

Daide Ricci

PRELIMINARY RESULTS OF
TRANSIT OBSERVATIONS
WITH THE
WIDE FASTCAM

CHEOPS ★ 2015-06-18

Follow me using your browser!

→ is.gd/cheops3

CCDs

- great photometric precision;
- long read out time (sometimes tens of seconds!);
- fast read out times? → high read out noise!

EMCCDs

- Lucky Imaging and Fast Cameras;
- low read out times and low read out noise!
- small field of view :(

WFC allows quick photometry
with a larger field (**8×8 arcmin**)

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→ is.gd/cheops3

WFC FOR EXOPLANETARY TRANSITS

Short-period candidates in the near future

→ TESS;

→ Kepler-2;

WIDE FASTCAM AIMS AT

→ refining ephemerides;

→ complementing and

→ tracing the path for CHEOPS follow-up;

→ Transit Timing Variations.

Side effects:

“ from great sampling rates come great GigaBytes ”

(200-300GB per night).

Improvements:

→ BITPIX=16;

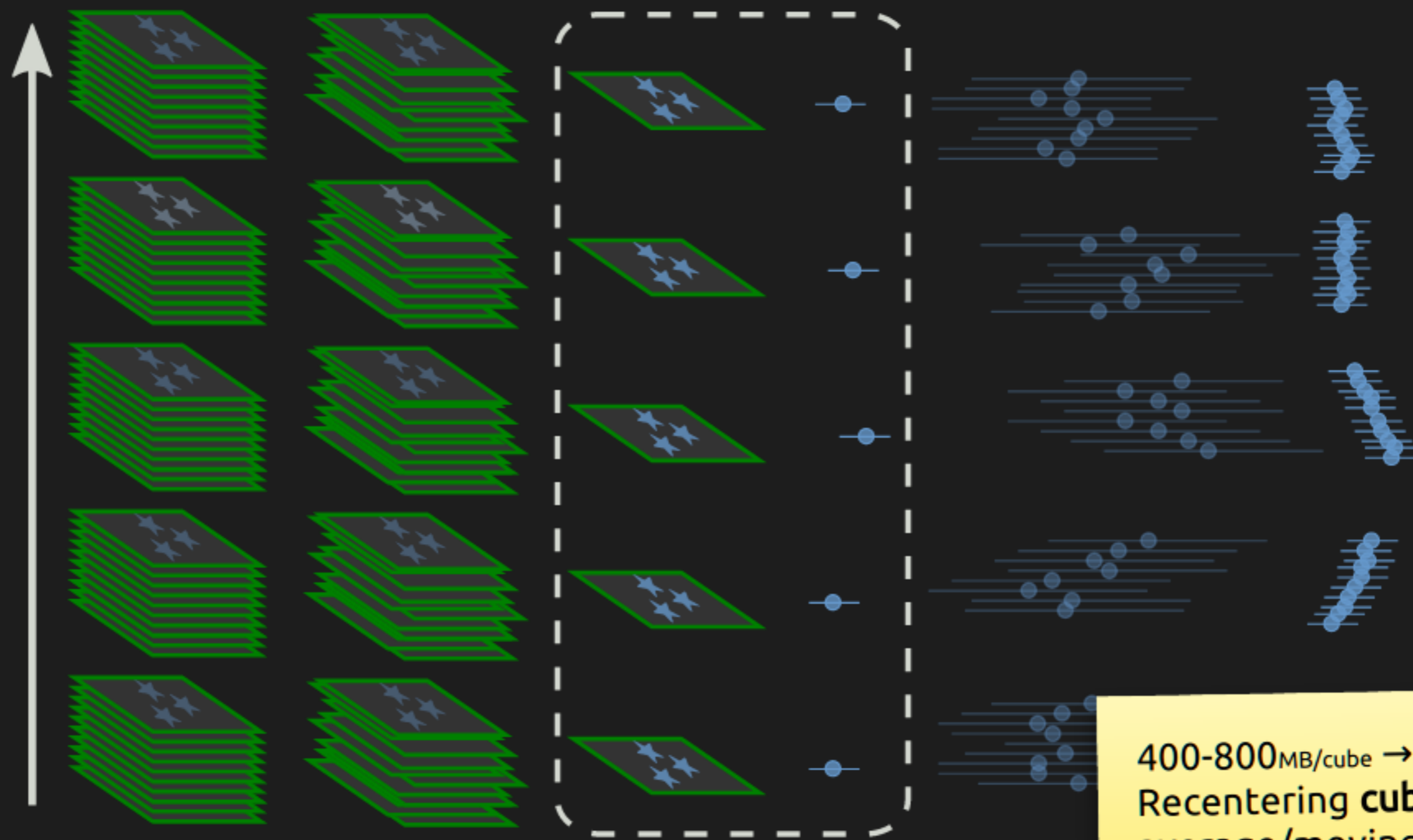
→ fpack compression;

→ ~80GB...

CUBES...

1024_{px} × 1024_{px} × 200 images @ 200ms/image

time ↑



400-800_{MB}/cube → 40_s "exposure"
Recentering **cubes** and then
average/moving average.

OBSERVING TRANSITS...

We chose the Johnson **R** filter and general exposure times of 200ms.

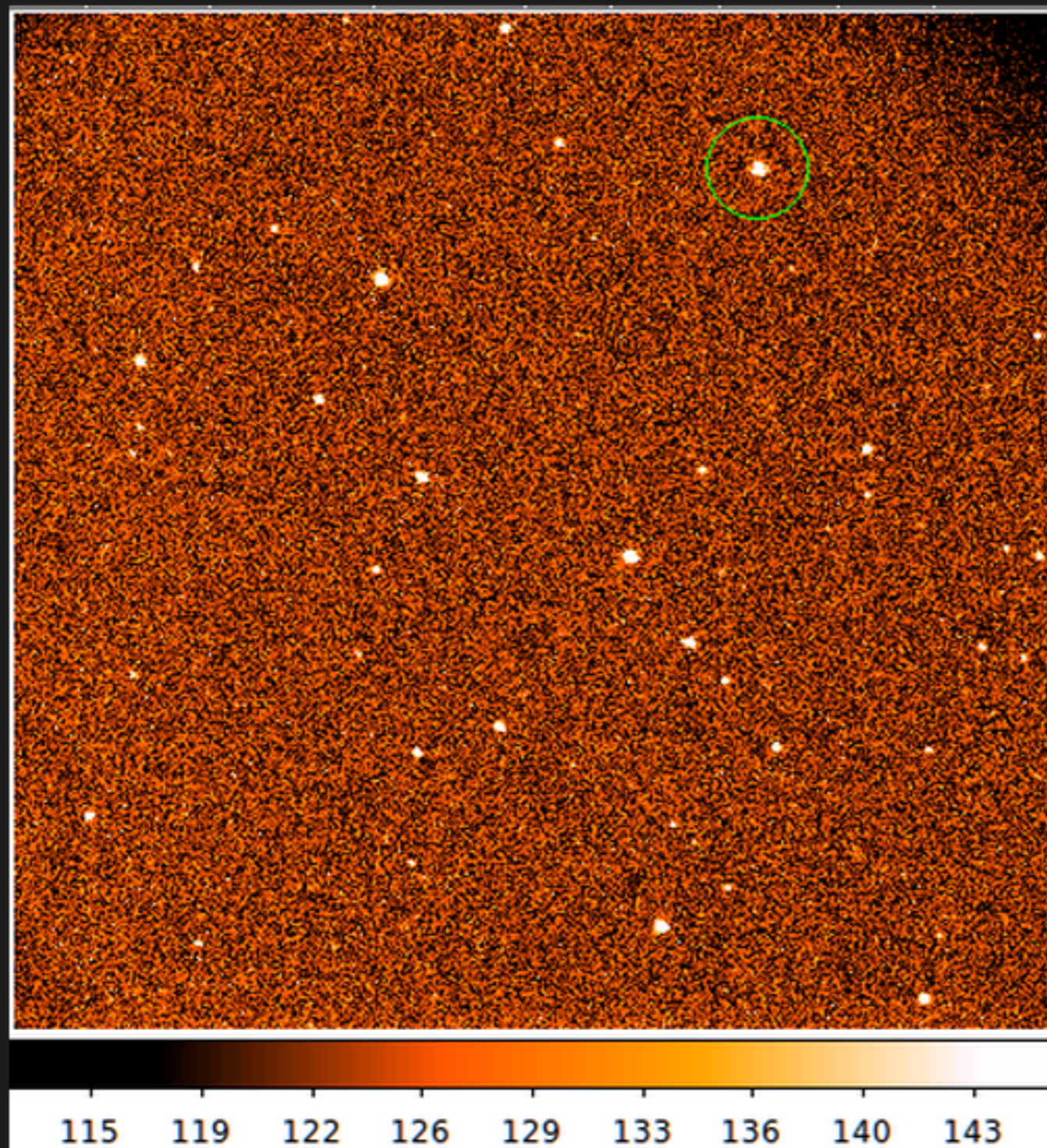
- **gj1214** - 2015-04-27
- **hat-p-27** - 2015-04-27
- **hats-2** - 2015-04-26
- **j165631** - 2015-05-04
- **j173703** - 2015-05-06
- **kepler-41** - 2015-05-07
- **koi-0760** - 2015-05-05
- **qatar-2** - 2015-04-23
- **wasp-43** - 2015-04-22
- **wasp-57** - 2015-05-08
- **wasp-58** - 2015-04-23 - 2015-04-28 - 2015-05-07

For our tests, targets have $M_V=11-13$ and a $\Delta_V \sim 1\%$.

CCD:

- Dynamic Range: 0-4000_{counts};
- gain = 0.10 e⁻/ADU;
- RON = 2.7 ADU (g1m200).

FOCUSING ON WASP-58



Not well studied object with:

→ **RA:** 23 13 58.76;

→ **DE:** +08 45 40.6;

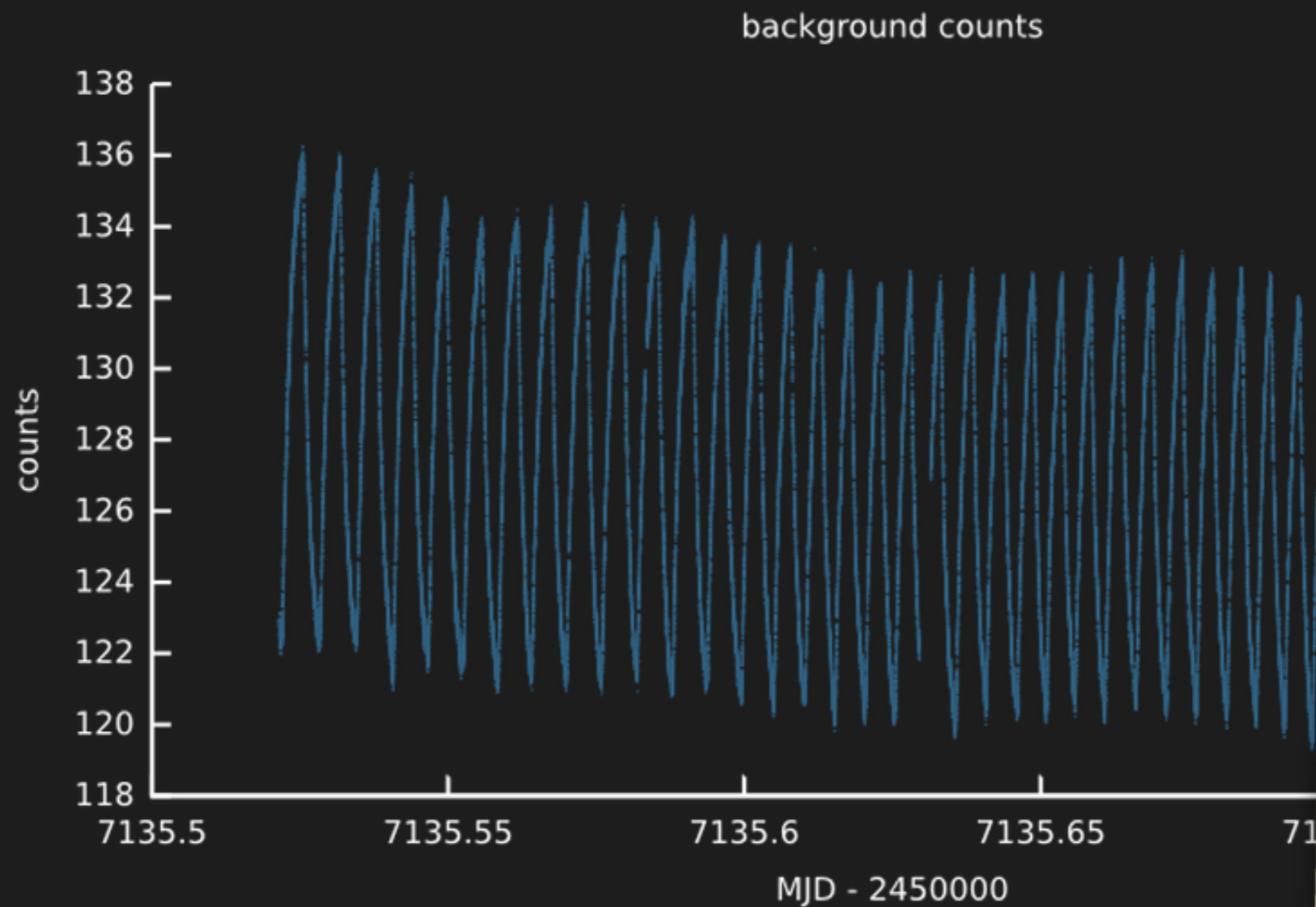
→ **V** = 12 mag;

→ **dV** = 0.0290 mag;

→ **duration** = 108.58 min;

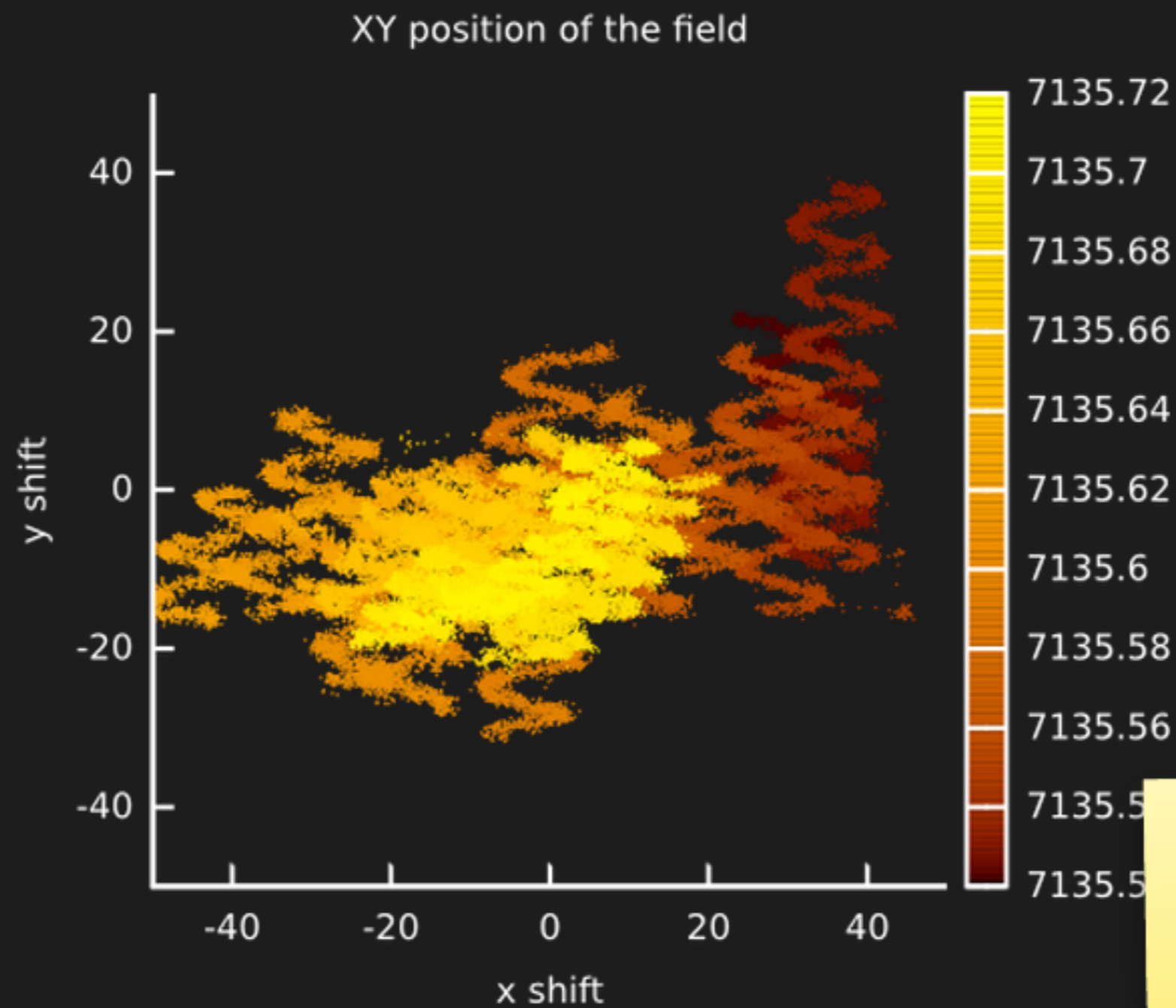
→ **Period** = 5.01718 days.

WFC BACKGROUND



Cooling cycle?
Does not affect our differential
photometry

TELESCOPE POINTING



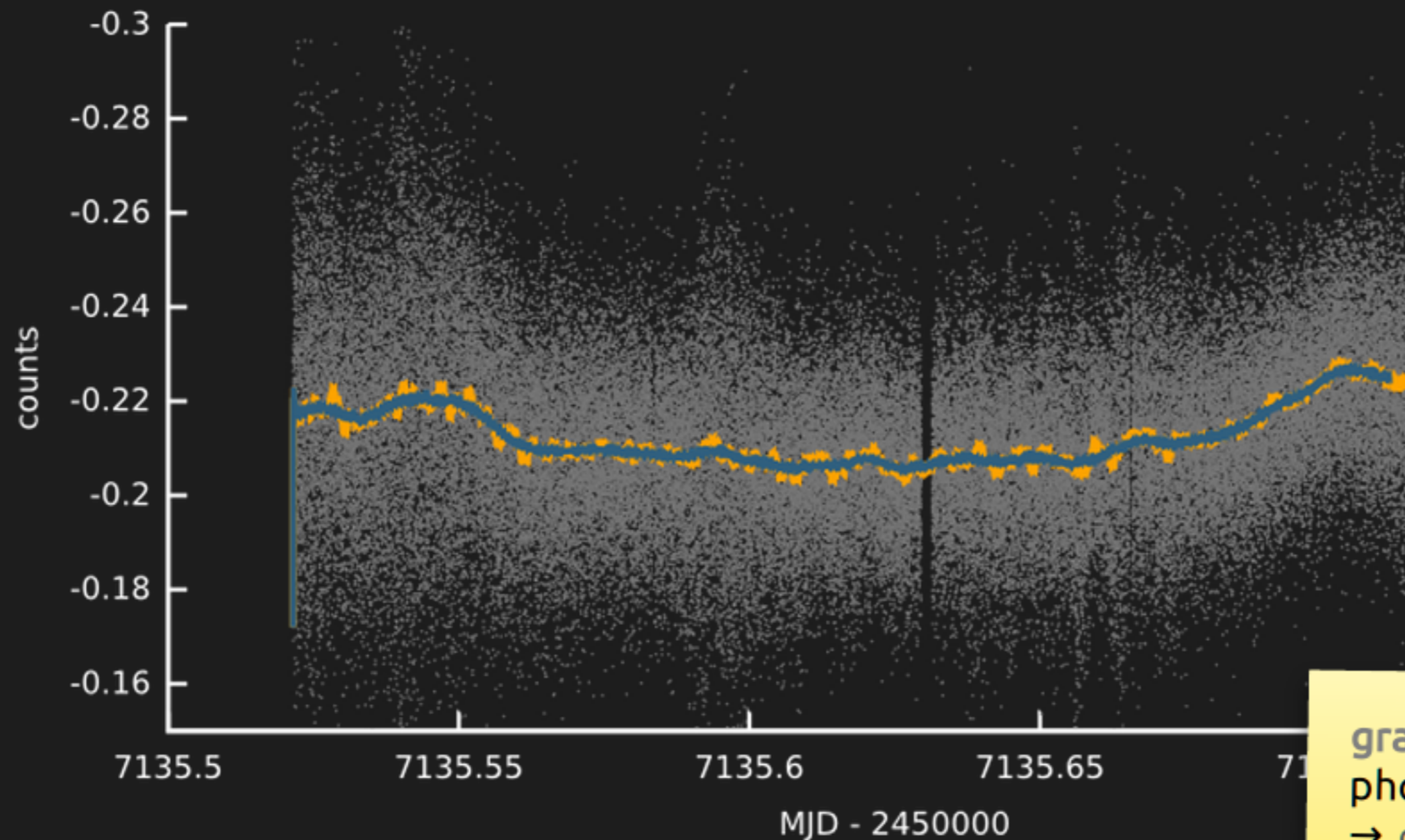
color scale: MJD - 2450000

Pointing / recentering ?

Corrected. Does not affect our
differential photometry

SLIDE-BY-SLIDE: 80 000 POINTS!

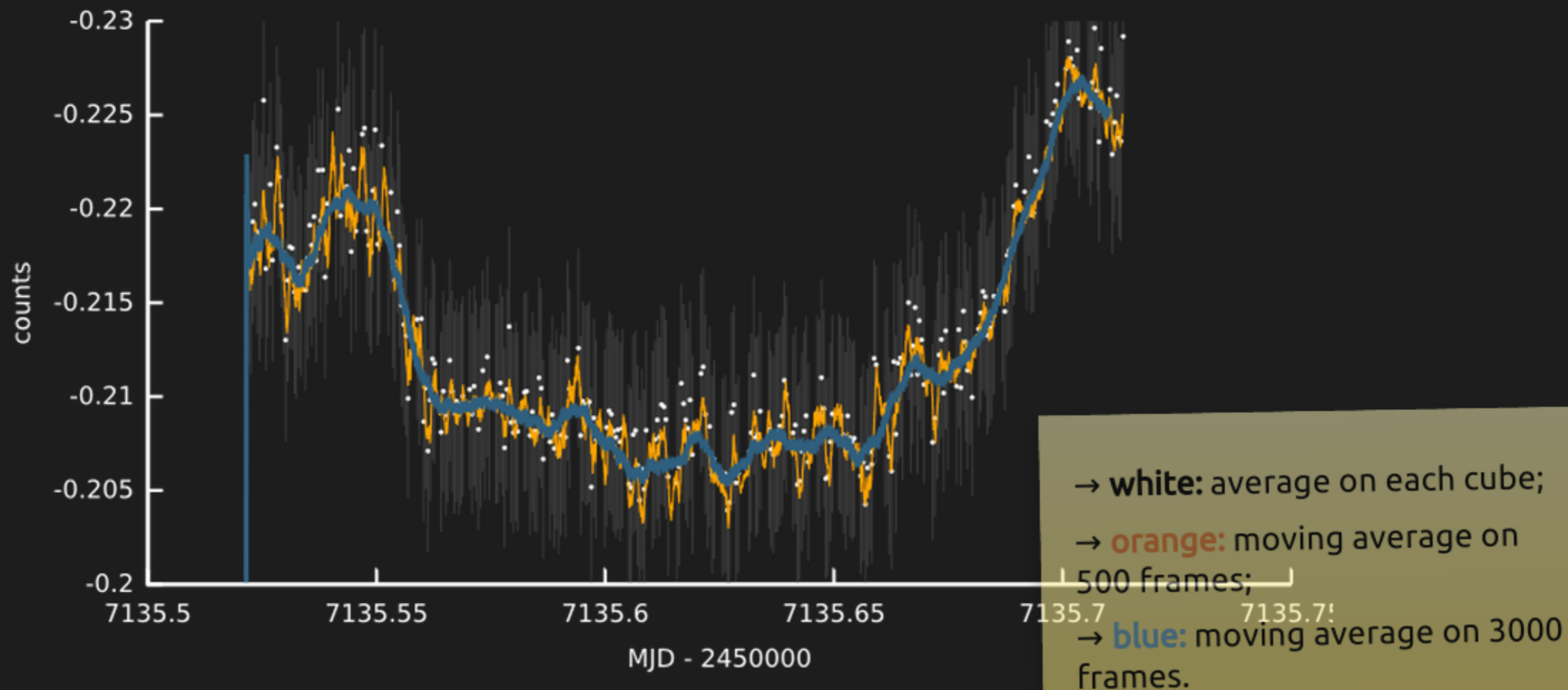
wasp-58 with Wide FastCamTCS, 2015-04-23



gray points: differential photometry on each frame
→ defot (Southworth 2010)

AVERAGE AND MOVING AVERAGE

wasp-58 with Wide FastCamTCS, 2015-04-23



NEXT STEP

- understand residual variations of **Wide FastCam**;
- comparing **defot** results with **ULTRACAM** data reduction software ;
- fit of ours and recent observations with **IAC-80** and **OARPAF-80**;
- ... suggestions?

wasp-58

- 1 observation with the **IAC 80cm** telescope at the Teide Observatory;
- 2 observations with an air cooled SBIG camera mounted on an **Astelco 80cm** telescope in northern Italy;
- 3 observations with **Wide Fastcam** at the 1.5m TCS telescope.

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thanks

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This is a real `html5` website
made using Mike Bostock's

→ [stack.js](#)