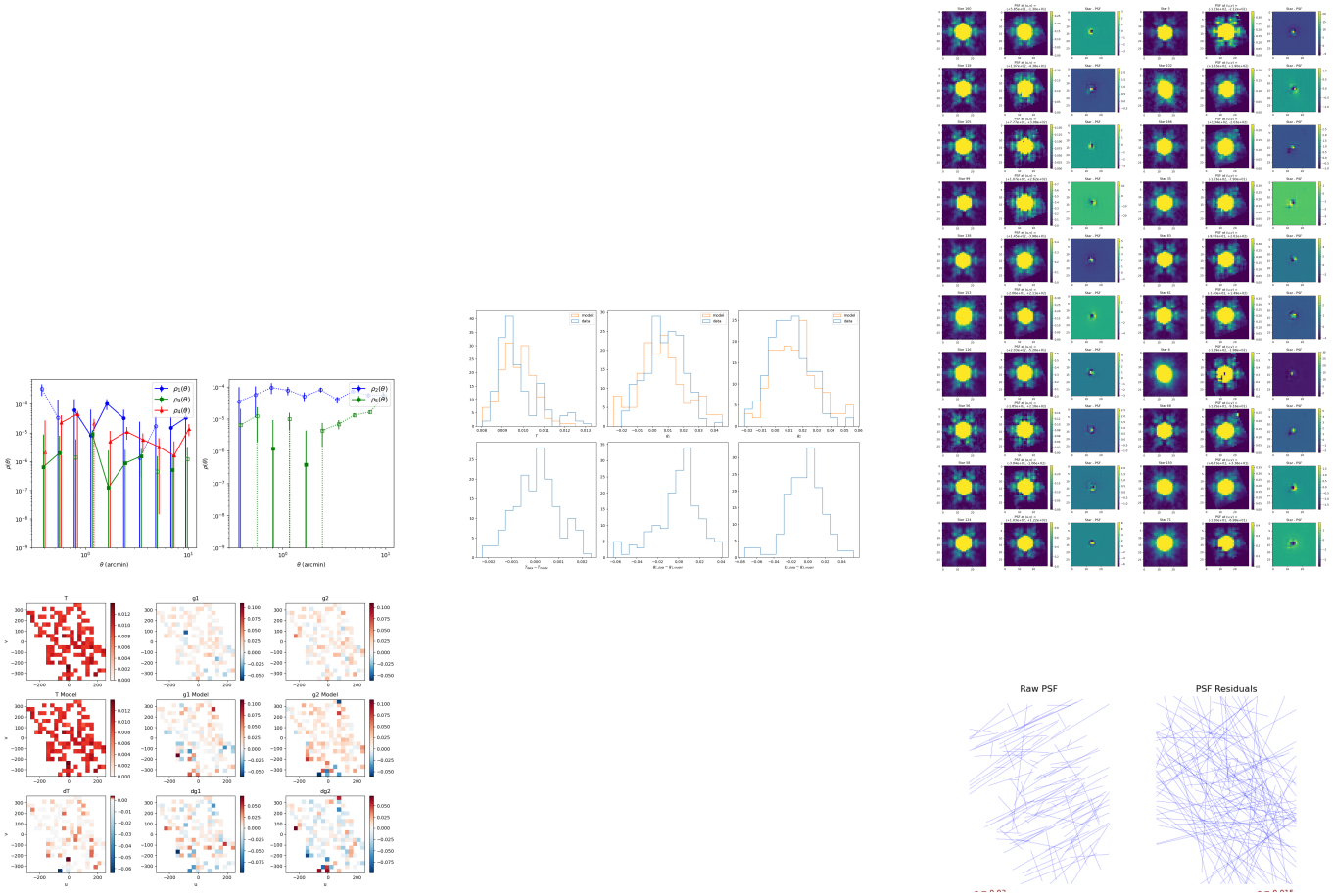
```
    # Output 277
Iteration 1: Fitting 153 stars
             (27 stars are reserved)
Beginning solution of matrix size (21600, 21600)
Ill-conditioned matrix (rcond=4.89443e-20): result may not be accurate.
             Total chisq = 2719.75 / 137241 dof
Iteration 2: Fitting 153 stars
             (27 stars are reserved)
Beginning solution of matrix size (21600, 21600)
Ill-conditioned matrix (rcond=4.28319e-20): result may not be accurate.
             Total chisq = 1623.11 / 137241 dof
```

```
    # Output 444
Iteration 1: Fitting 148 stars
             (25 stars are reserved)
Beginning solution of matrix size (21600, 21600)
Ill-conditioned matrix (rcond=1.43754e-19): result may not be accurate.
             Total chisq = 4094.30 / 132756 dof
Iteration 2: Fitting 148 stars
             (25 stars are reserved)
Beginning solution of matrix size (21600, 21600)
Ill-conditioned matrix (rcond=4.14087e-19): result may not be accurate.
```

Comment, things break down heavily ! See rcond number
In the second case things broke down in a more pathological way



(a) Simulated60mas277



(a) Simulated60mas444

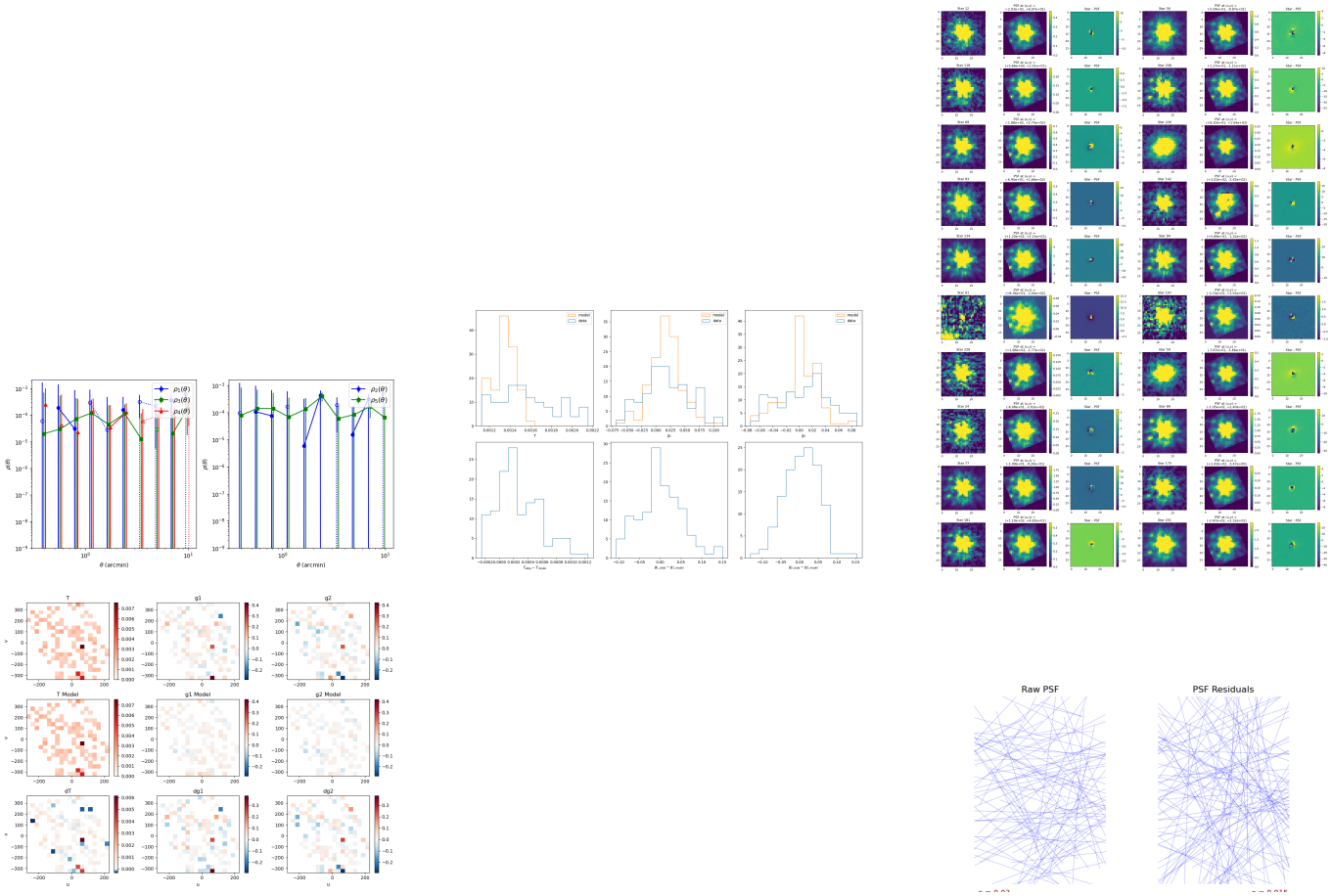
1.2 30mas Max Size Simulated Data

```
# How large should the postage stamp cutouts of the stars be?
    stamp_size: 30

model:
    # This model uses a grid of pixels to model the surface brightness distribution.
    type: PixelGrid
    scale: 0.025       # NIRCam ative pixel scale
    size: 35           # Model is 24 x 24 in these pixels
```

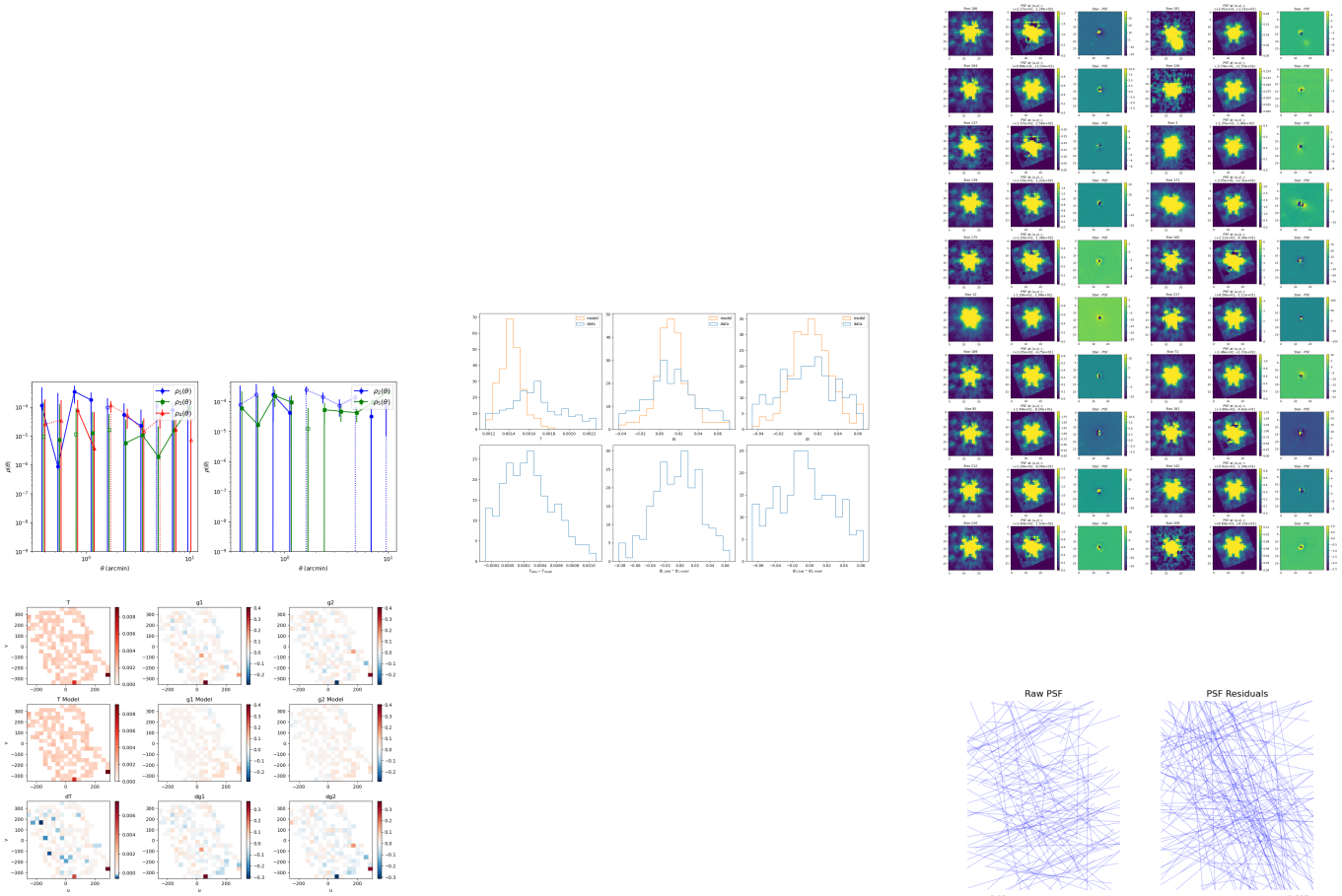
```
    # Output 150
Iteration 1: Fitting 236 stars
             (41 stars are reserved)
Beginning solution of matrix size (9600, 9600)
Caught Matrix is singular.
Switching to svd solution
```

Then tried :

```
# How large should the postage stamp cutouts of the stars be?
    stamp_size: 30

model:
    # This model uses a grid of pixels to model the surface brightness distribution.
    type: PixelGrid
    scale: 0.025       # NIRCam ative pixel scale
    size: 30           # Model is 24 x 24 in these pixels
```



(a) Simulated30mas115



(a) Simulated30mas150

Another Paper

— Full disclosure I have barely read this one, basically just skimmed it, but something I read in the paper you sent me made me think to look for something like this
— [Here!]

Ascent Award

— I think I might apply for one more award to see if I can get paid for part time work during summer $1 \sim 10$ hours a week

Still to Do

— Paper gave me some ideas and confirmed supscisions of a manifold structure to be taken advantage of
— Parse through PIFF
— Start planning my alternative
— Confusion running on real data