

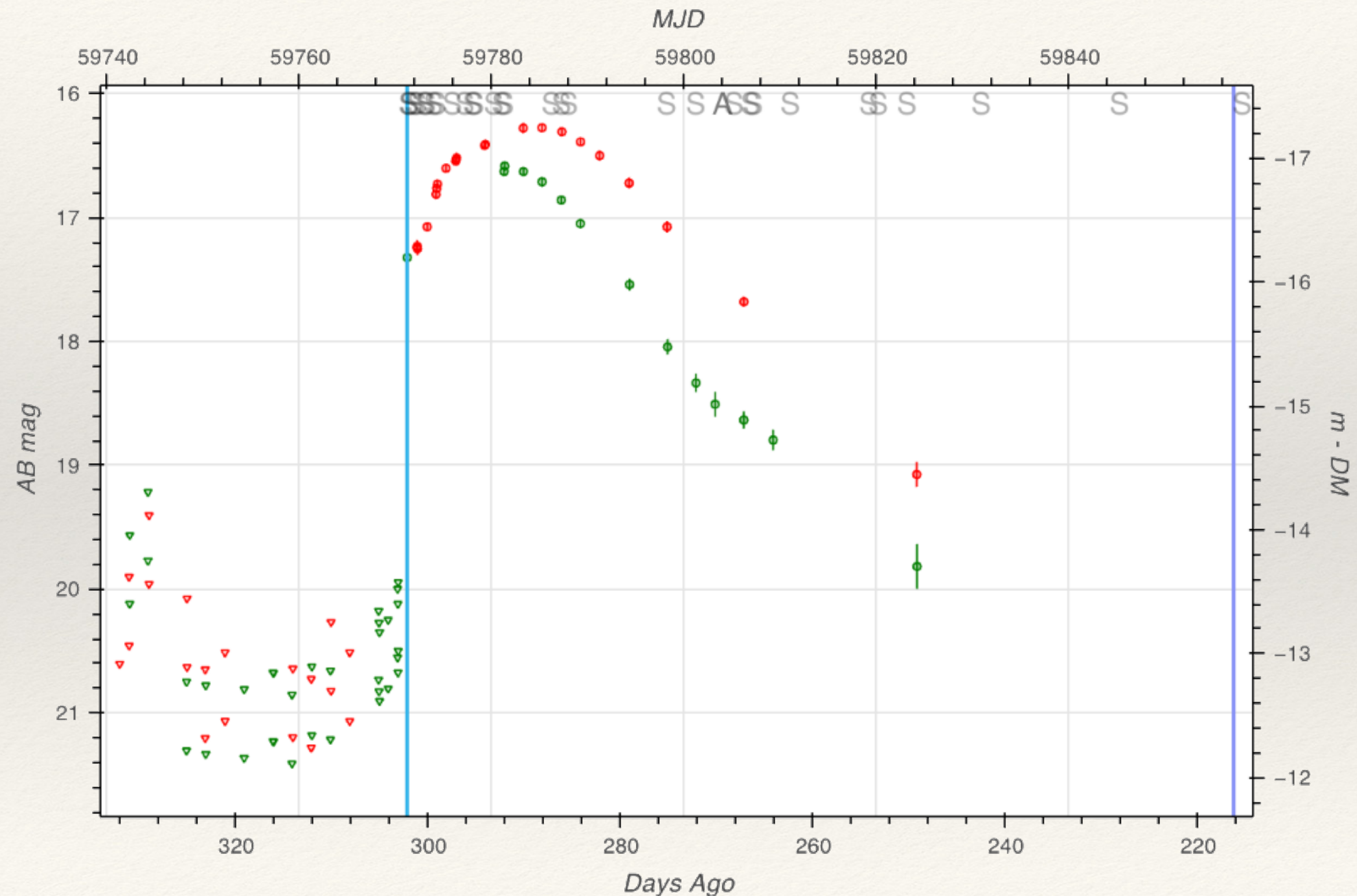


ZTF Calibration Activities | IN2P3 work

What *most* user see

ZTF22aasxgjp | a SN Ic

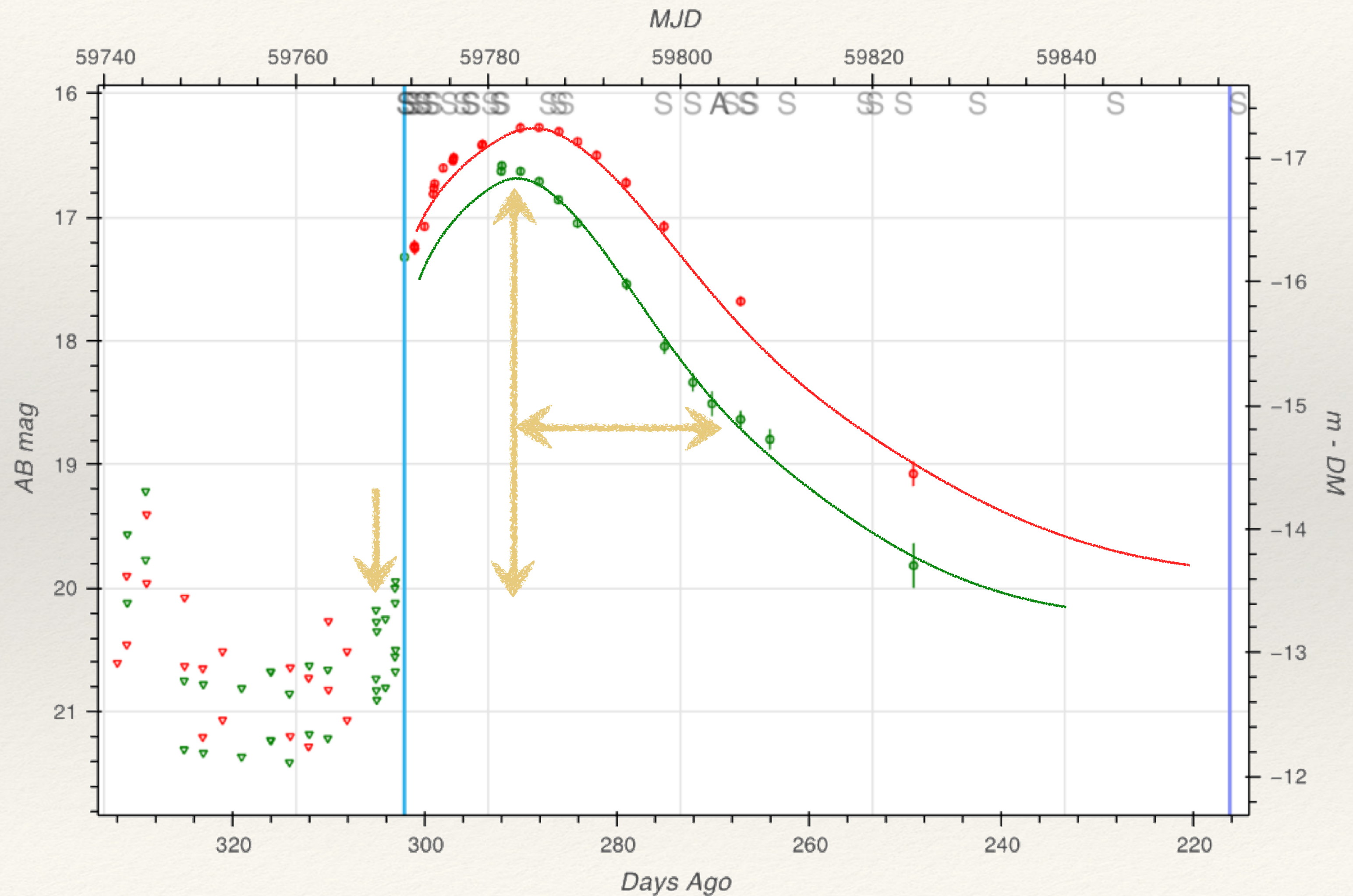
Force photometry on transient objects



What *some* user do

ZTF22aasxgjp | a SN Ic

Force photometry on transient objects



What do you see | *where does it come from*

Issues you may not be aware of...

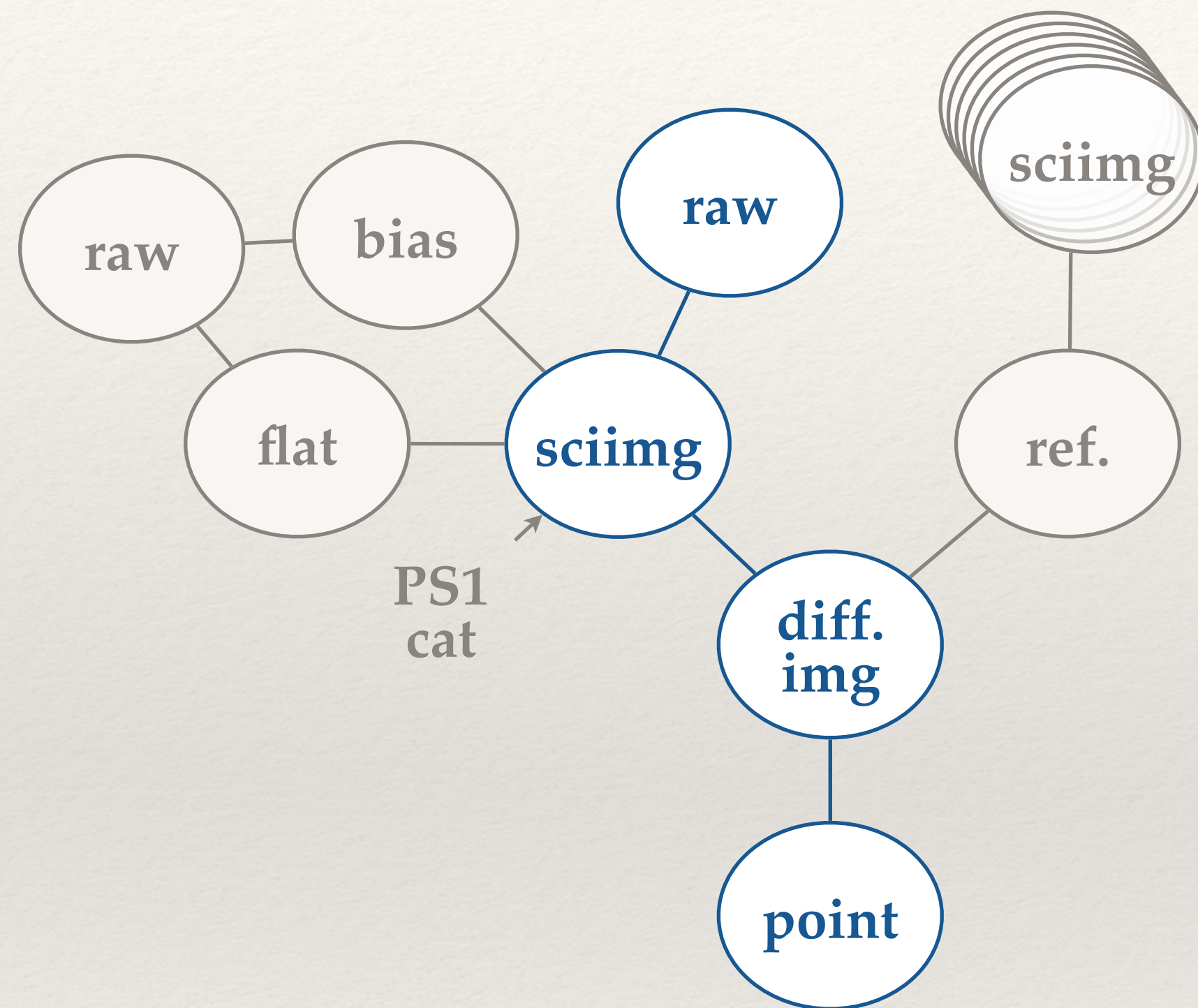


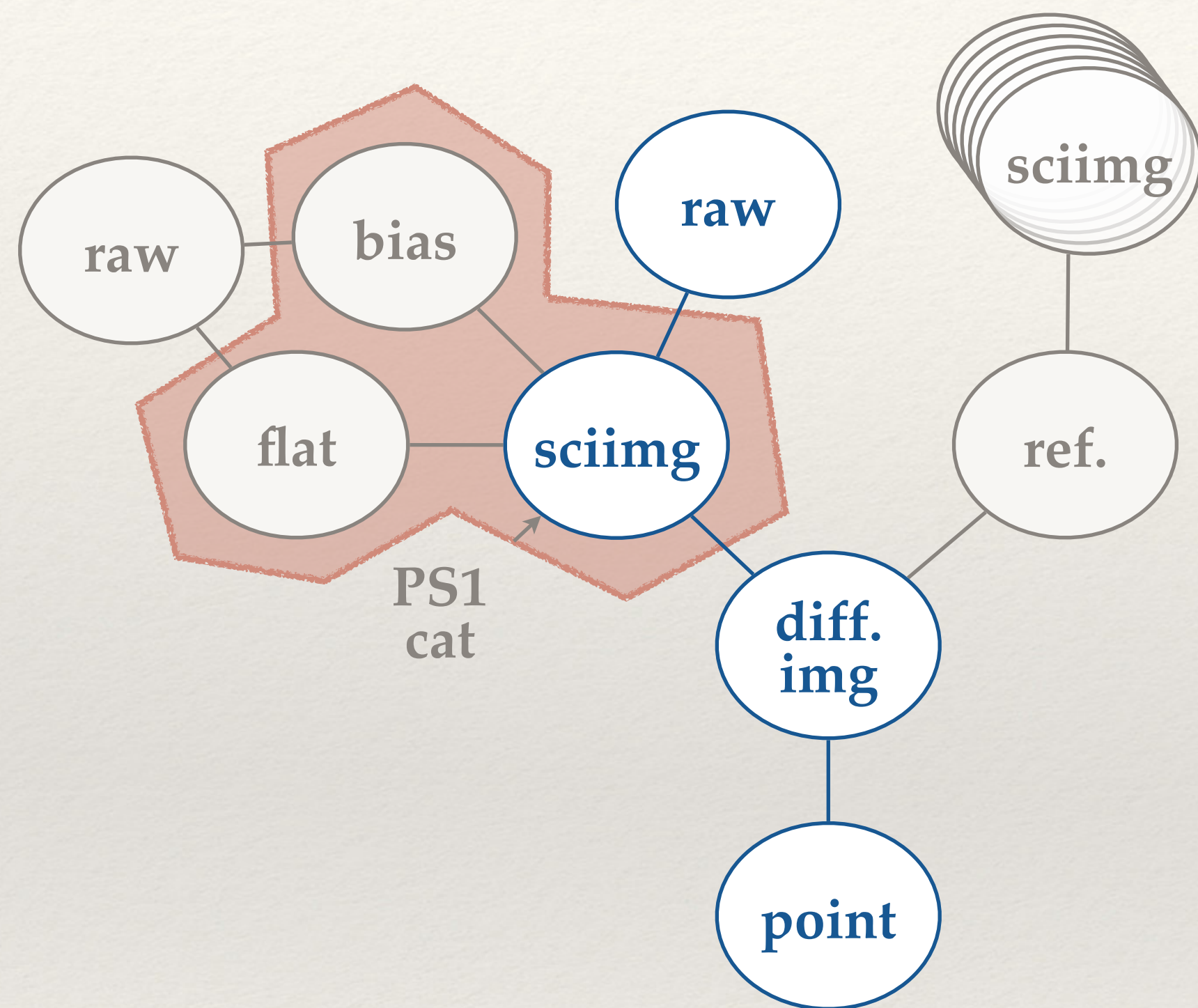
Image subtraction

Quadrant level analyses

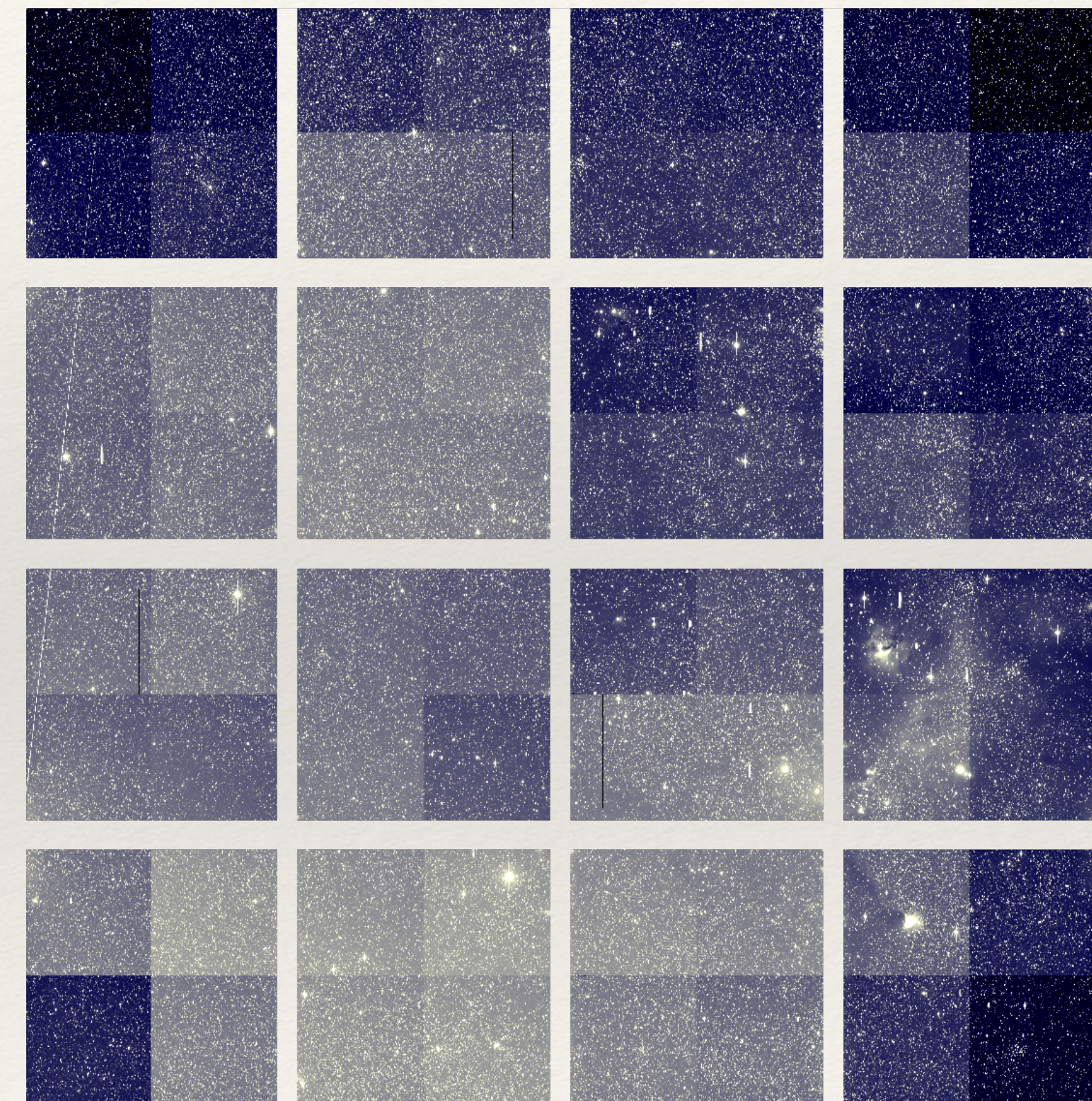
PSF uniformity

Non-linearities

What do you see | *where does it come from*

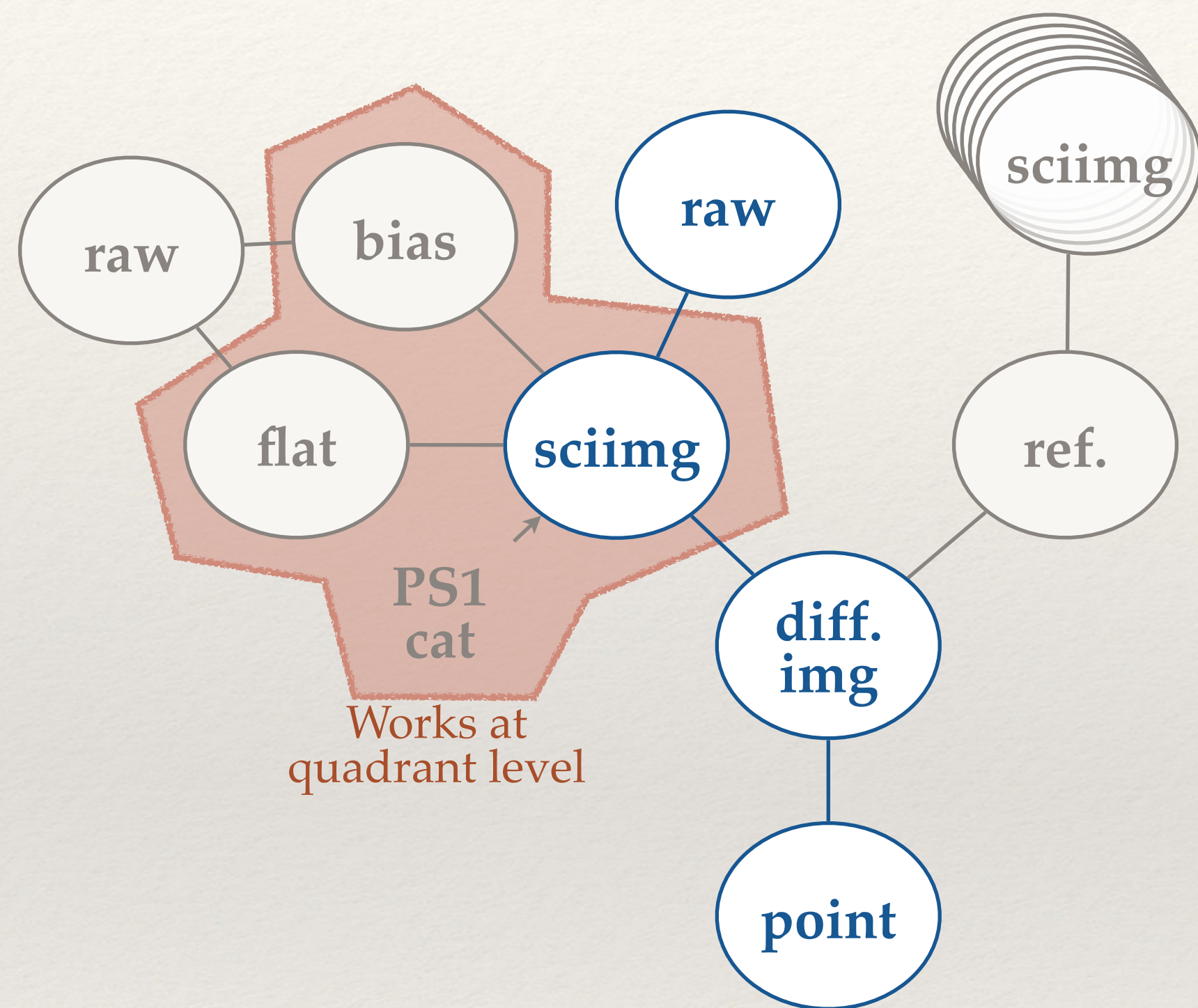


Quadrant level analyses

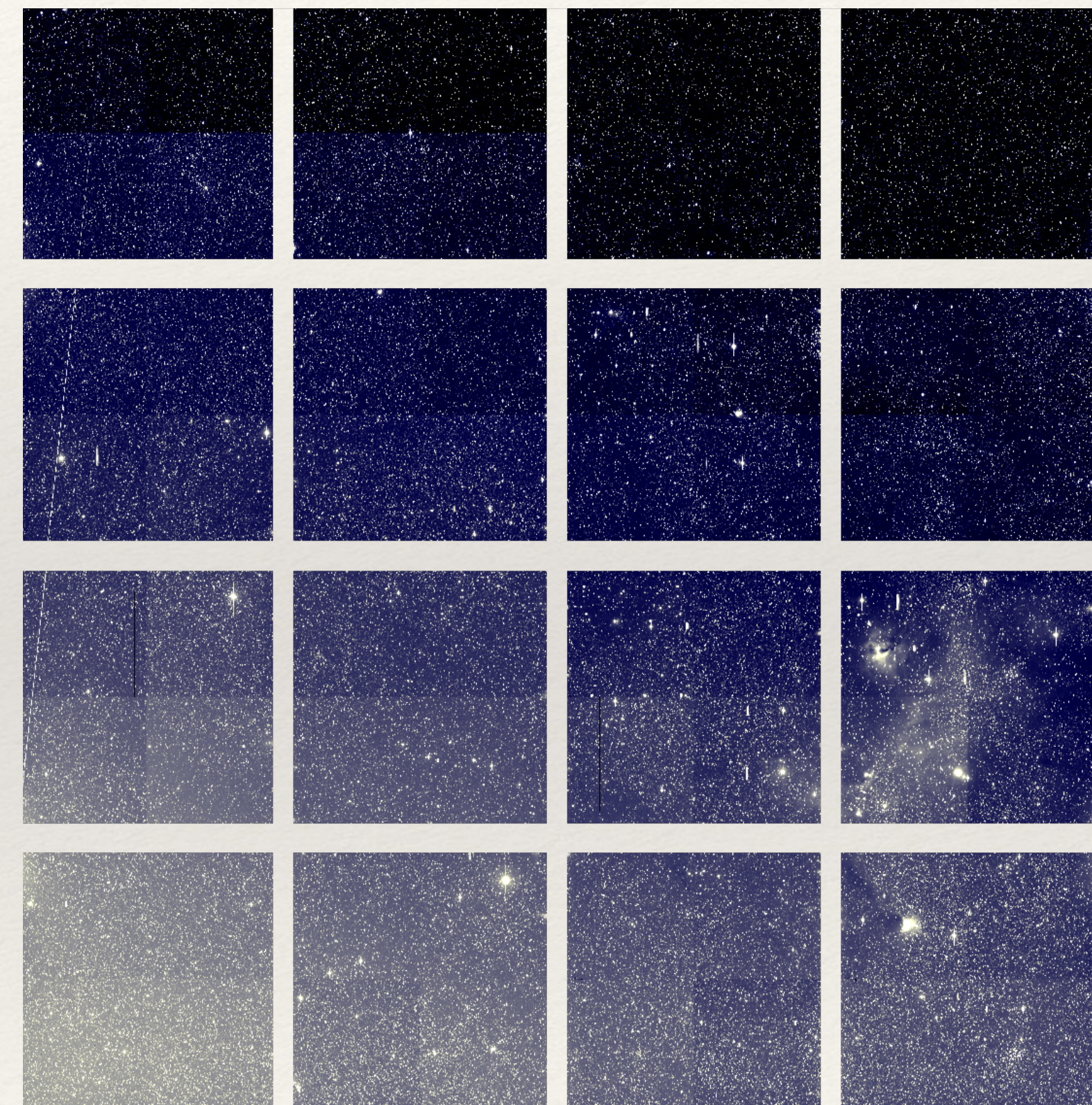


ztf_20190325147488_000359_zg | arcsinh scale

What do you see | *where does it come from*

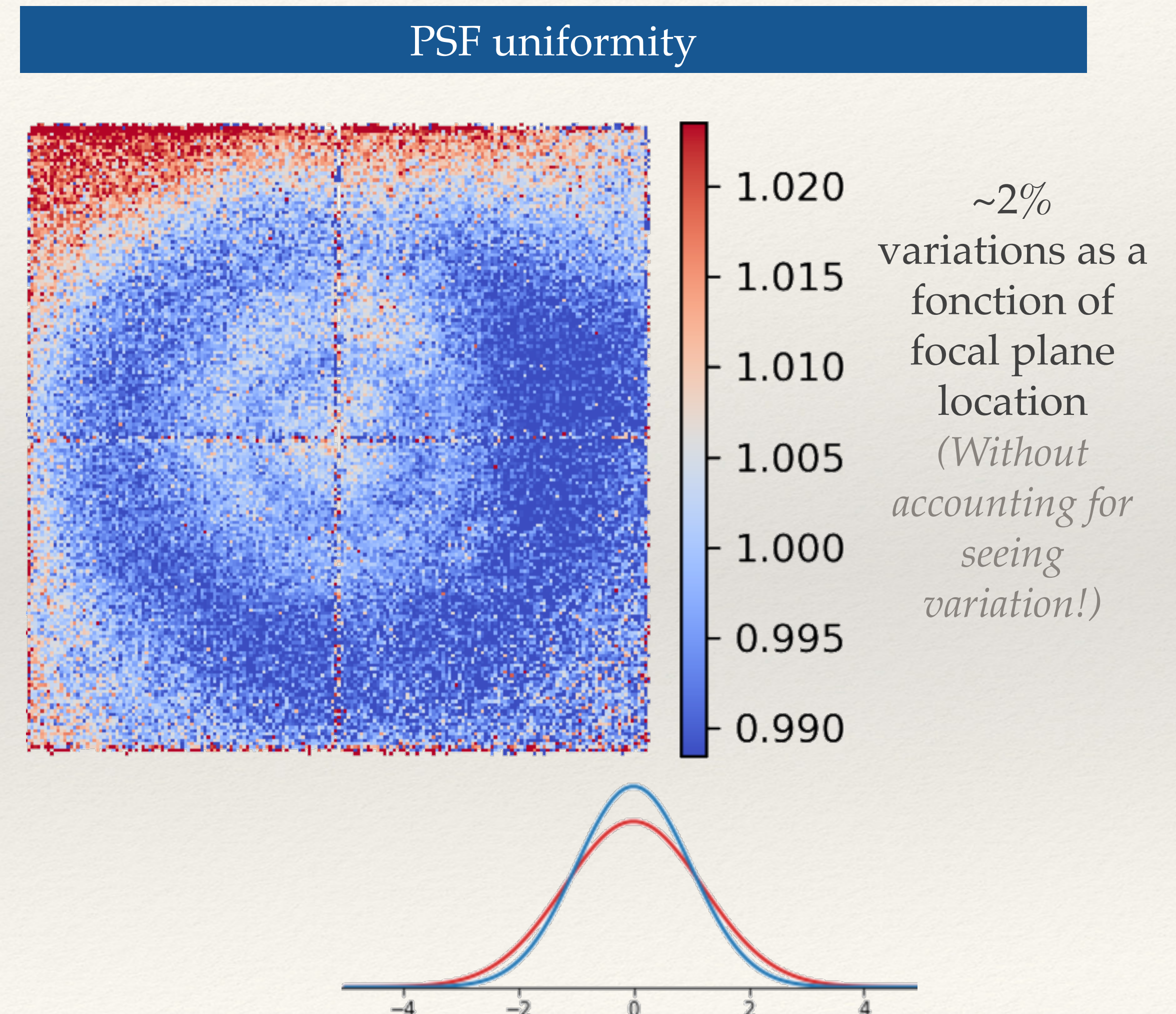
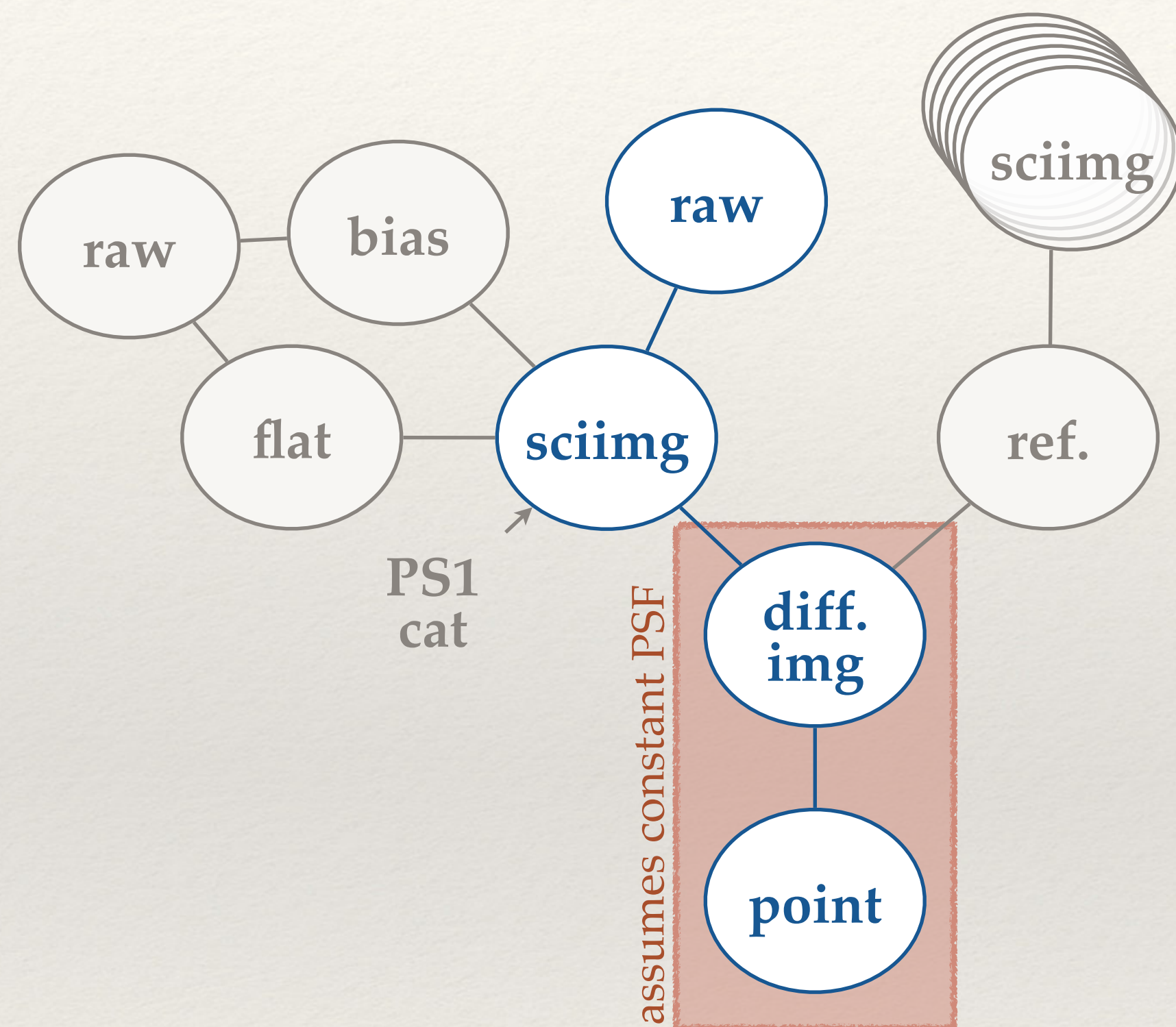


Quadrant level analyses | *Anchored on PS1*

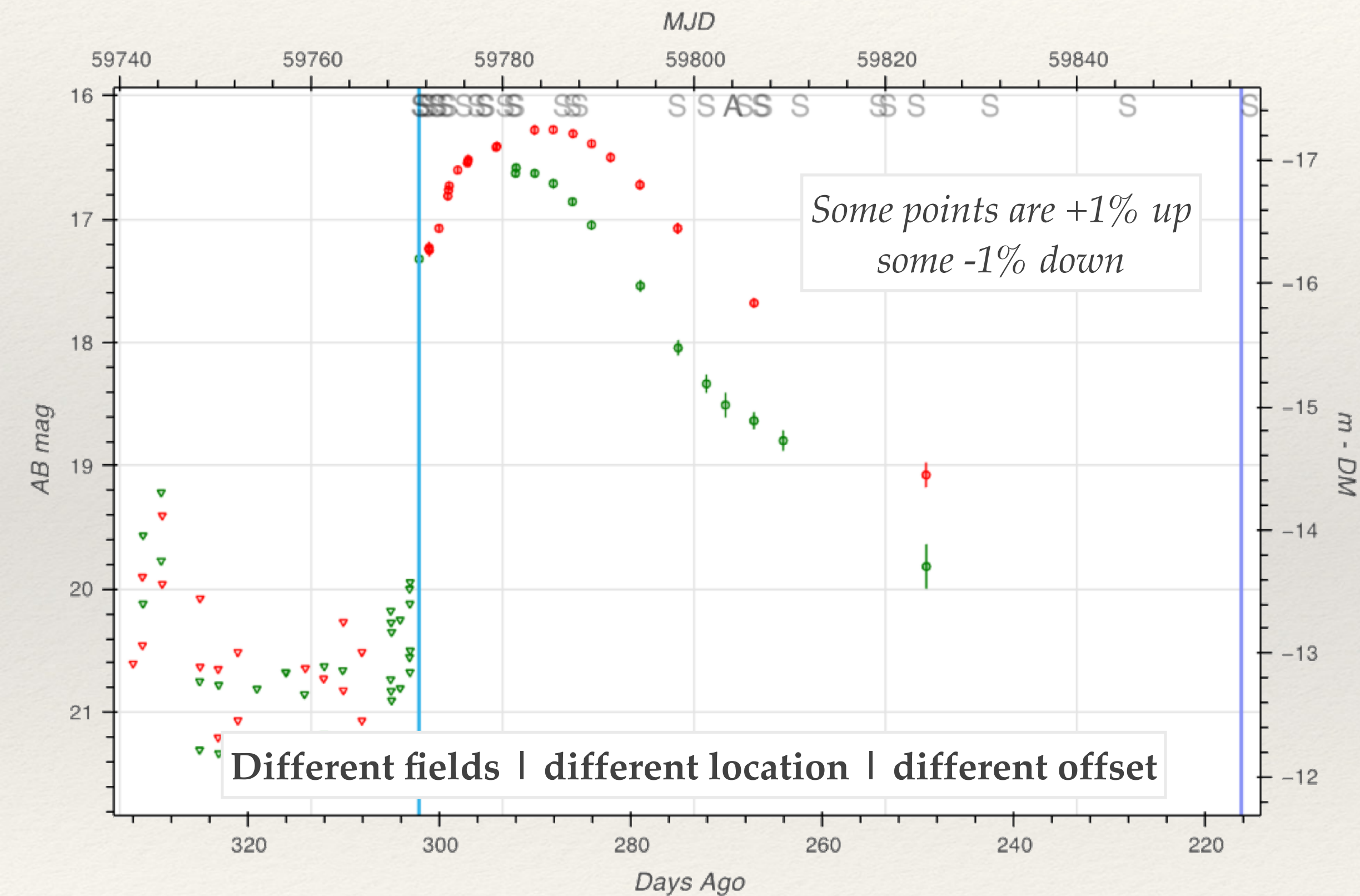


ztf_20190325147488_000359_zg | zp=25 | arcsinh scale

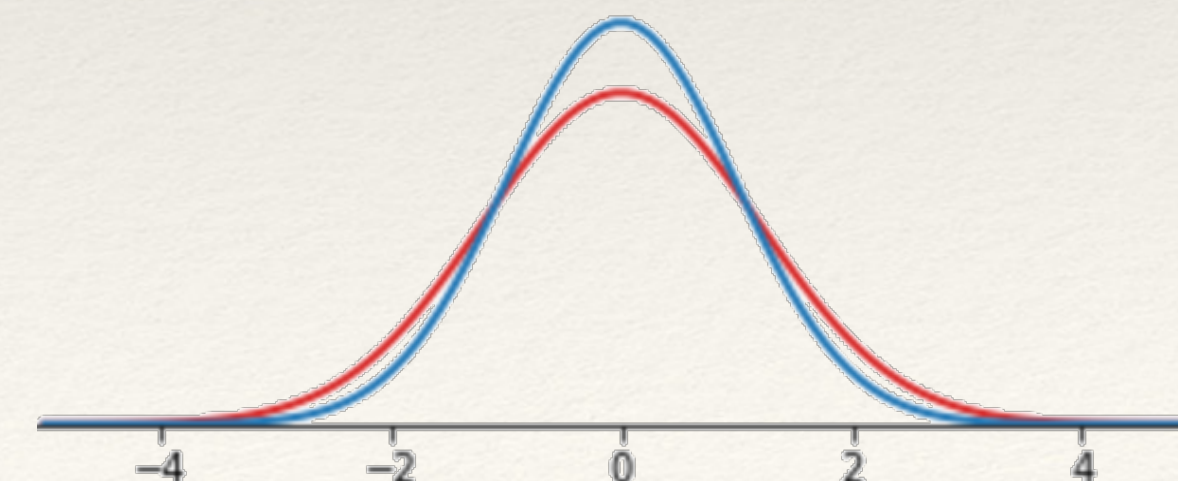
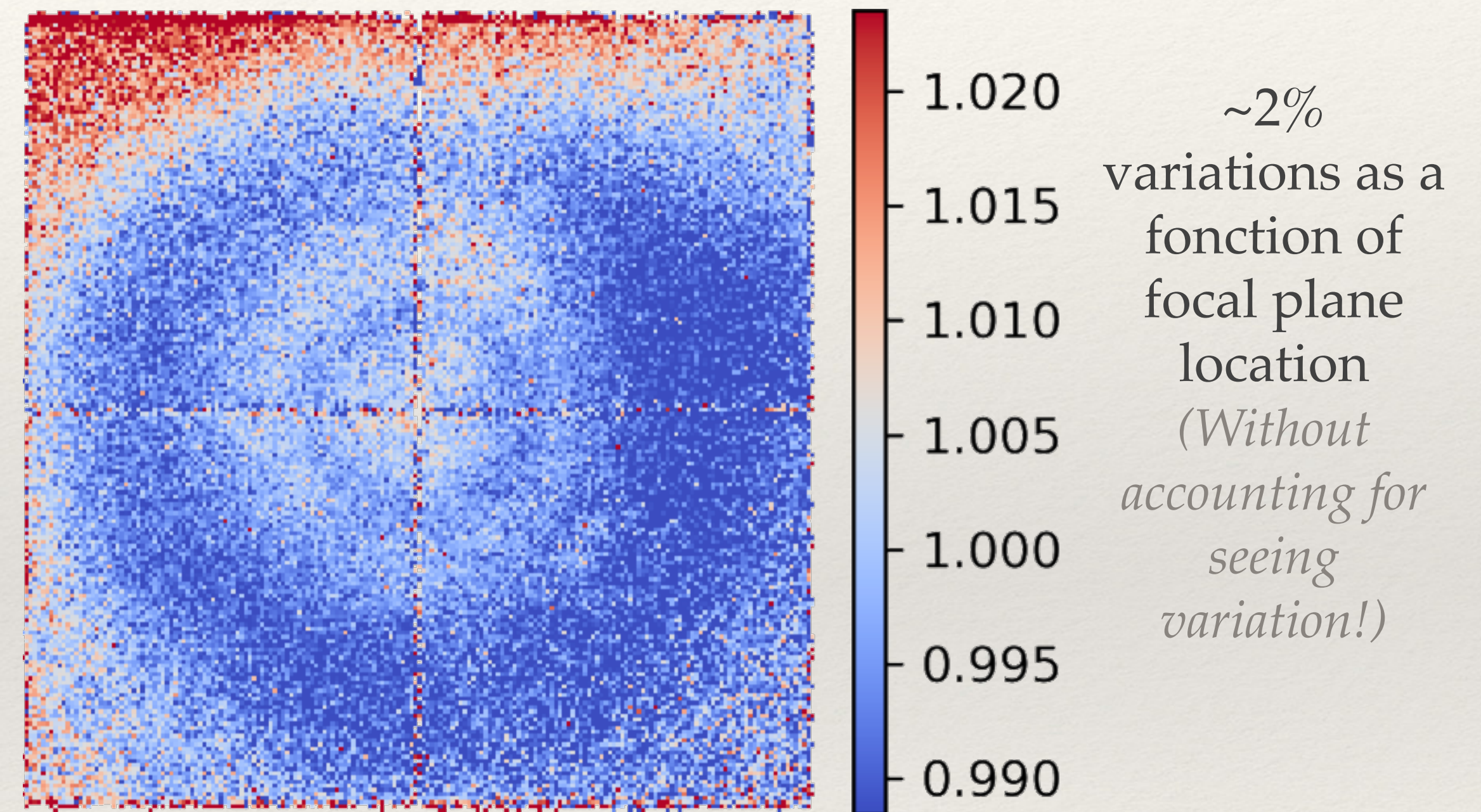
What do you see | *where does it come from*



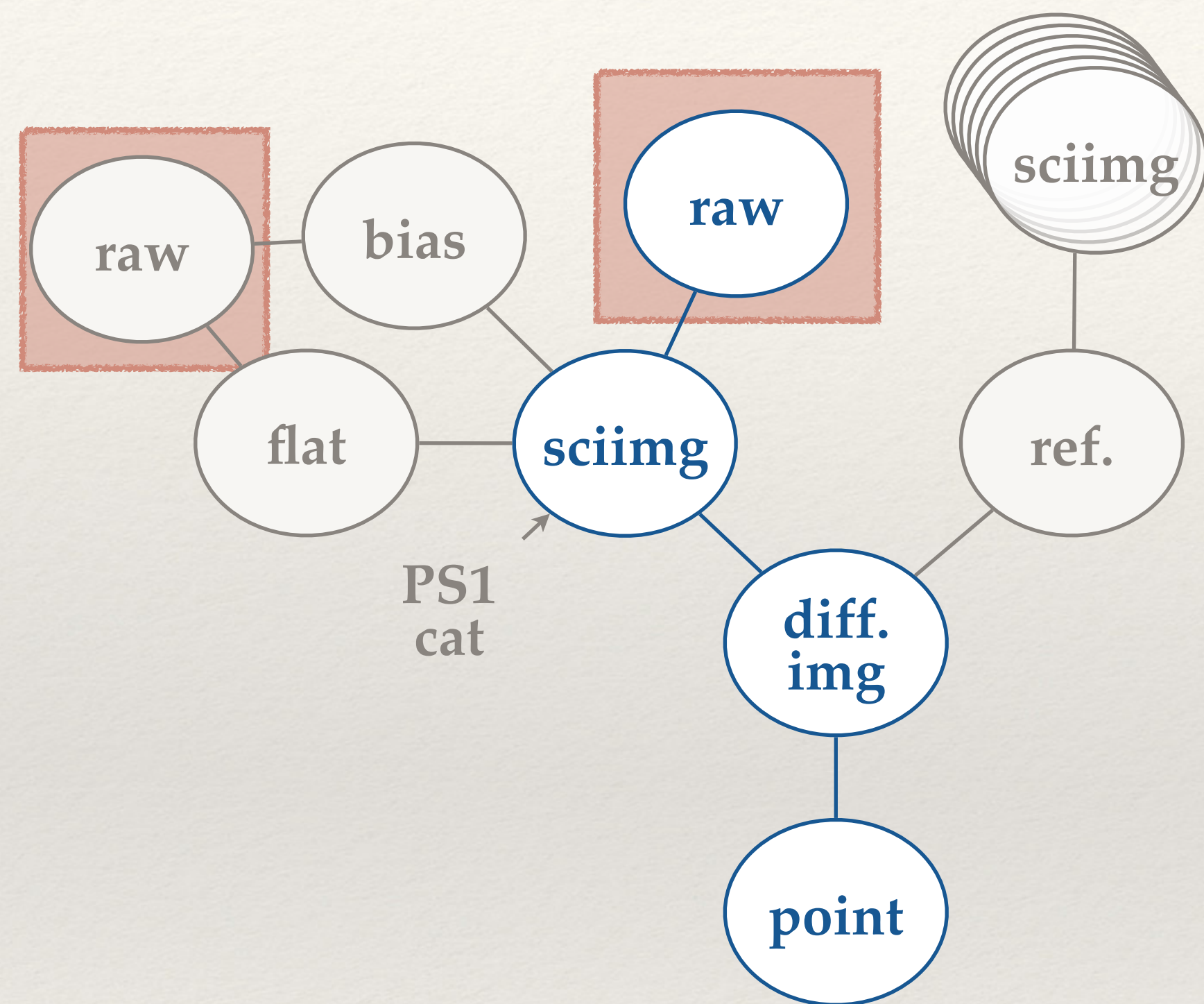
What do you see | *where does it come from*



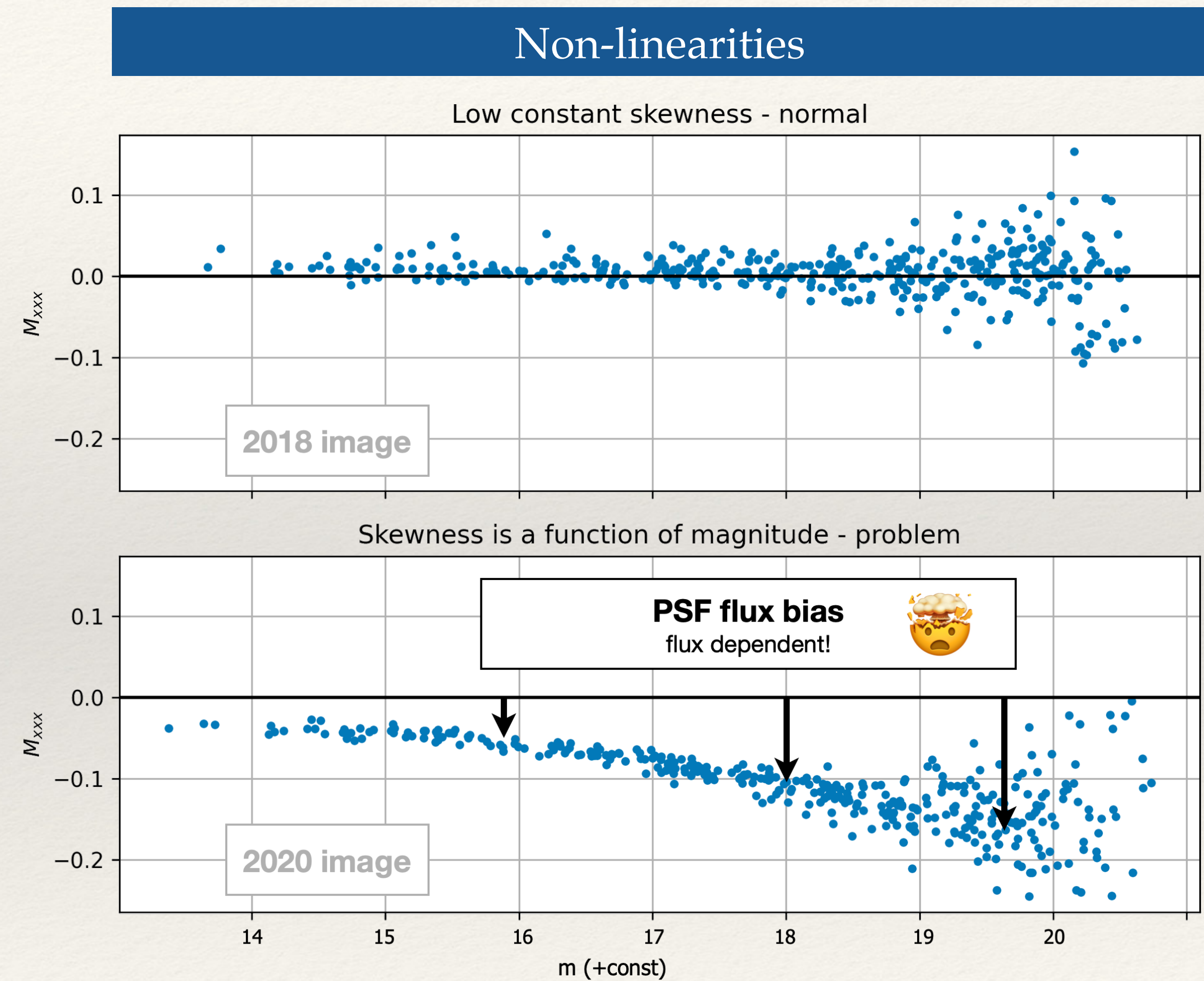
PSF uniformity



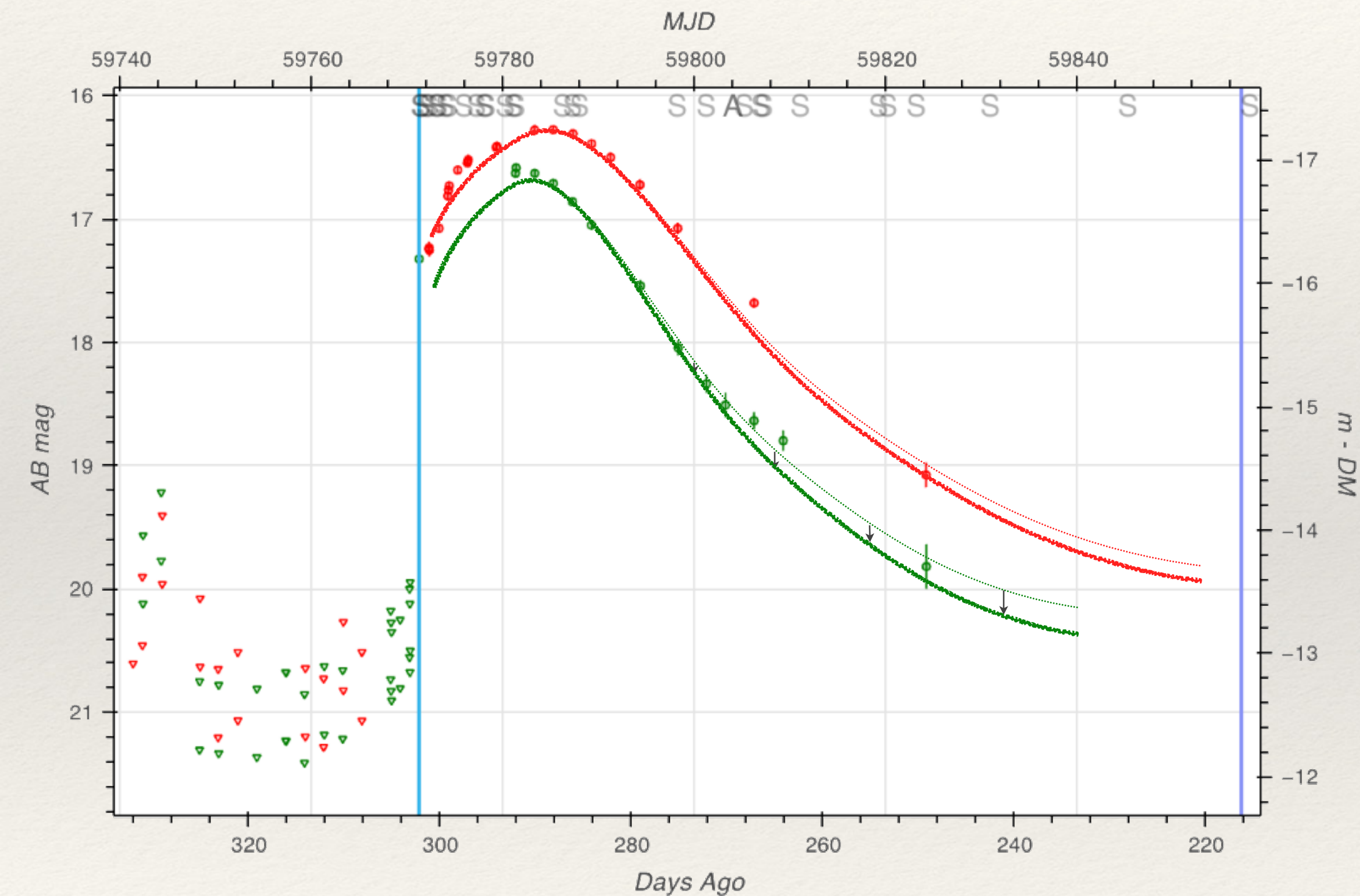
What do you see | *where does it come from*



Elongation of the PSF along the x-axis



What do you see | *where does it come from*

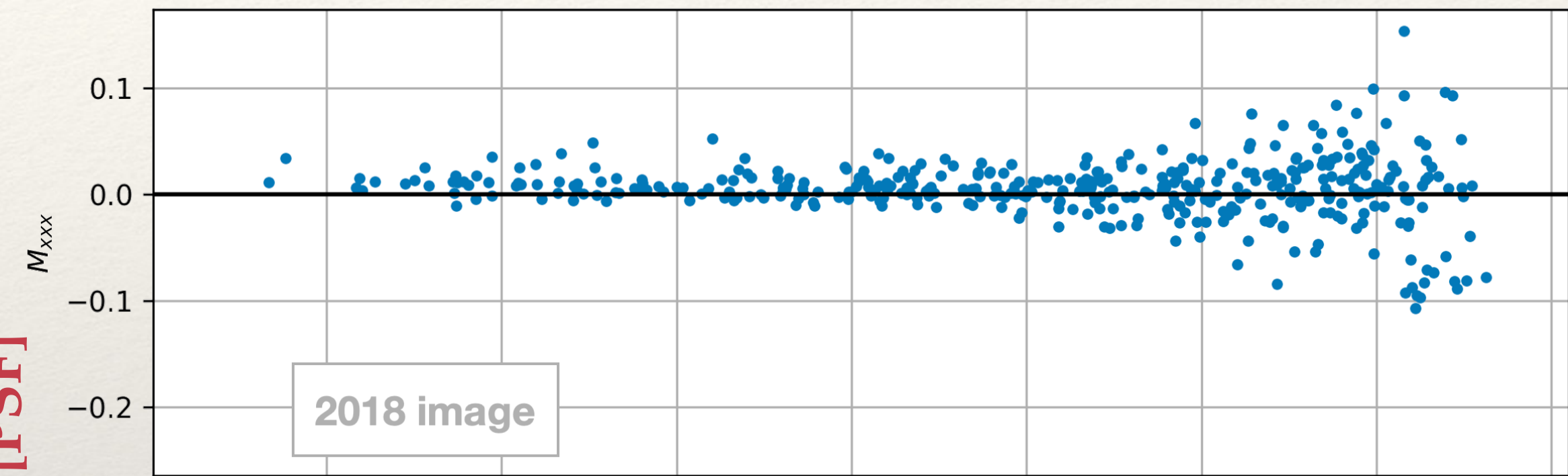


Elongation of the PSF along the x-axis

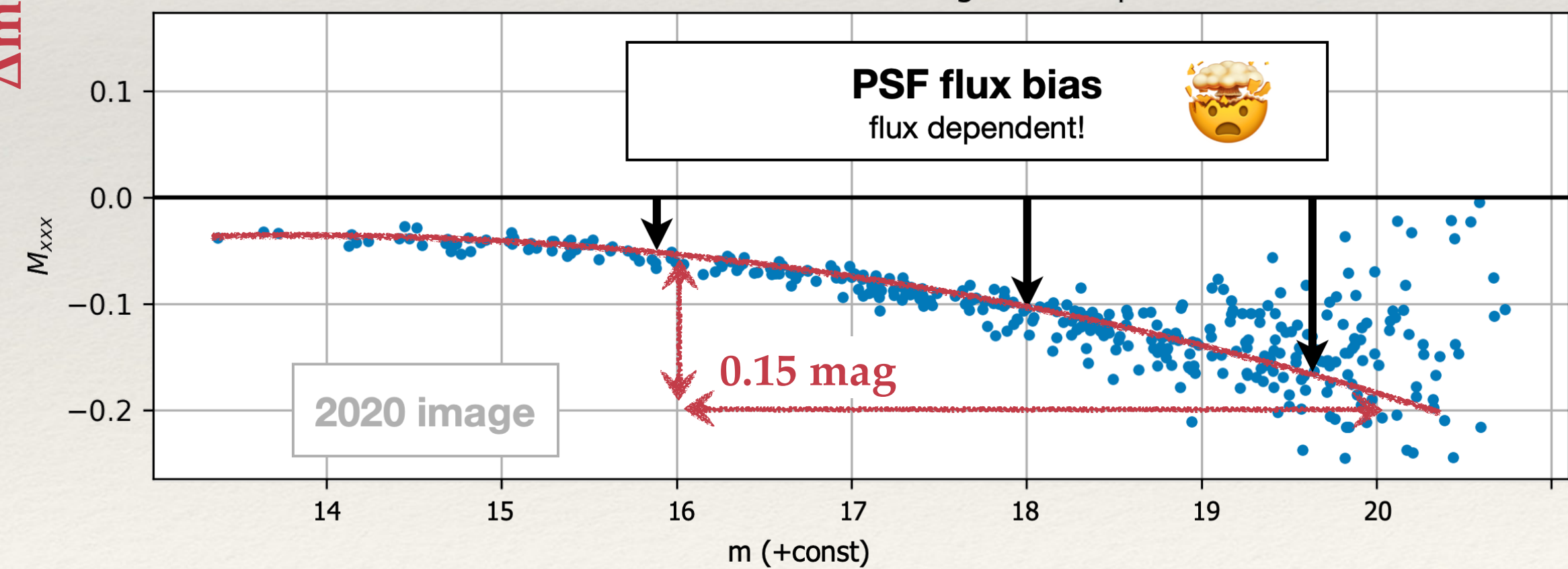
$\Delta mag [PSF]$

Non-linearities

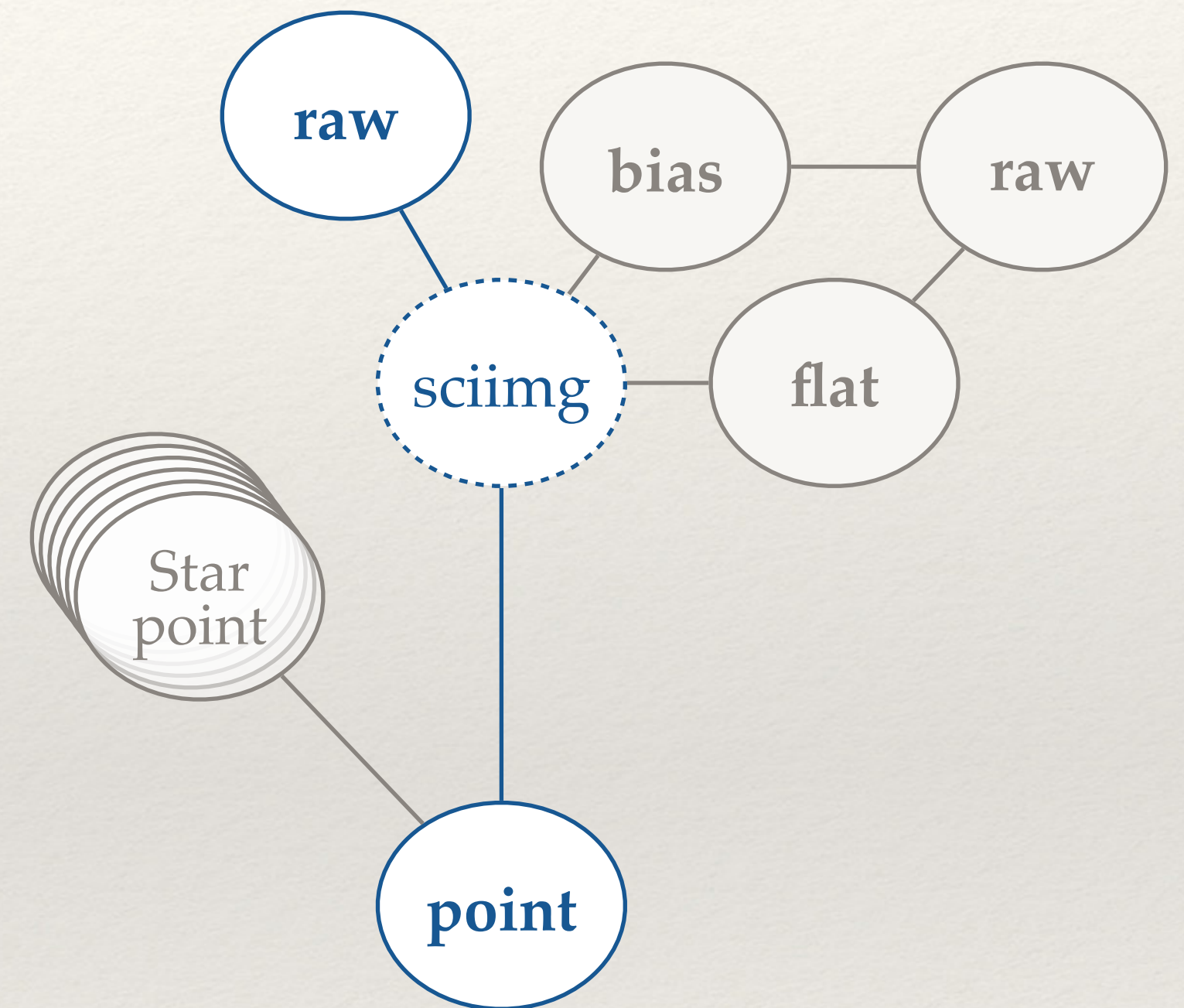
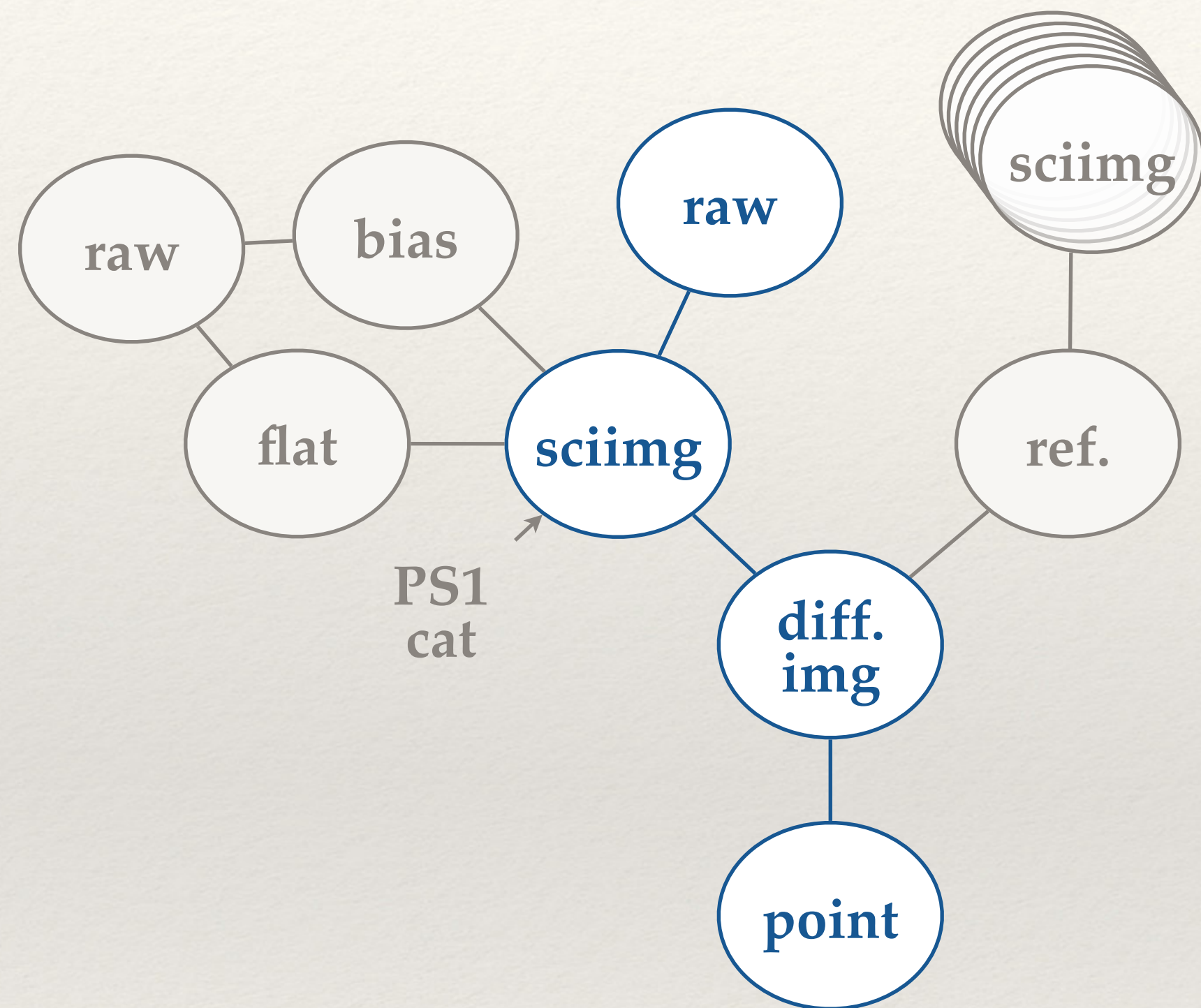
Low constant skewness - normal



Skewness is a function of magnitude - problem

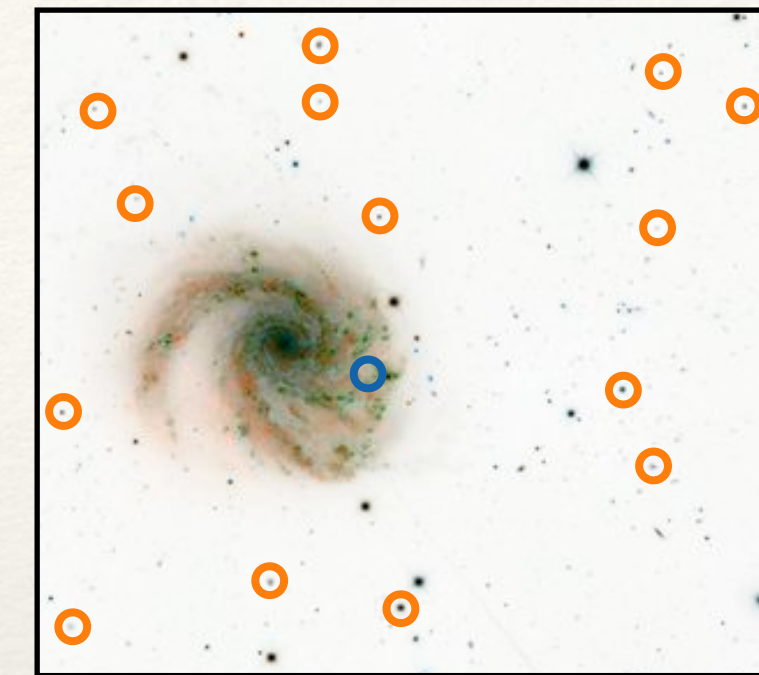
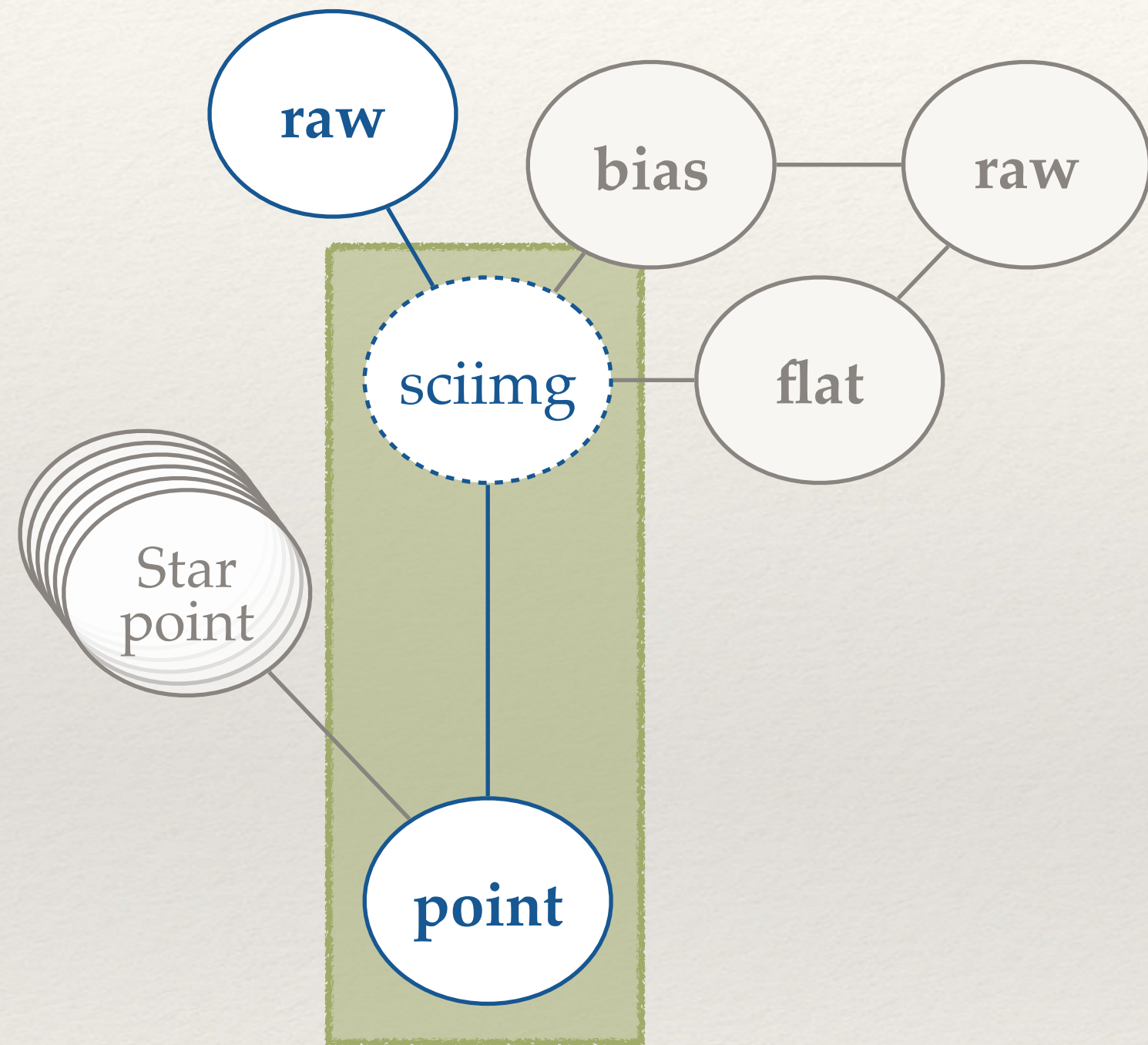


ZTFINP23 | *a new pipeline*



No reference images, no PSF issues | scene-modeling
No external catalog dependency | ubercal
No quadrant effect, no pocket bias | new ccd-level pipeline

ZTFINP23 | *scene modeling*

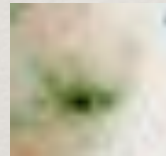


Scene modeling

No need for reference image
We fit all at once:

Galaxy Background
Transient
Observing conditions (PSF, wcs)

SCENE MODEL

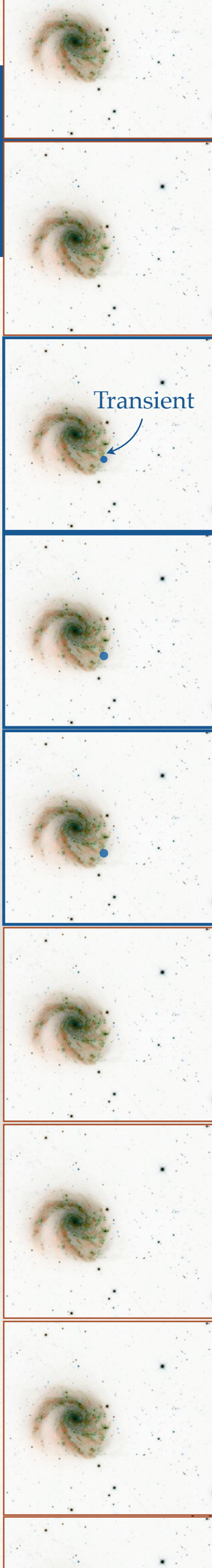
- Stars (Dirac) *constant* on average
-  Background = Pixel model | *best image*
- Transient (Dirac) *variable* flux



OBS. MODEL

Image PSF & Atmospheric Throughput
Variable

O(10³) images

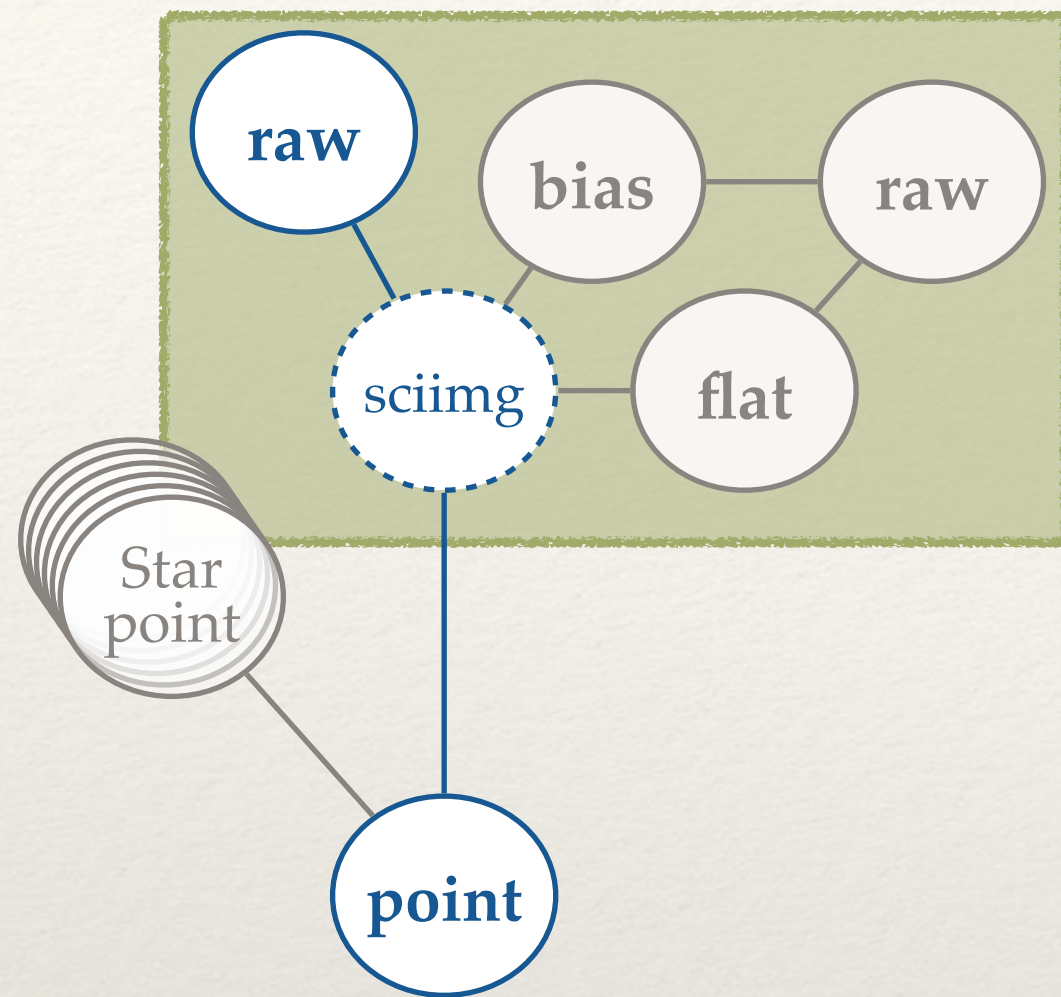


See Leander Lacroix' legacy talk

ZTFINP23 | *work at the CCD level*



Marie.Aubert
@clermont.in2p3.fr

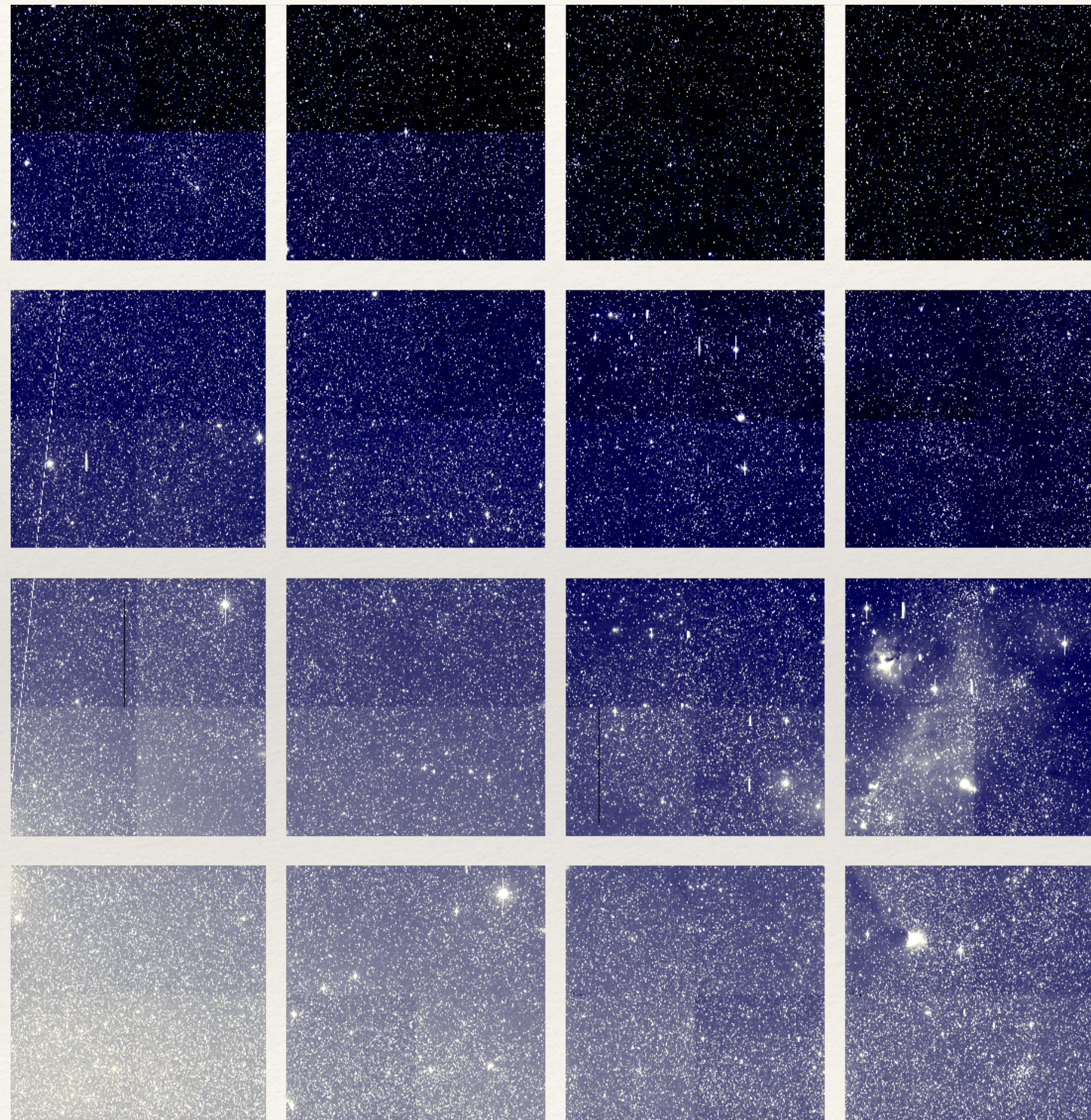


Ccd-level pipeline

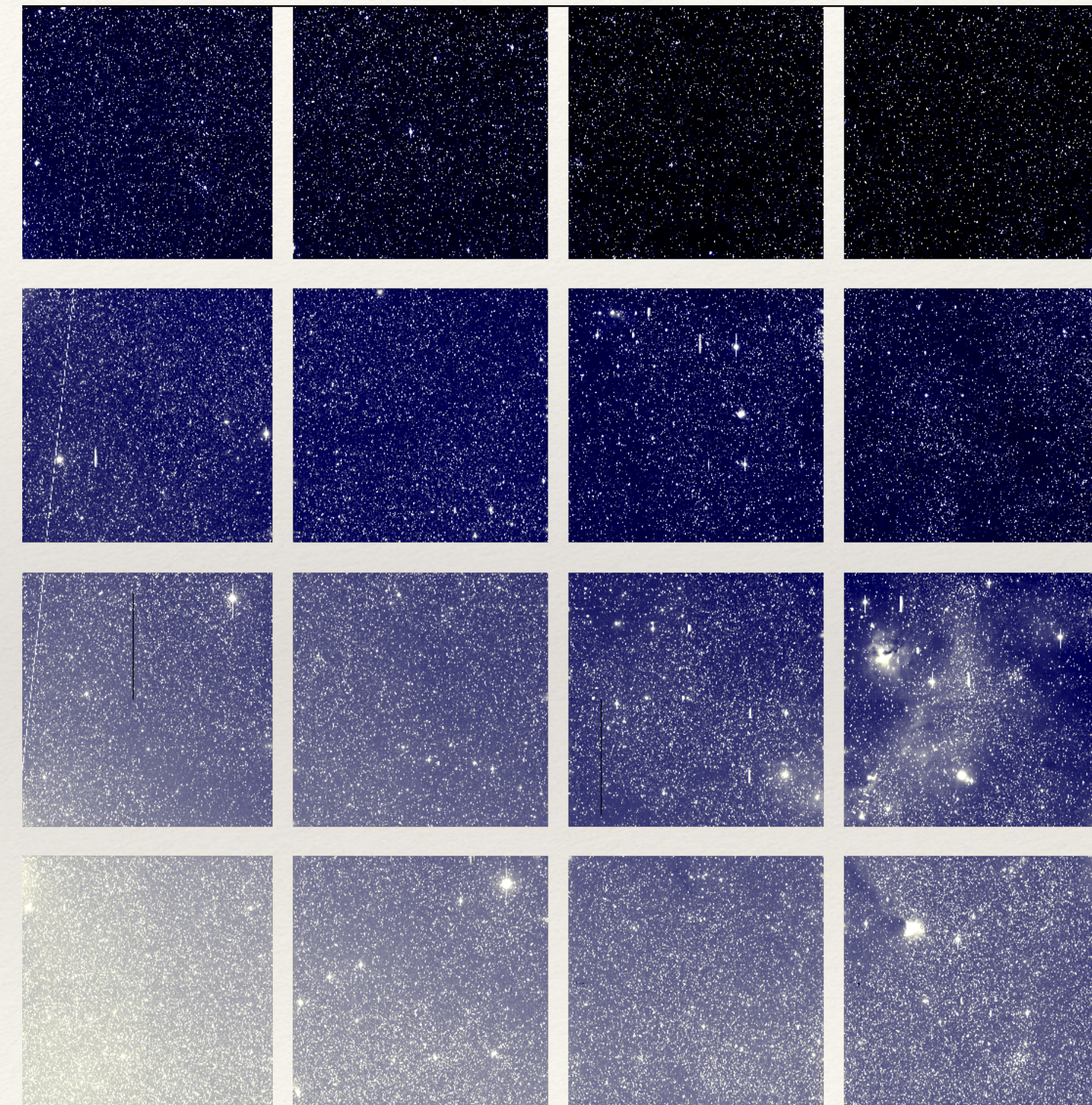
bias & flats are made
per period, not per day

Solving non-linearity
bias on the fly
(*not yet in prod*)

IPAC science image pipeline

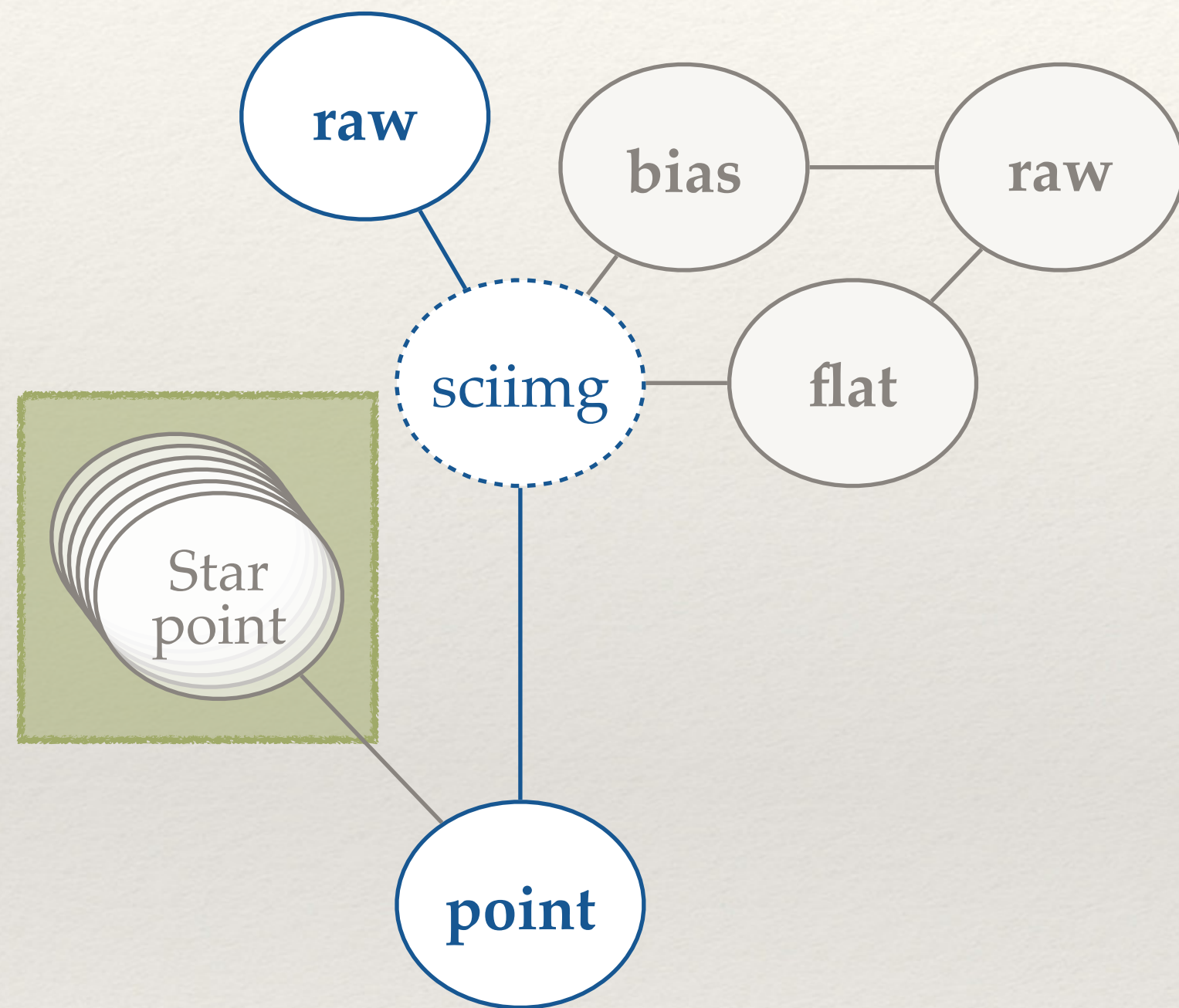


IN2P3 science image pipeline



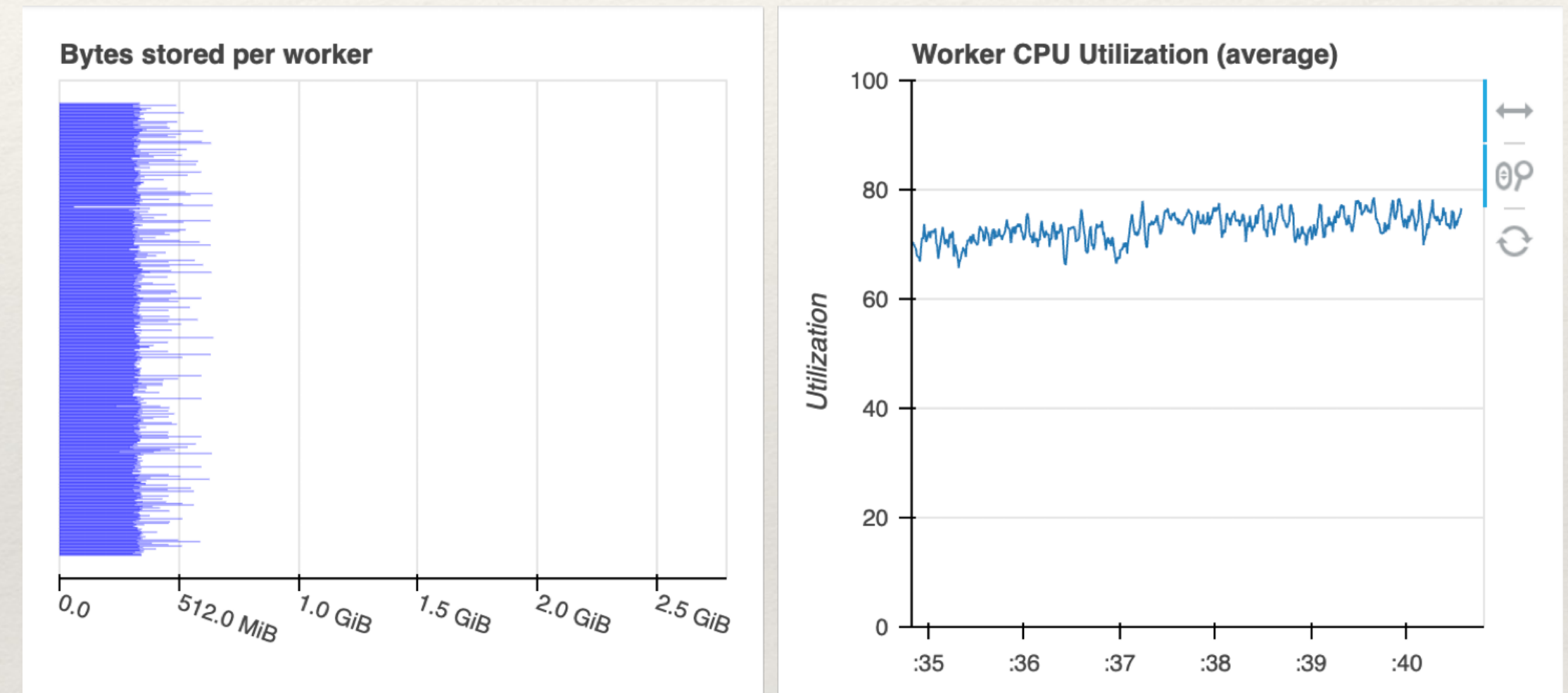
Go talk to Marie !

ZTFINP23 | *Ubercal - step 1 aperture*



Large work on massive computing

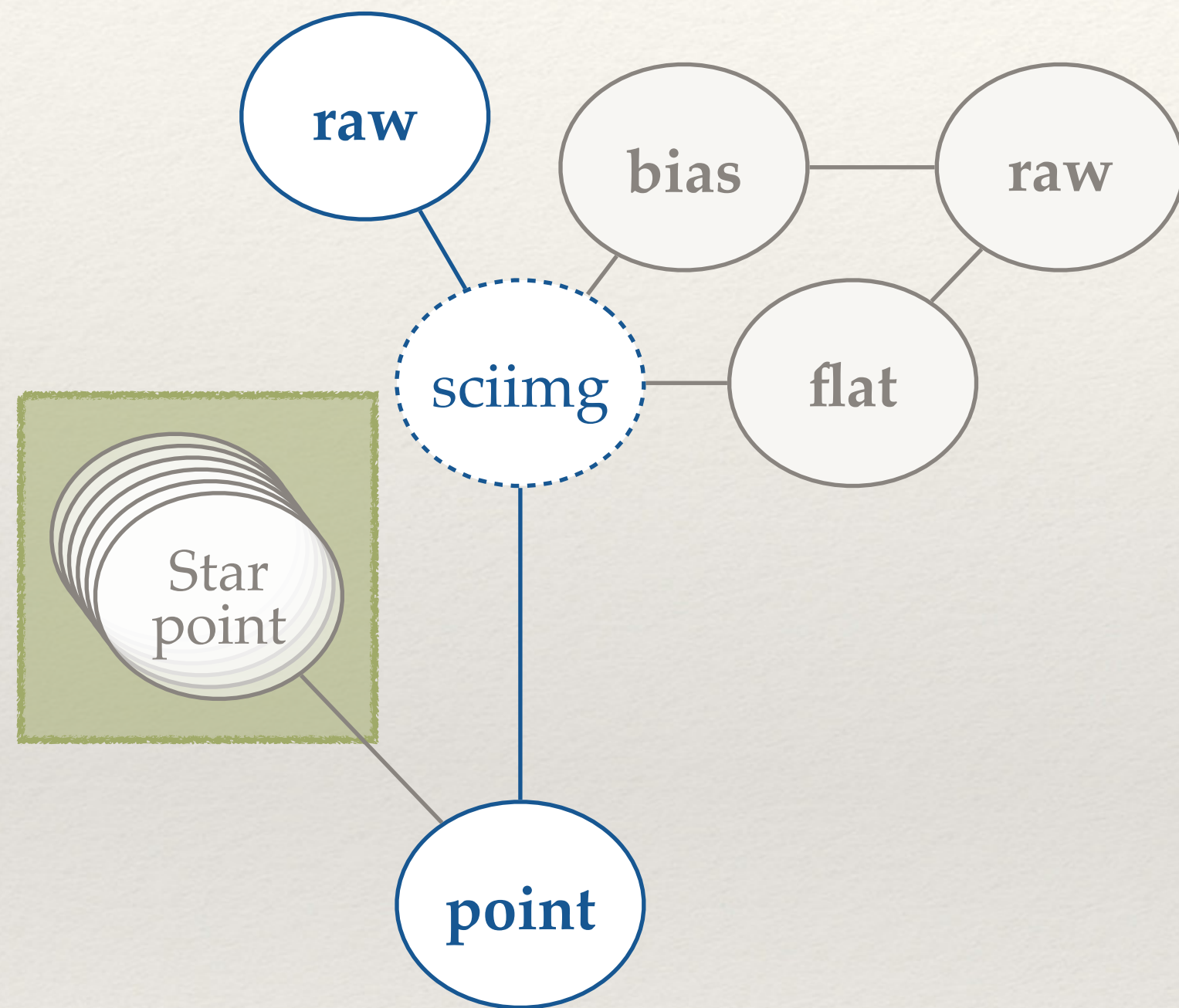
dask | no memory issues | efficient CPU use | etc.



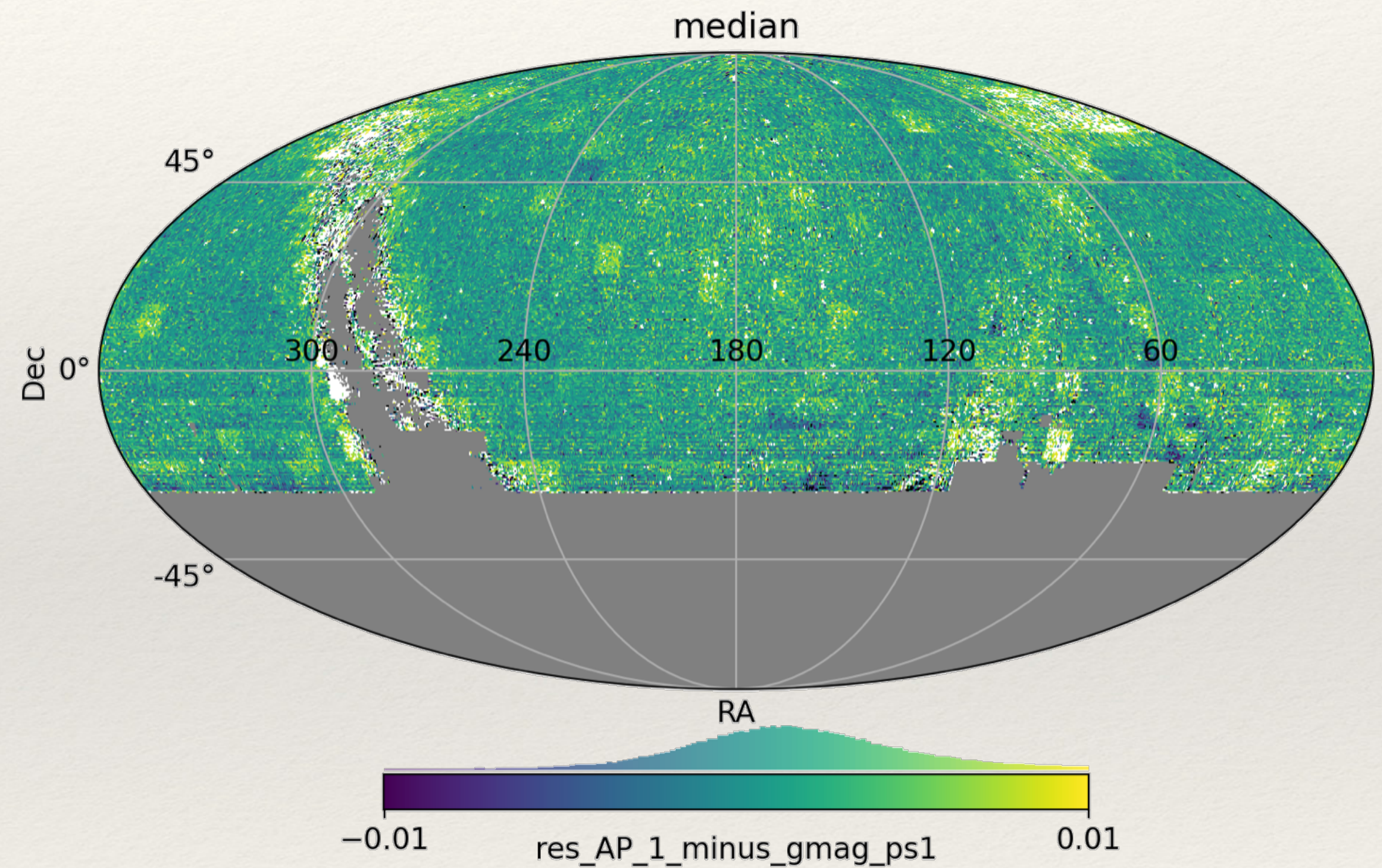
Aperture photometry

1 year of extra-galactic sky takes 1 day with 1 000 CPU

ZTFINP23 | *Ubercal - step 2 Matrix inversion*



Challenge: TB (sparse)matrix inversion



Few per mil residual with respect to PS1

See Nicolas Regnault's legacy talk

