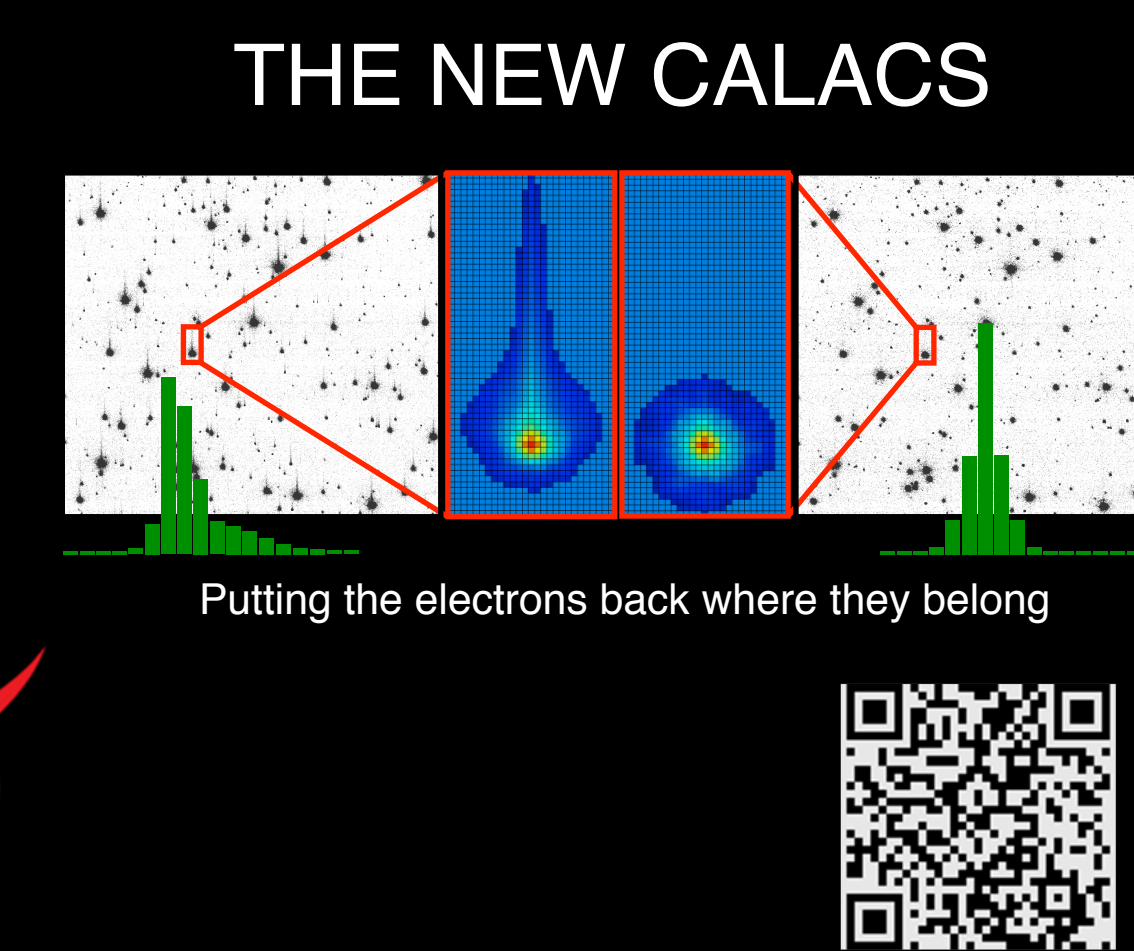# Astrodrizzle: Utilizing New CALACS Products

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THE NEW CALACS

Putting the electrons back where they belong

ABSTRACT

Recent improvements and additions to the standard ACS data calibration pipeline have made for better data in several ways: a robust and widely-applicable de-striping algorithm, the pixel-based correction of CTE trails, and better bias shift correction, among other things. These are particularly important improvements for post-SM4 ACS data. Effects such as CTE trails and striping are either more prominent or new in more recent data after the additional years of on-orbit radiation damage and the installation of the new CCD Electronics Box Replacement (CEB-R) with its SIDECAR ASIC (Application-Specific Integrated Circuit) circuitry. The latter imposes a striping pattern in all post-SM4 ACS/WFC data. Finally, the AstroDrizzle software from the new DrizzlePac software package for aligning, CR-cleaning, and combining images is used. We present some newly re-processed post-SM4 ACS/WFC data as example of these improvements.

CALACS now produces both FLT & FLC.

→ You get both via pipeline retrieval.
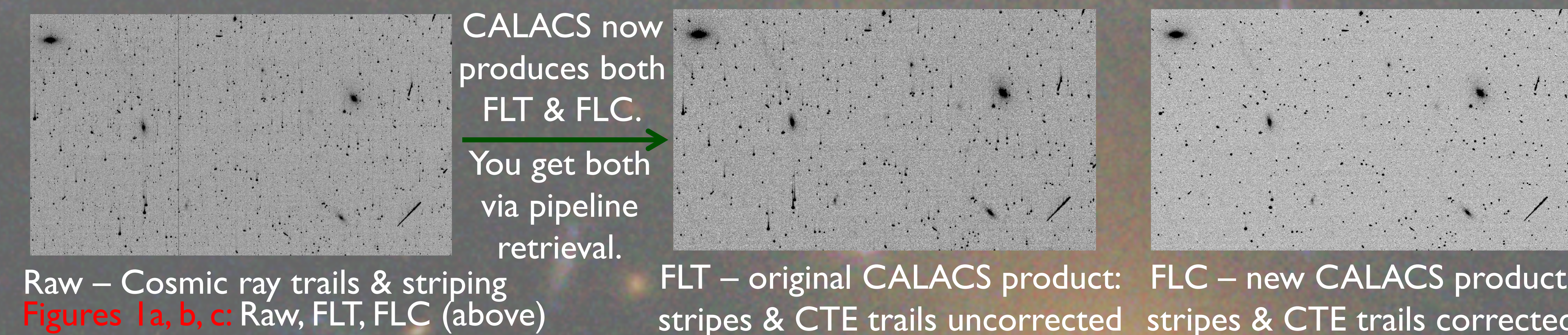
Raw – Cosmic ray trails & striping

FLT – original CALACS product: stripes & CTE trails uncorrected

FLC – new CALACS product: stripes & CTE trails corrected

Figures 1a, b, c: Raw, FLT, FLC (above)
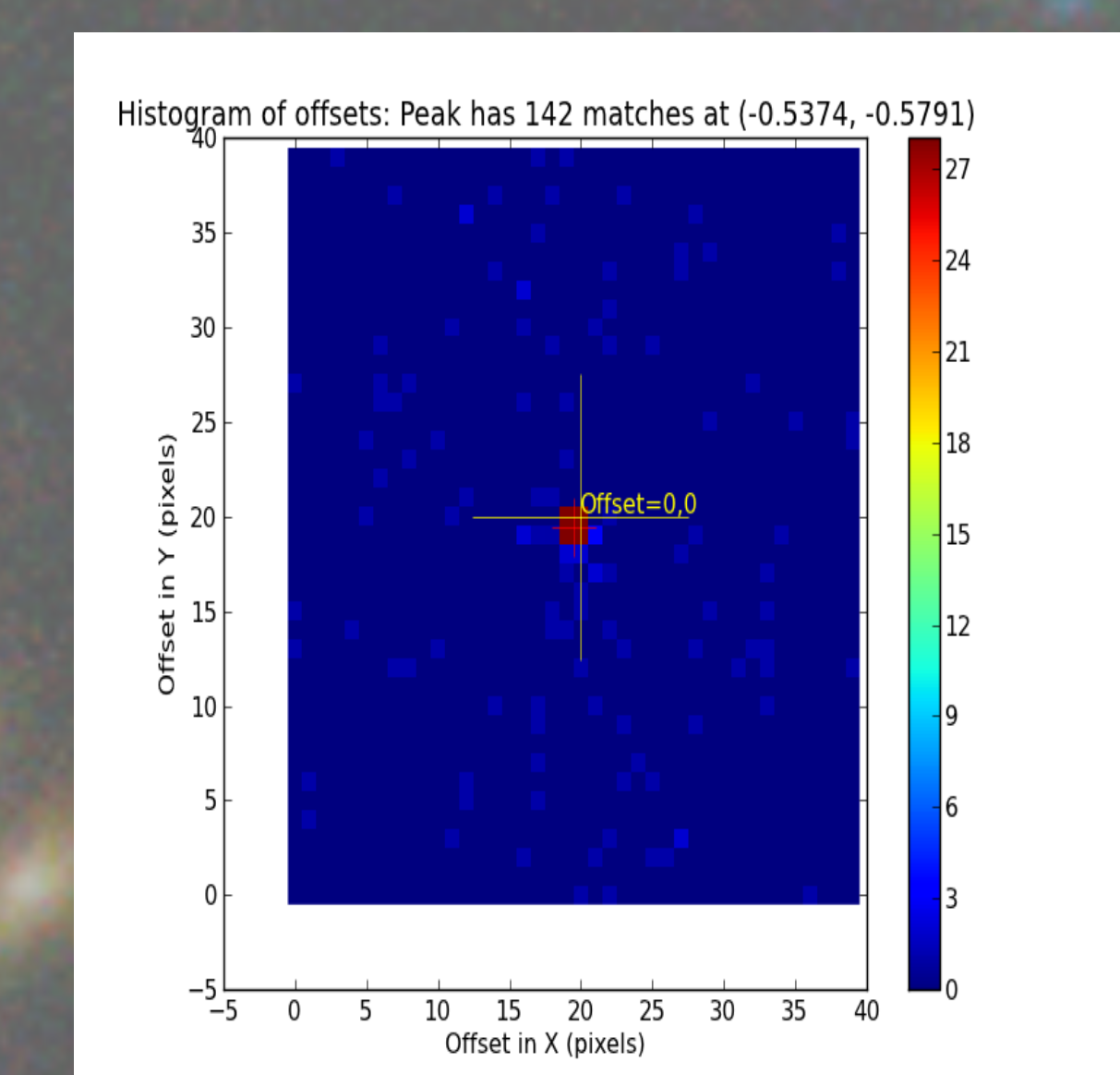
Figures 3a, b, c:
When using tweakreg, you want to get x,y residuals with rms of order ~0.05-0.15 (right panel) and vector residuals with no large directional trends, e.g. smaller & random. The histogram (L) above should show a reasonable offset.
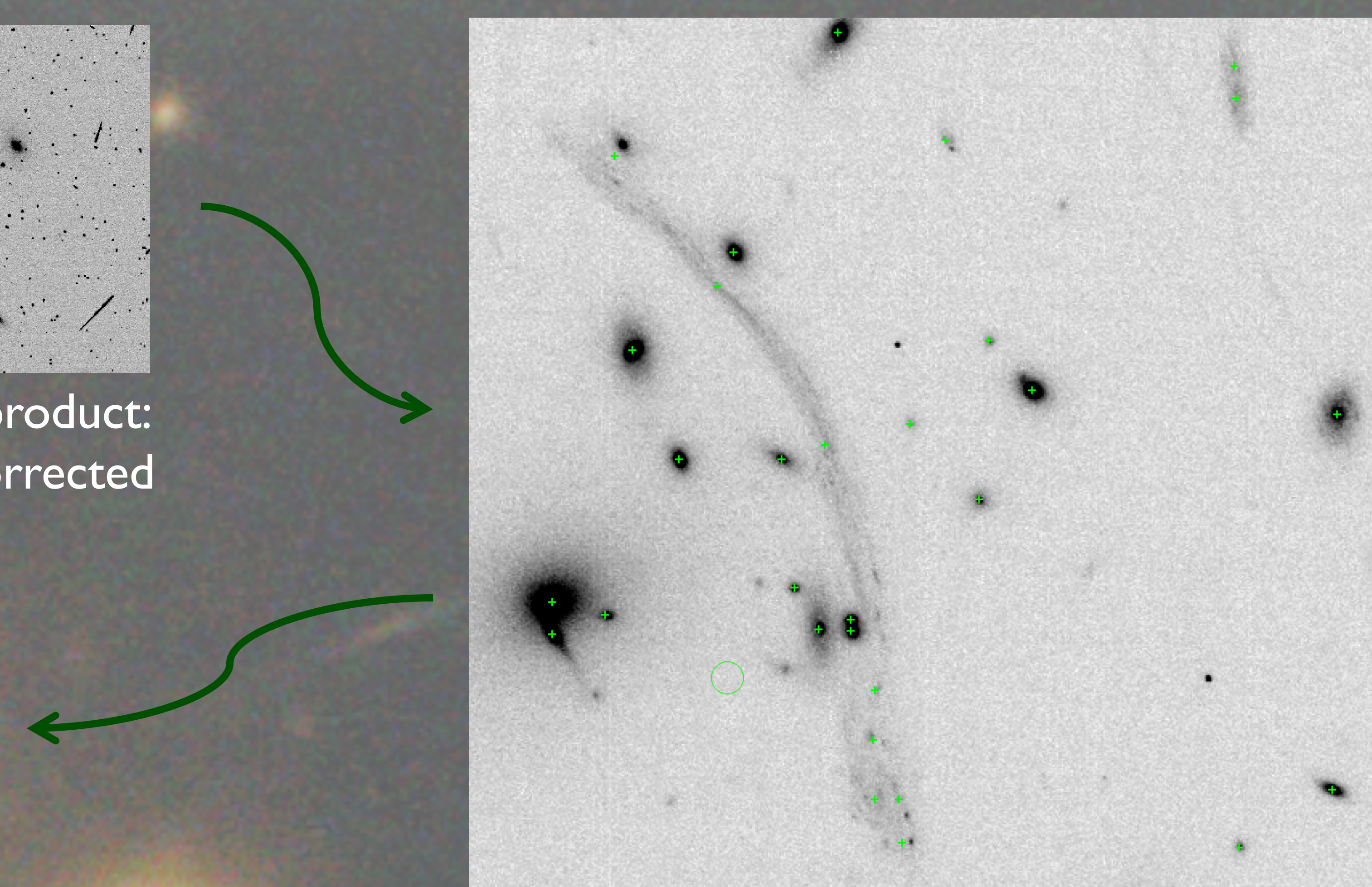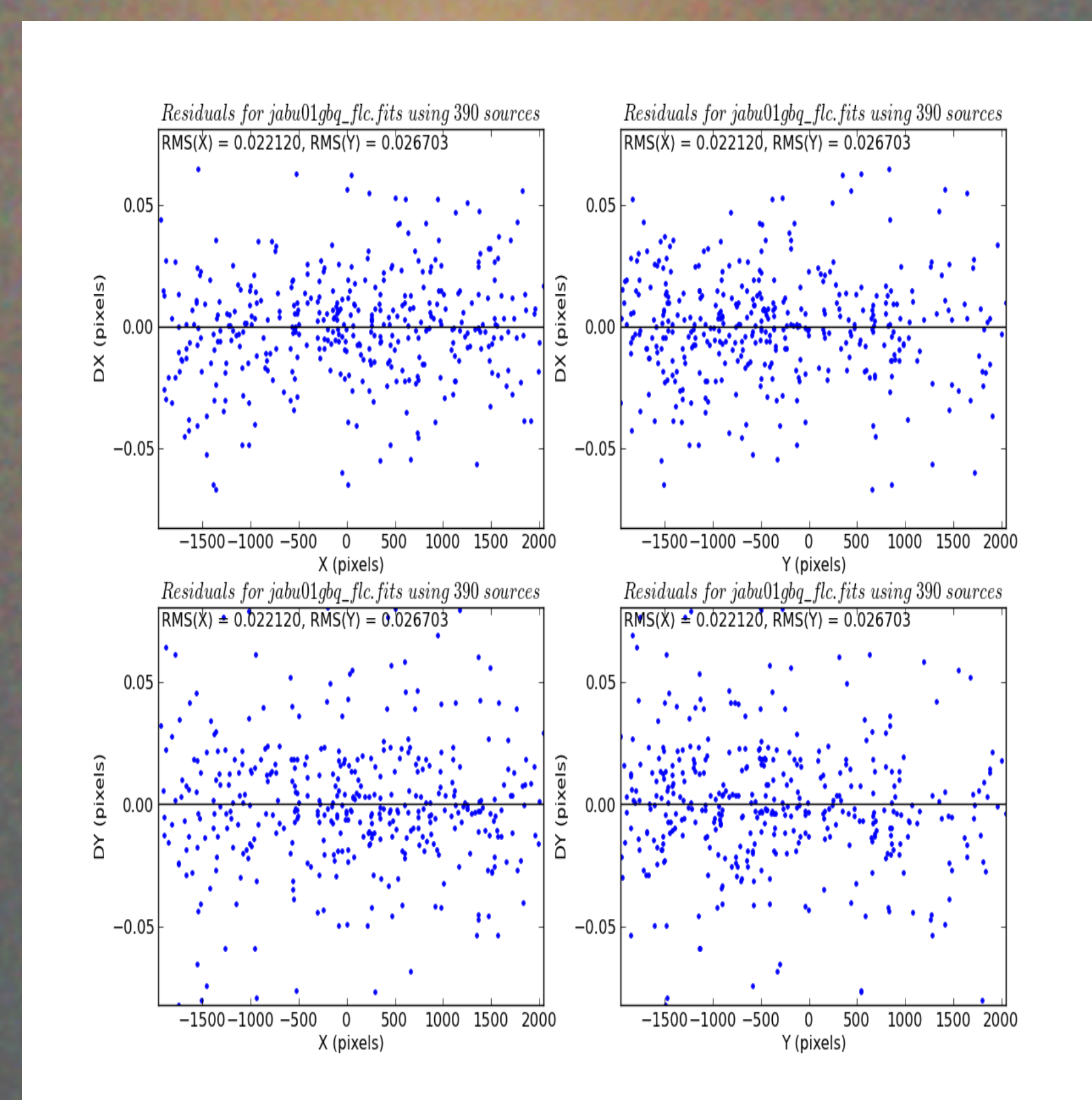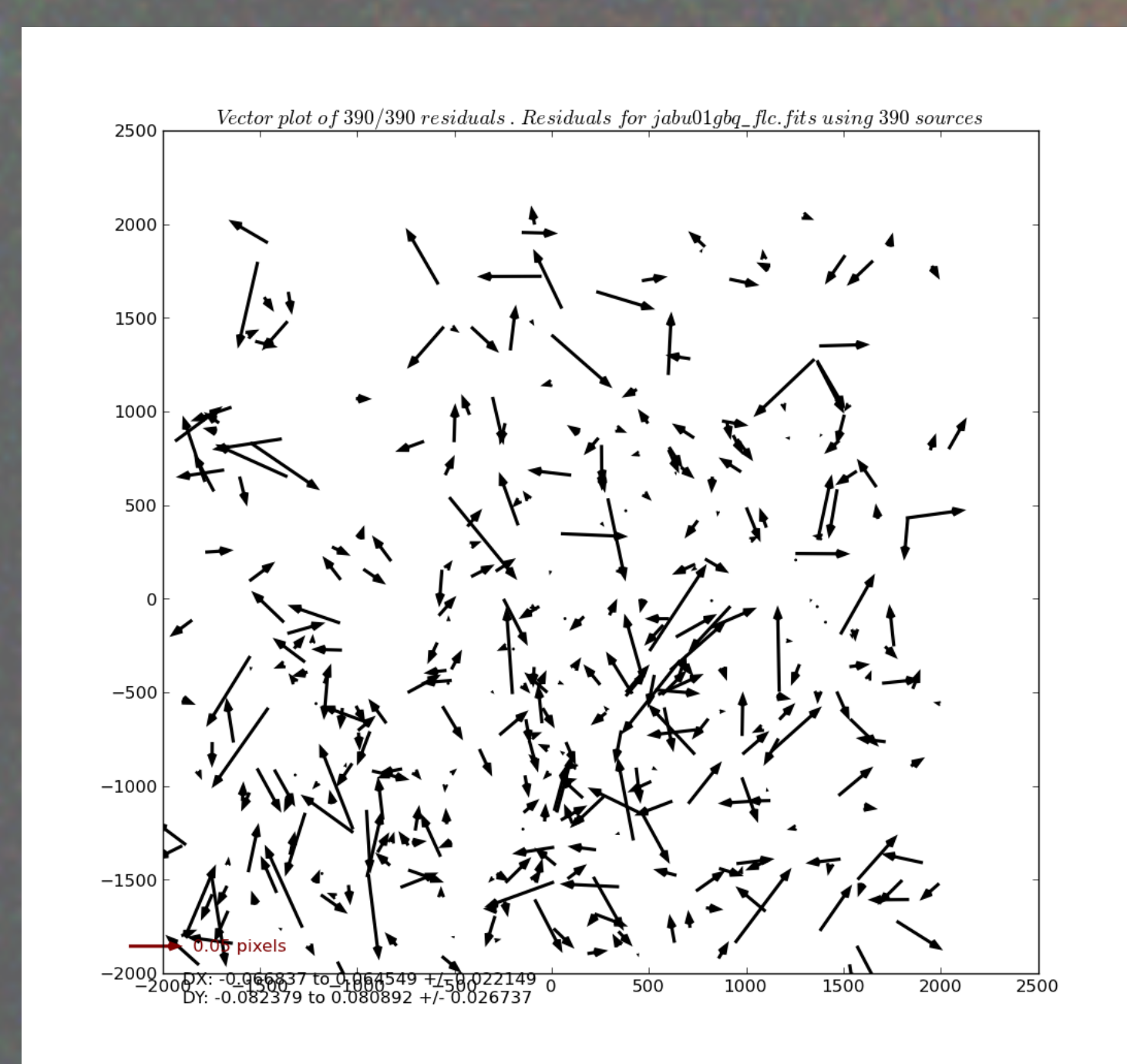
Figure 2: The current default for tweakreg, the task in DrizzlePac used for astrometric registration, is imagefindpars, which is tuned primarily for finding stars. Some extragalactic images have almost no stars but many galaxies. So, you may make your own SExtractor catalogs for each image as we have done here, using a cosmic-ray cleaned intermediate version of each image produced as a useful by-product of your initial drizzling. Input your SExtractor catalogs into tweakreg, and update your flc files' headers when happy with the solution. Save/share headerlets!
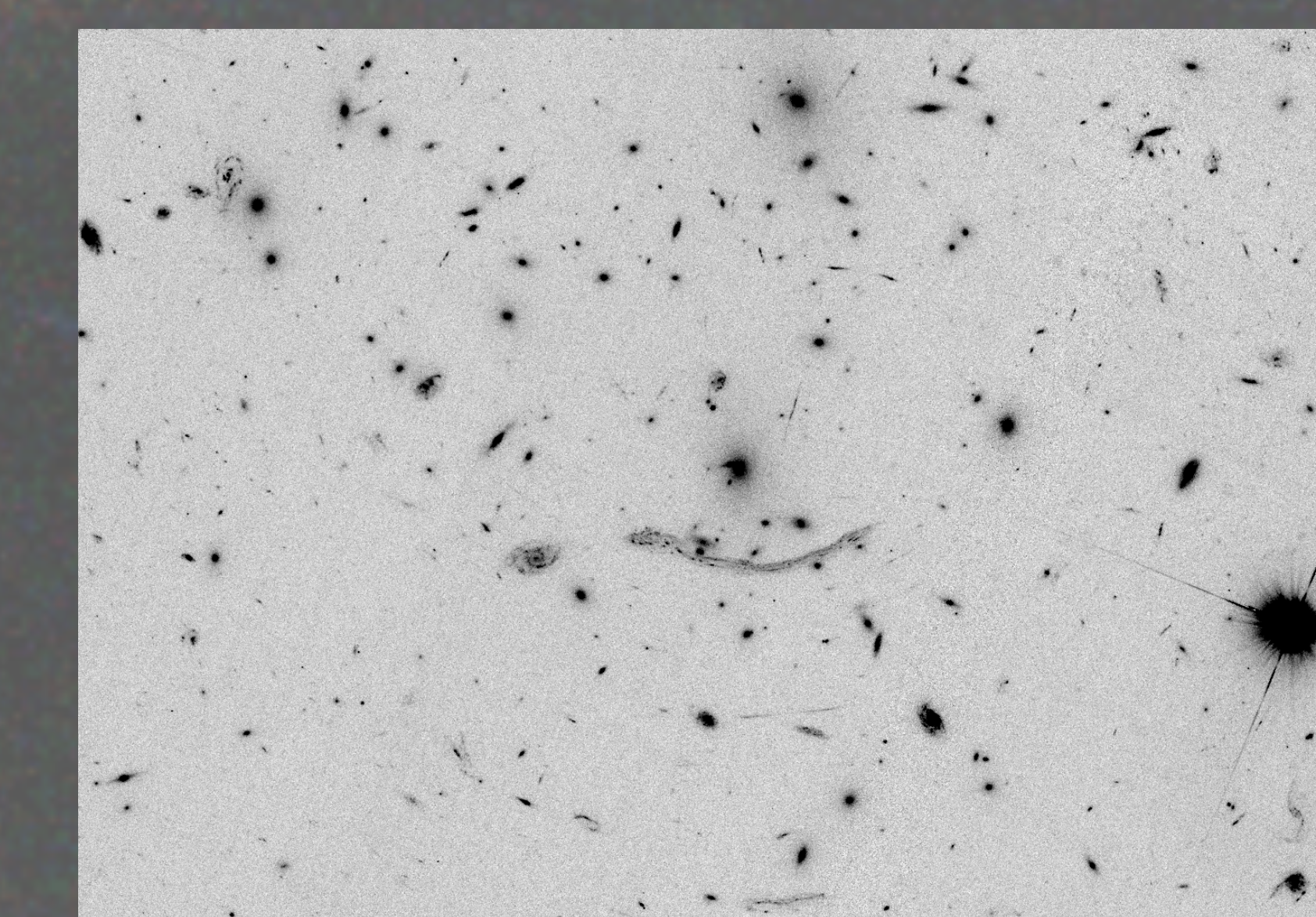
Figures 4a, b, c (this level):
Align your images by filter first, and combine them. Then you can remove offsets between those, and propagate the info back into headers of all flc files.
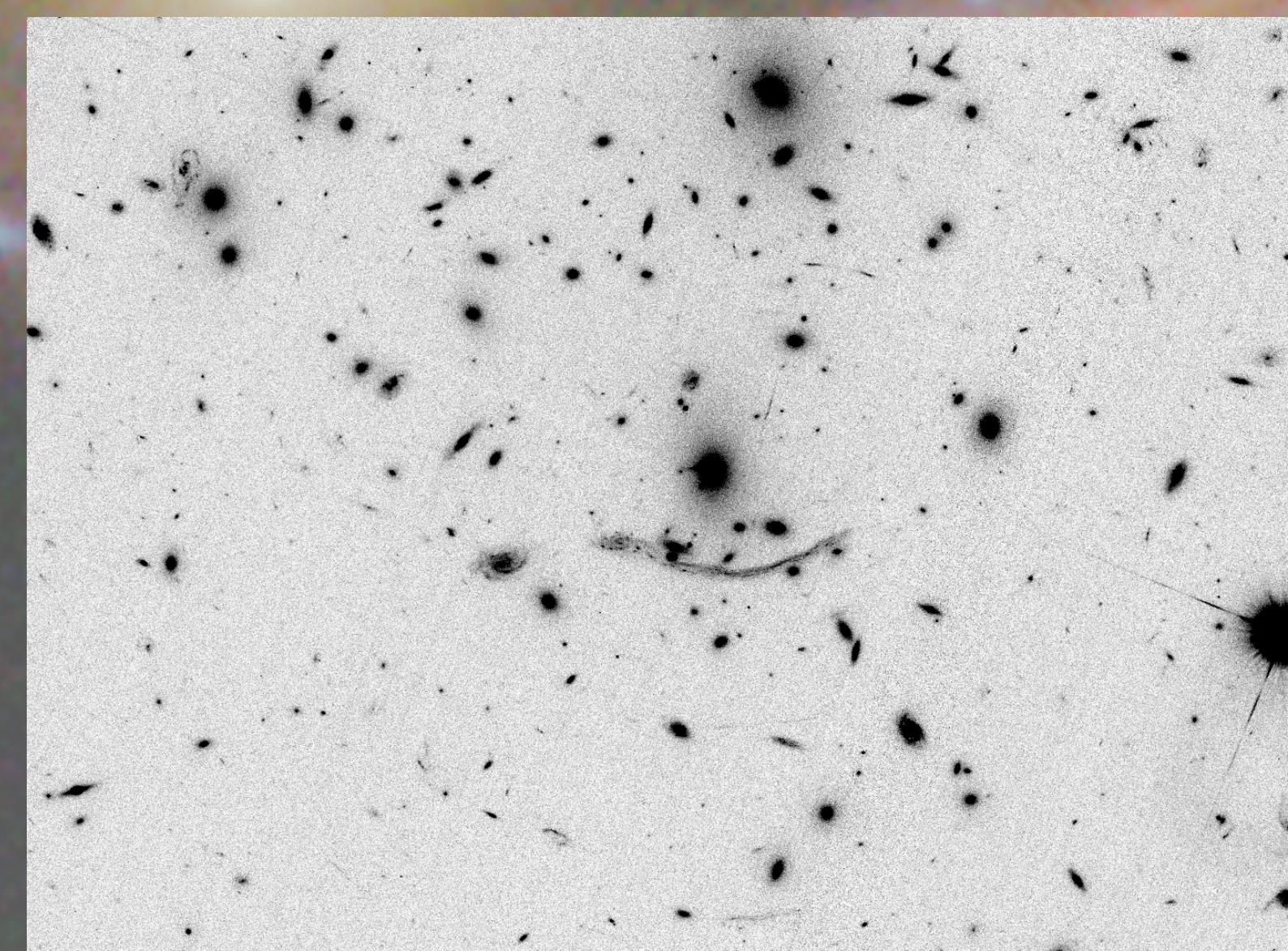
Figures 5a, b, c (lower level, below):
The pipeline will give you drizzled files for all associations only at the default pixel scale etc. For doing your science it is advisable to re-do the alignment and re-drizzle at the desired often finer resolution scale.
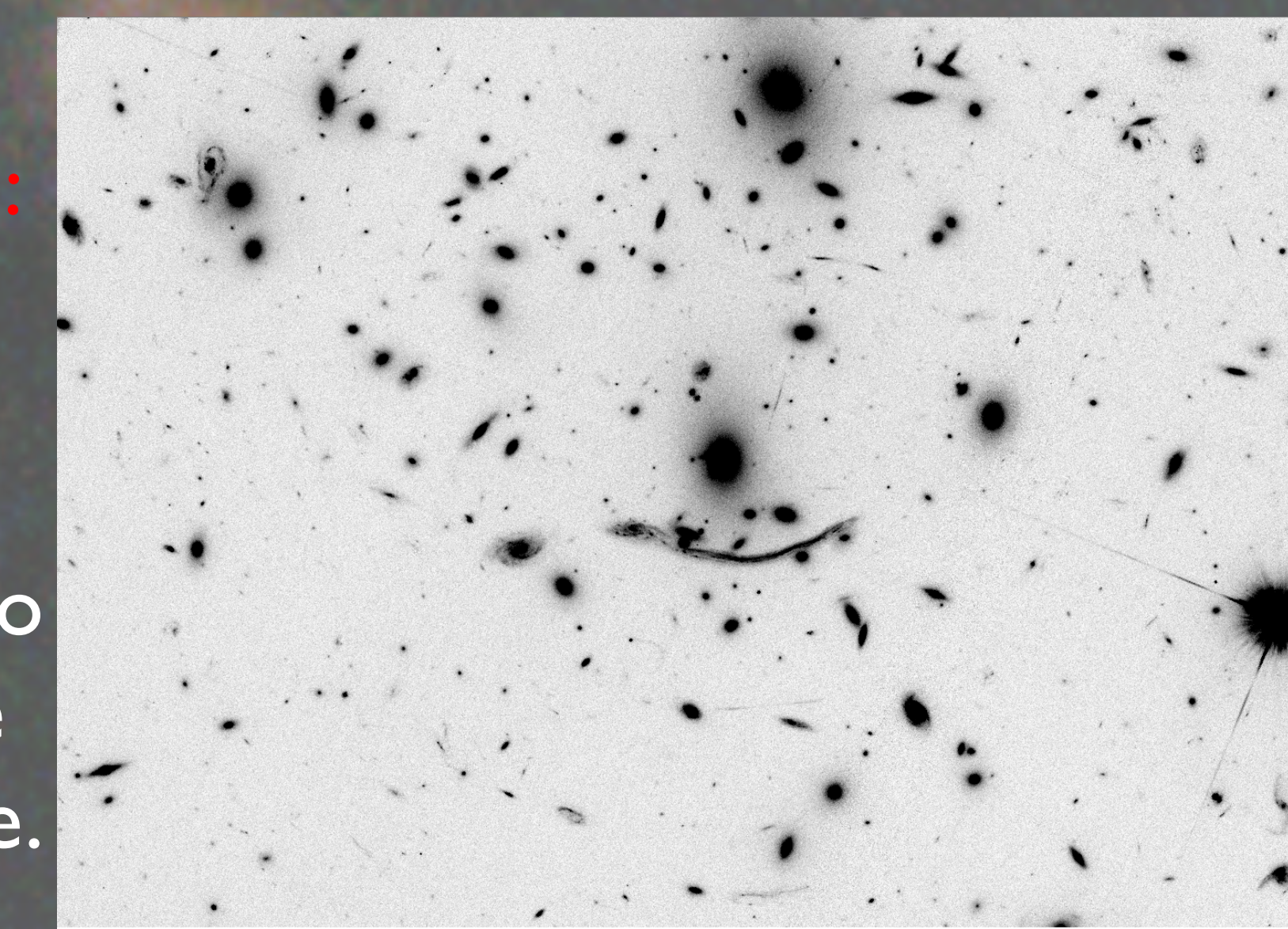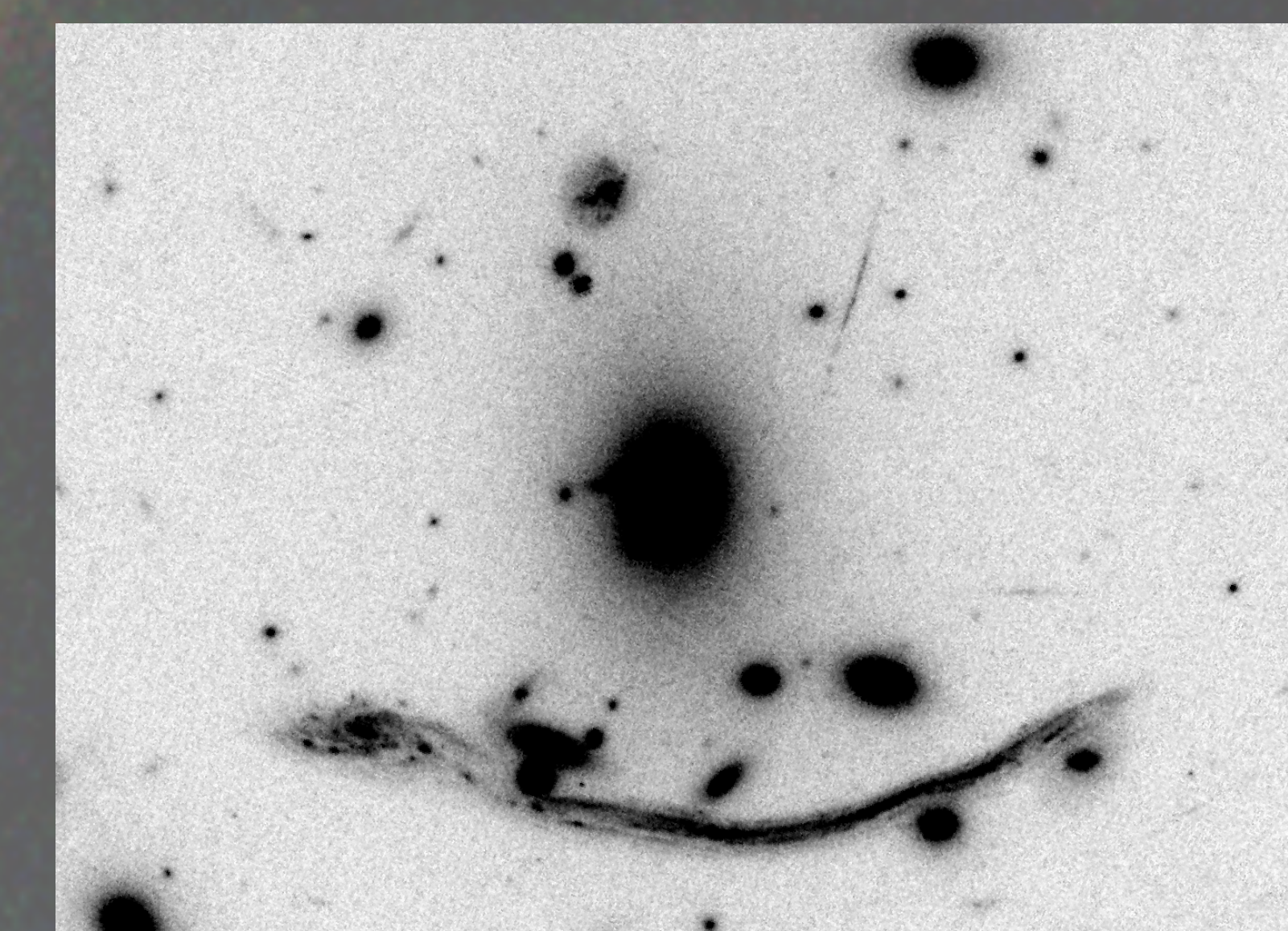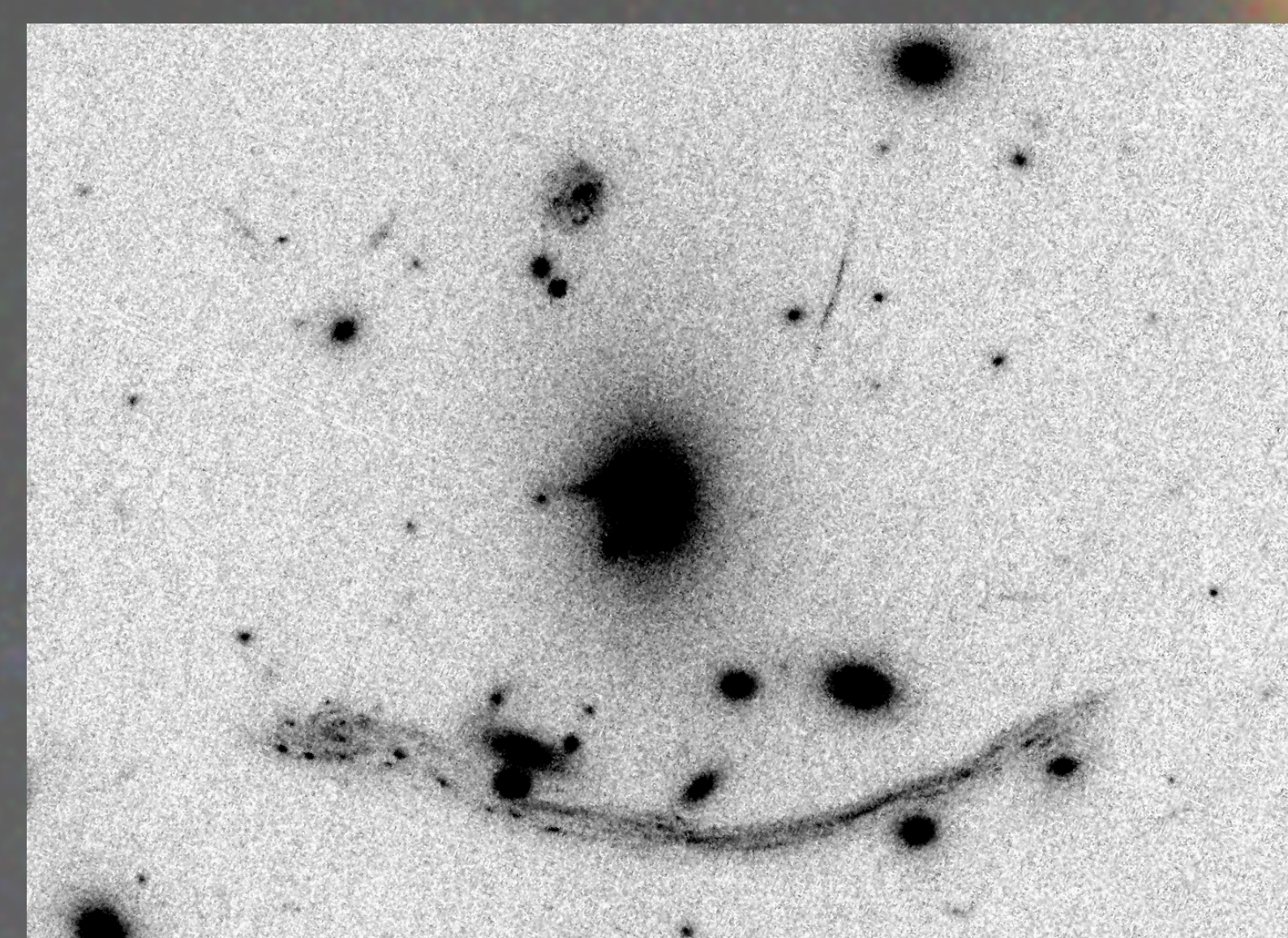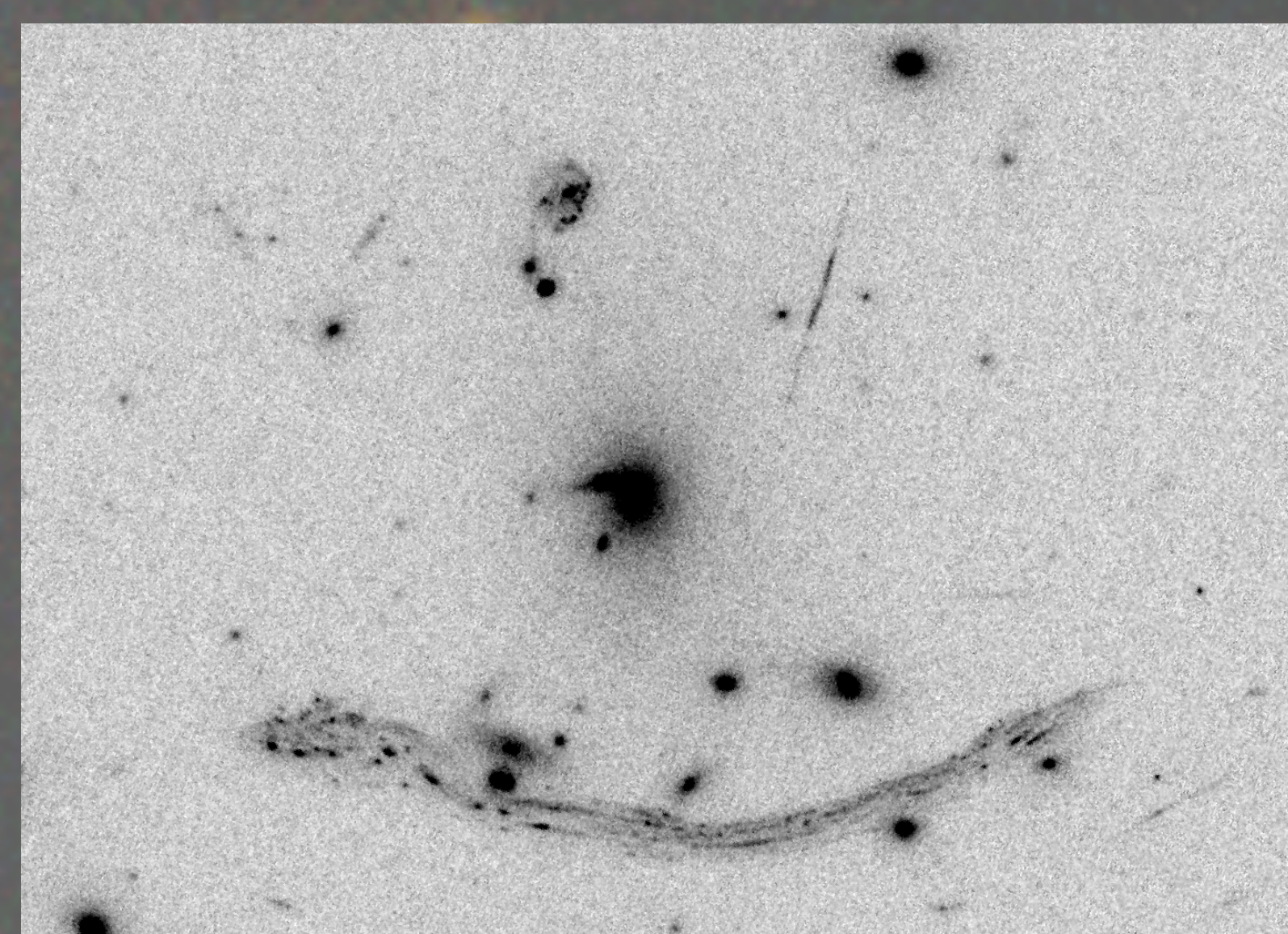
B-475 Filter

V-625 Filter

I-814 Filter

We're studying our pixel-based CTE correction on extended sources. First results inconclusive due to low S/N, but appears not to harm them. We will use more deep survey samples (& longer time baselines).

Images shown all FLCs newly-processed with DrizzlePac software and were done with default scale only for purpose of demonstration & to use with SExtractor (currently non-standard). We will explore & document this further.

Anderson, J. & Bedin, L. R. 2010, *PASP*, **122**, 1035–1064
Chiaberge et al. ACS ISR 2009-01
Gonzaga et al., 2012, The DrizzlePac Handbook (Copies of the Handbook available at this meeting and on-line.)