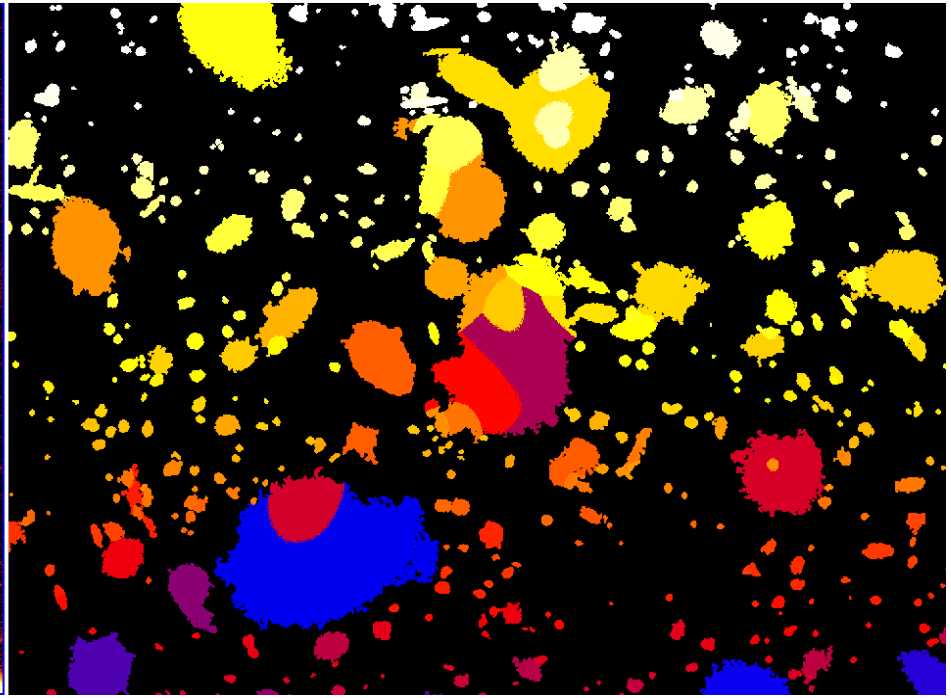
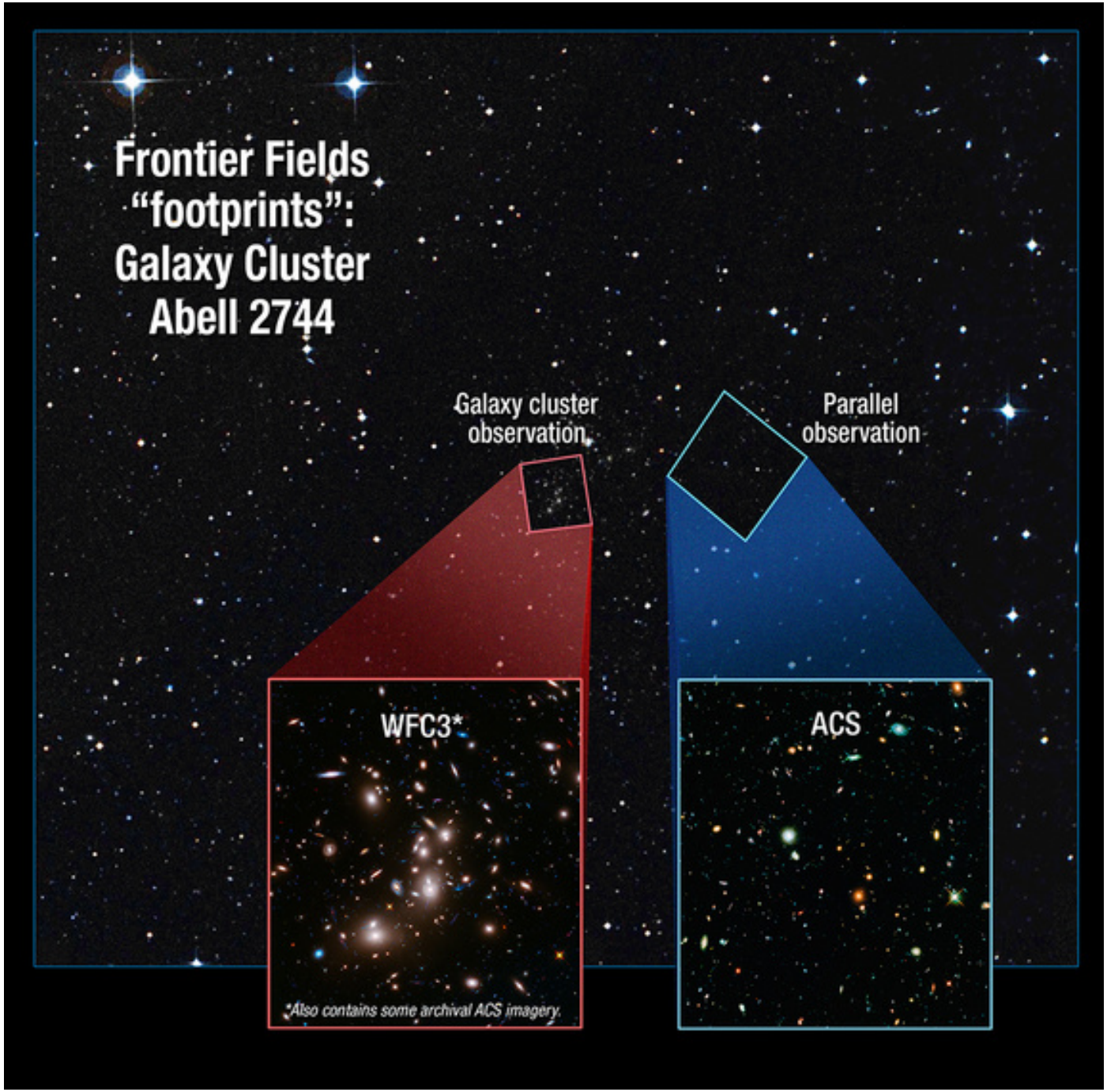
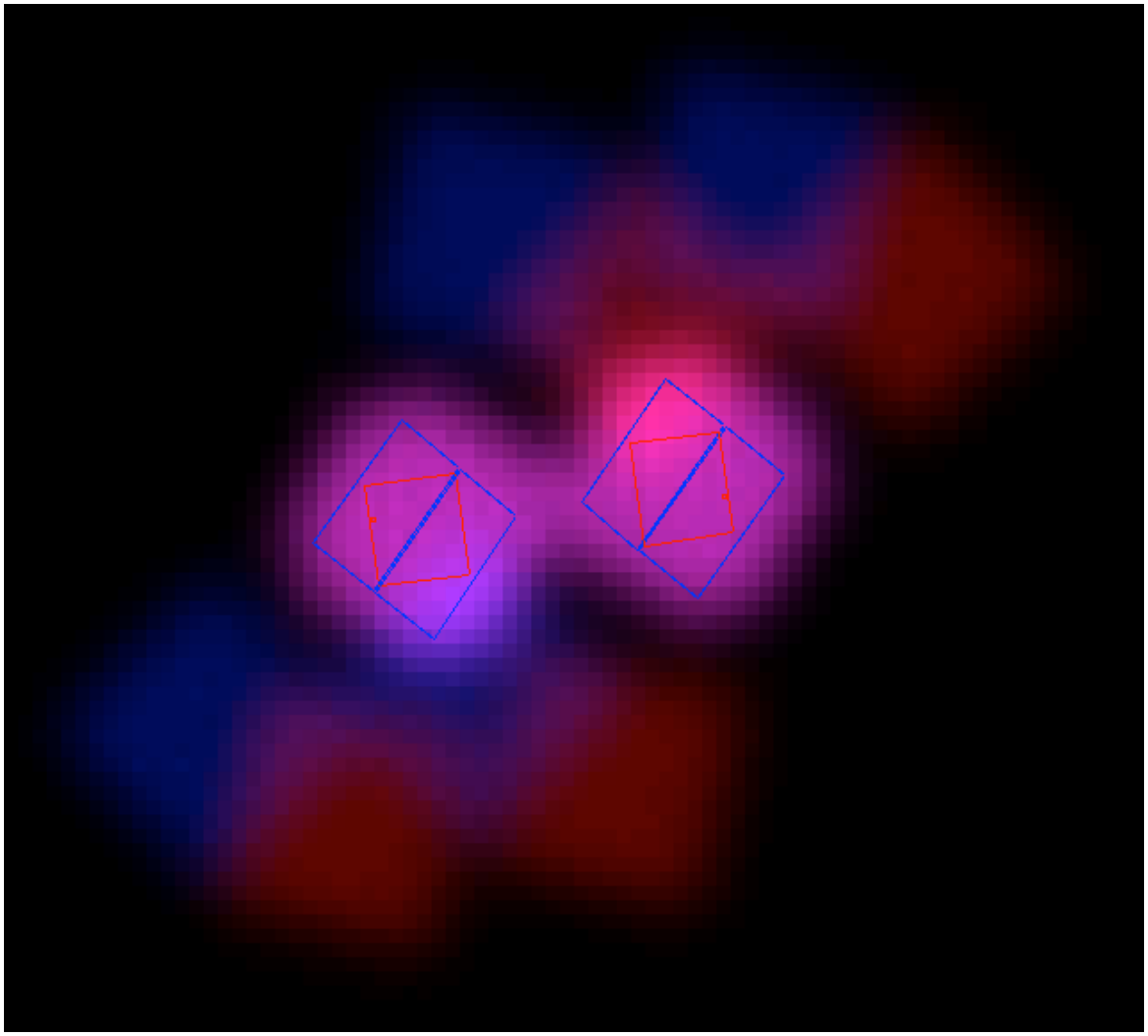
Object Detection and Photometry in the FF

M. Castellano, E. Merlin, R. Amorin



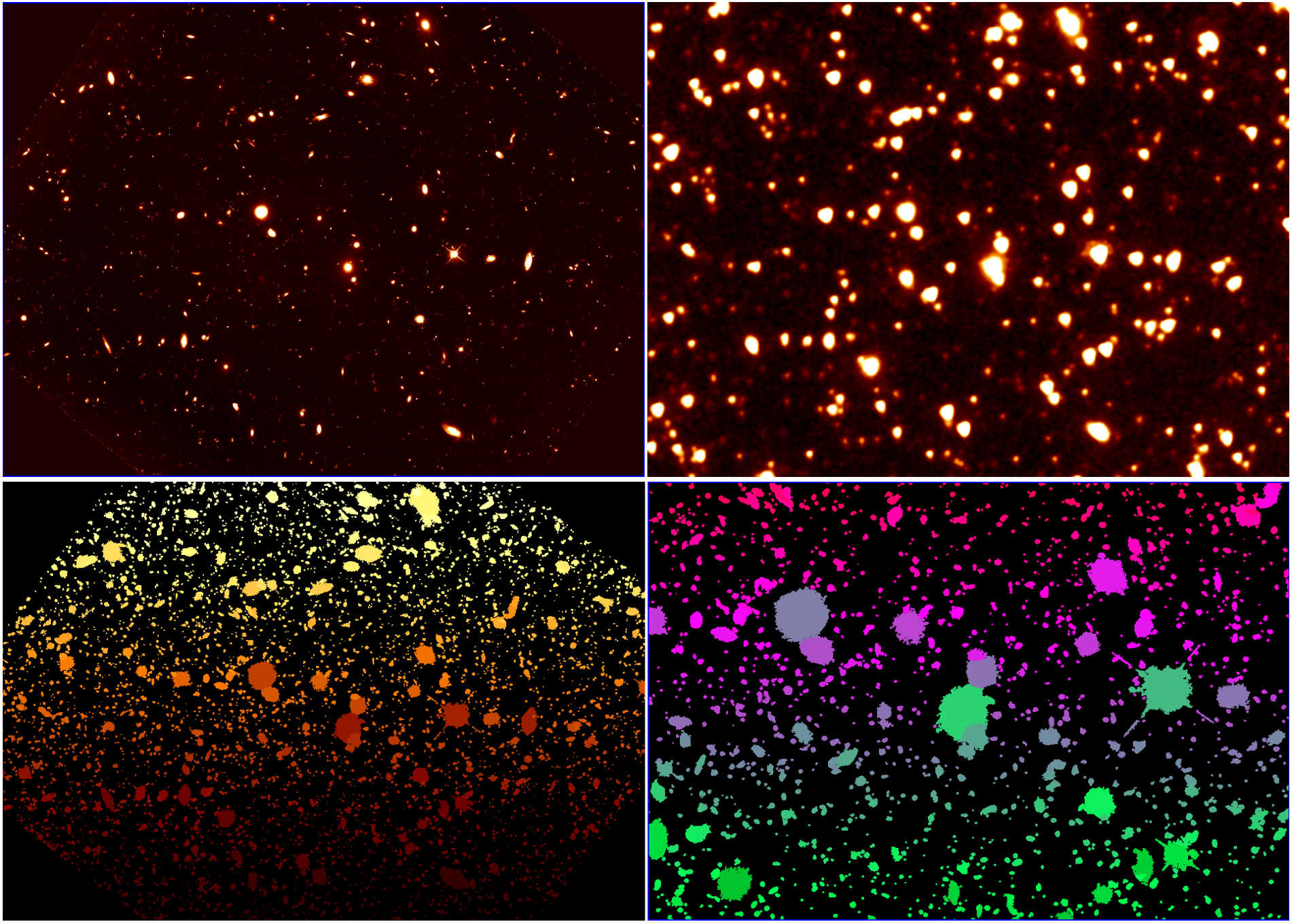



Frontier Fields
"footprints":
Galaxy Cluster
Abell 2744
Galaxy cluster
observation
Parallel
observation
WFC3*
ACS
*Also contains some archival ACS imagery.

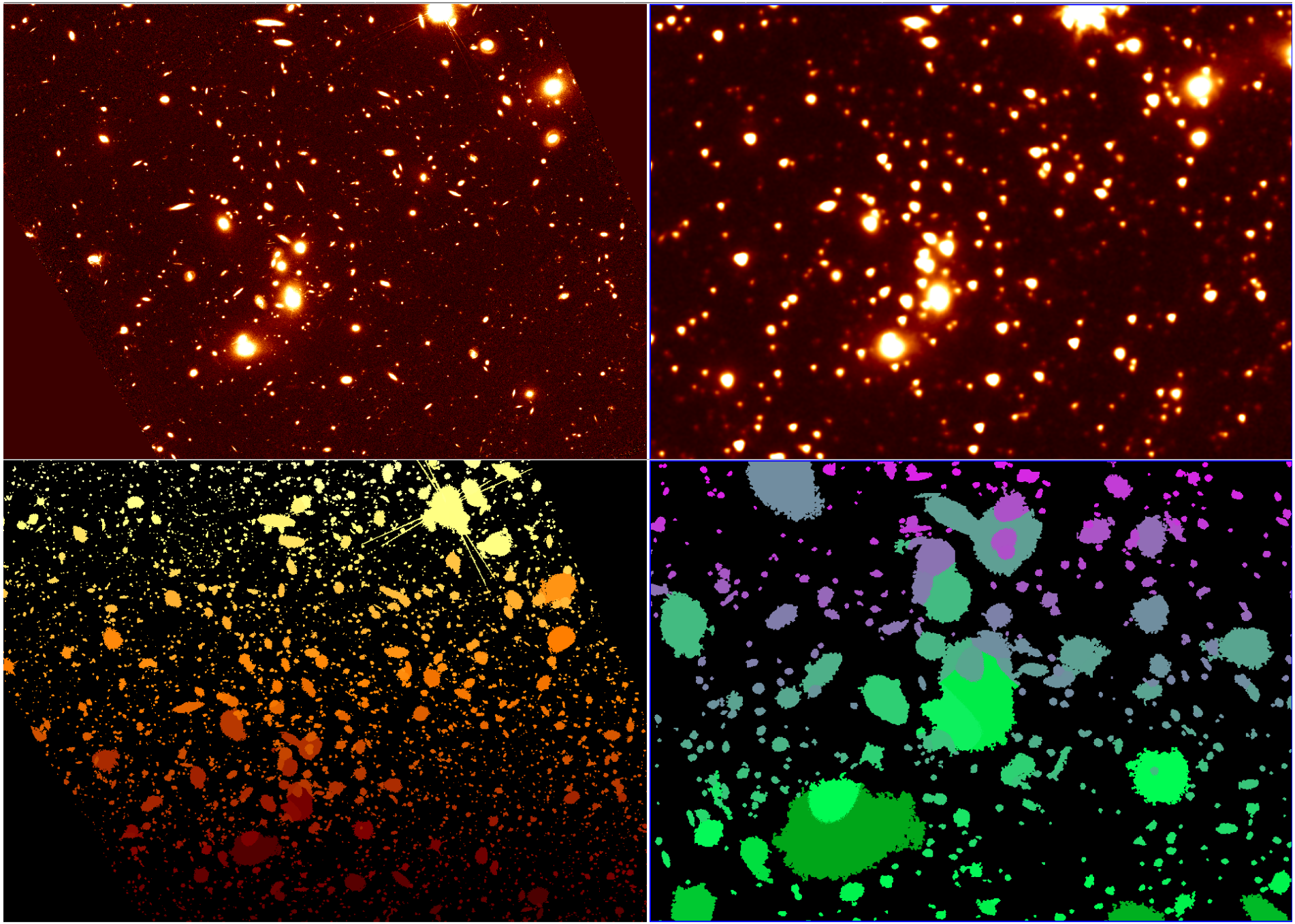


Spitzer pointings to Frontier Fields. Blue line: ACS, red line: WFC3

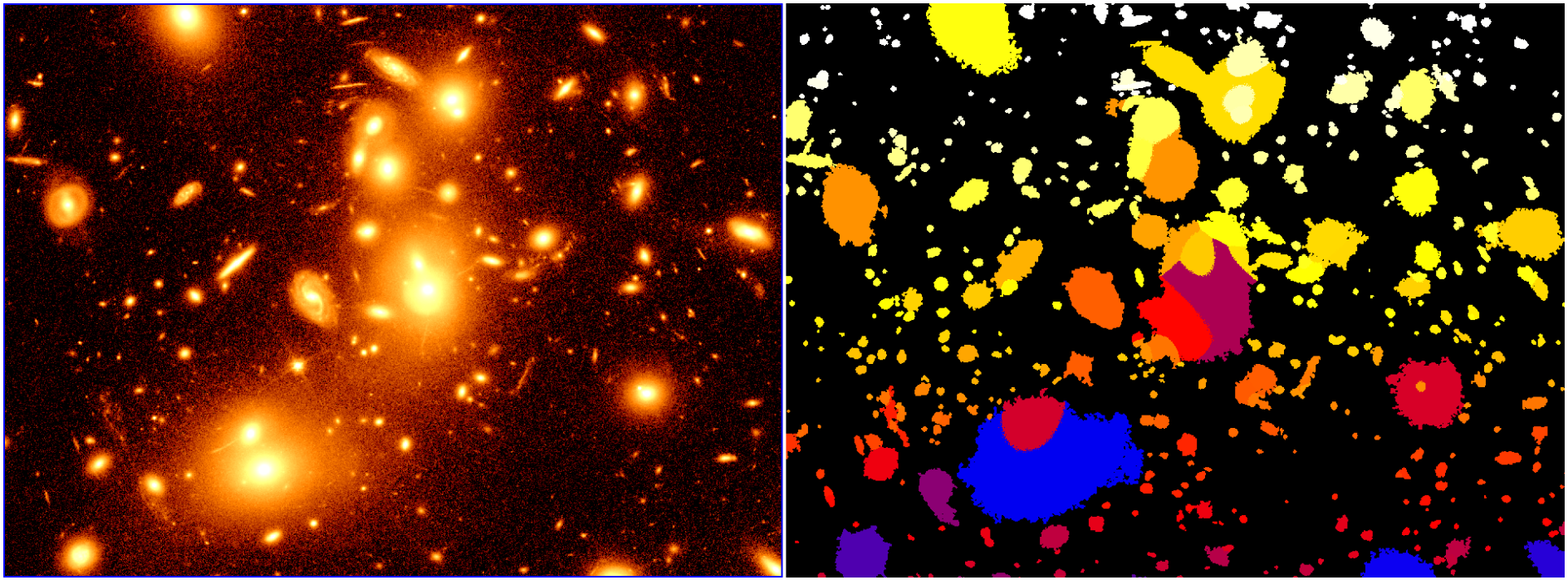
Frontier Fields: Abell 2744 Parallel *(HSTf814w, IRAC1, SEx segmentation and zoom)*



Frontier Fields: Abell 2744 *(HSTf814w, IRAC1, SEx segmentation and zoom)*



Frontier Fields: Abell 2744

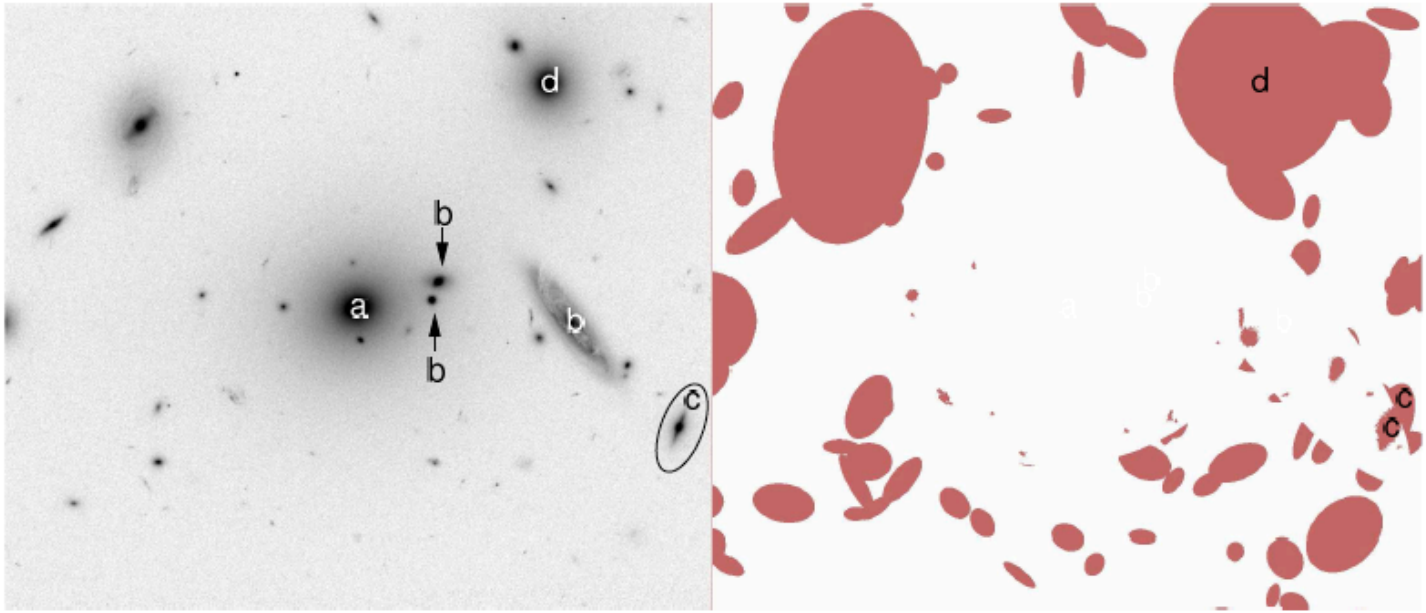


Possible approach: model sources (Galfit) and use models as priors

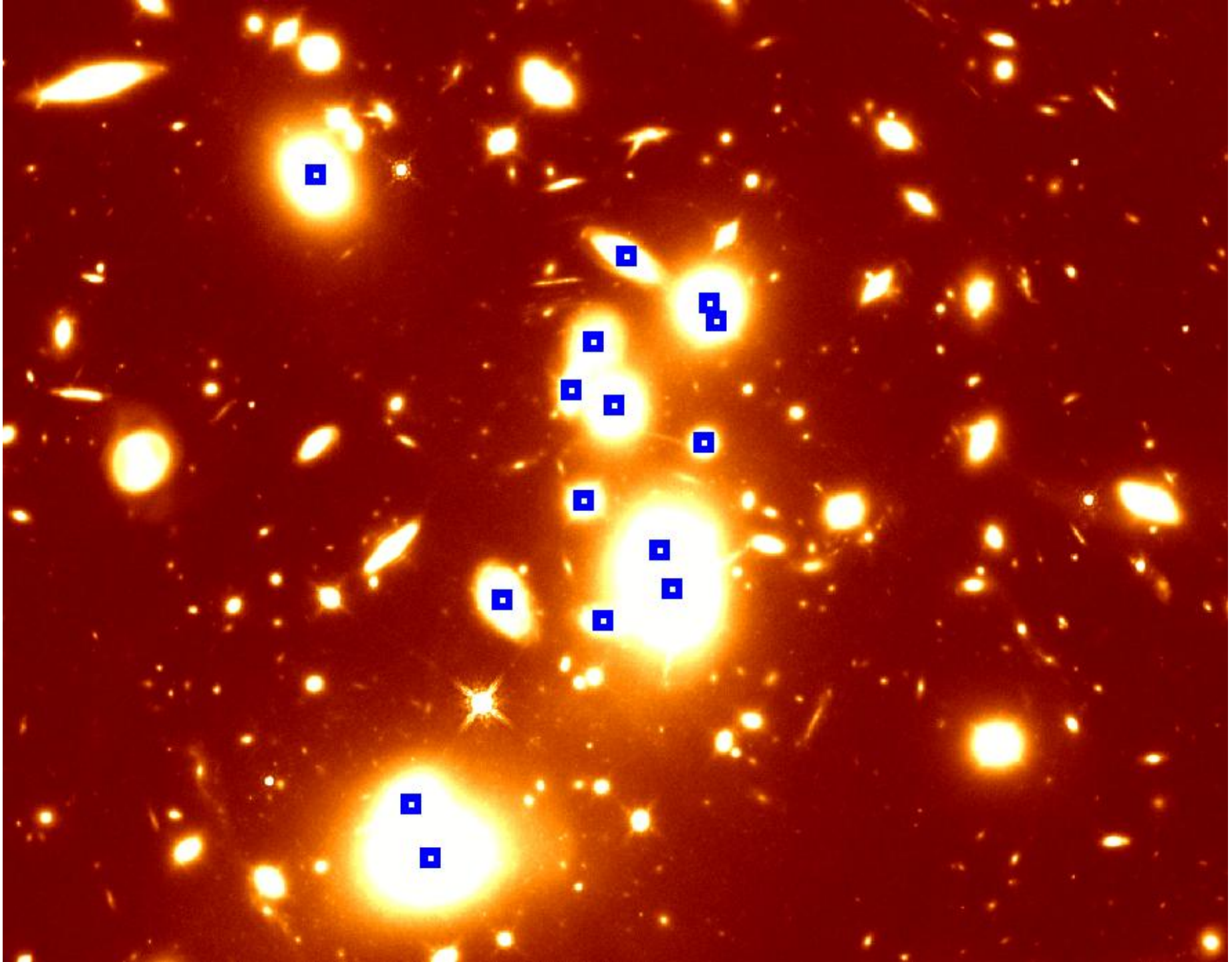
Sextractor + GALFIT = GALAPAGOS

Barden et al. 2009, Gray et al. 2009

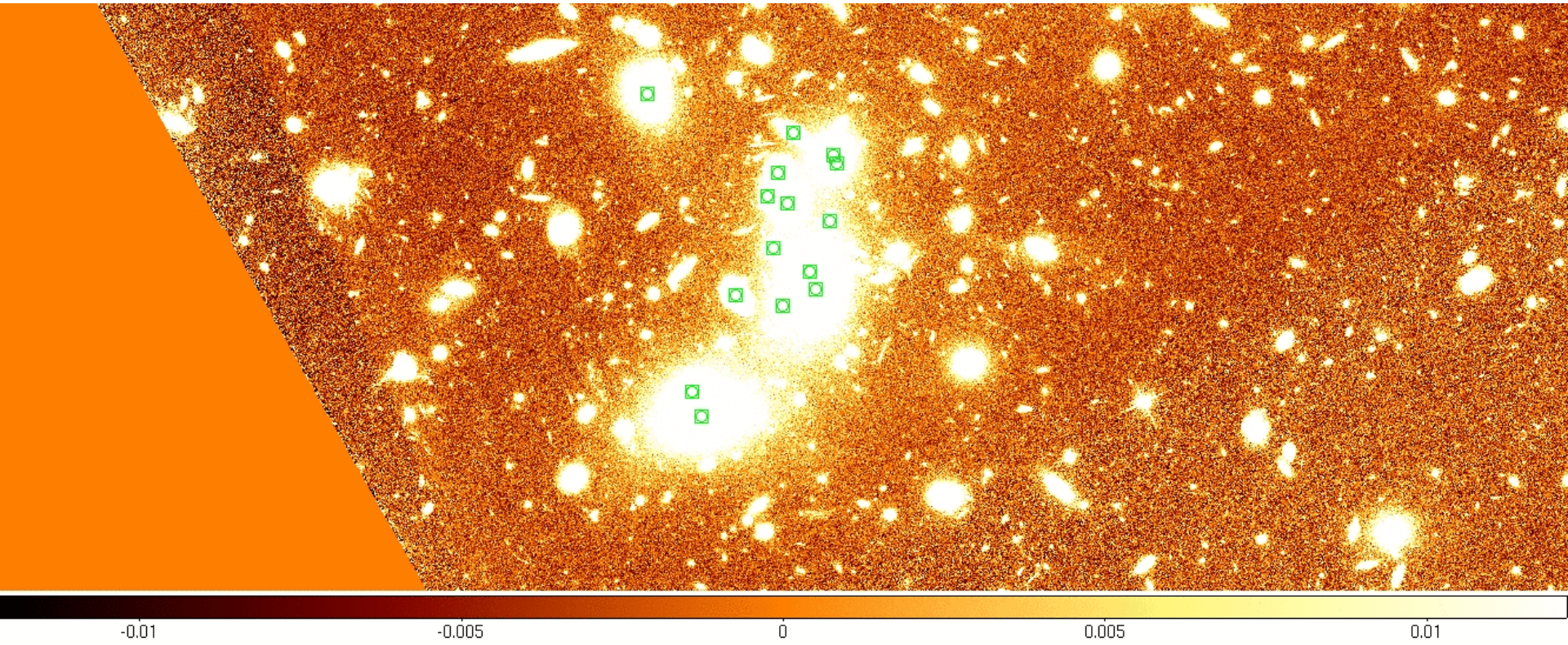




"GALAPAGOS uses SExtractor to initially detect sources in the images and applies GALFIT to model galaxy light profiles. To robustly estimate the background sky it uses a flux growth curve method. The sizes of postage stamps for detected sources are based on SExtractor shape parameters. In order to efficiently process large amounts of data in reasonable time, GALAPAGOS incorporates a complex sorting mechanism and makes use of modern CPU's multiplexing capabilities"



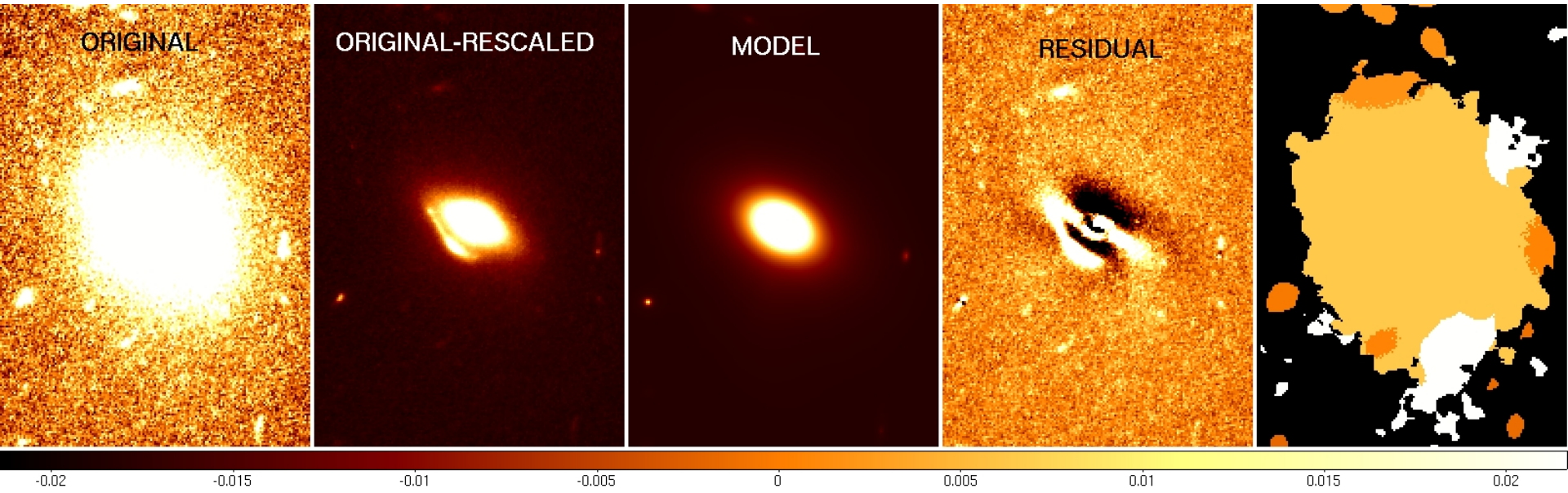
Frontier Fields: Abell 2744, ACS F814W

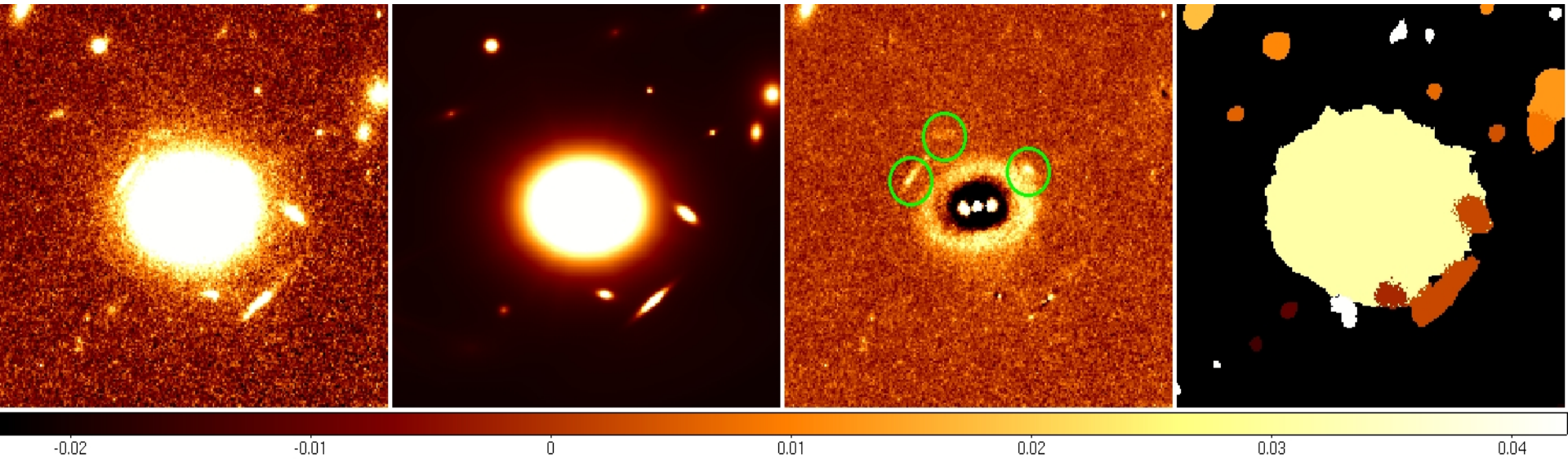


GALAPAGOS gives best fit Sersic models and thumbnail-residuals for each object.

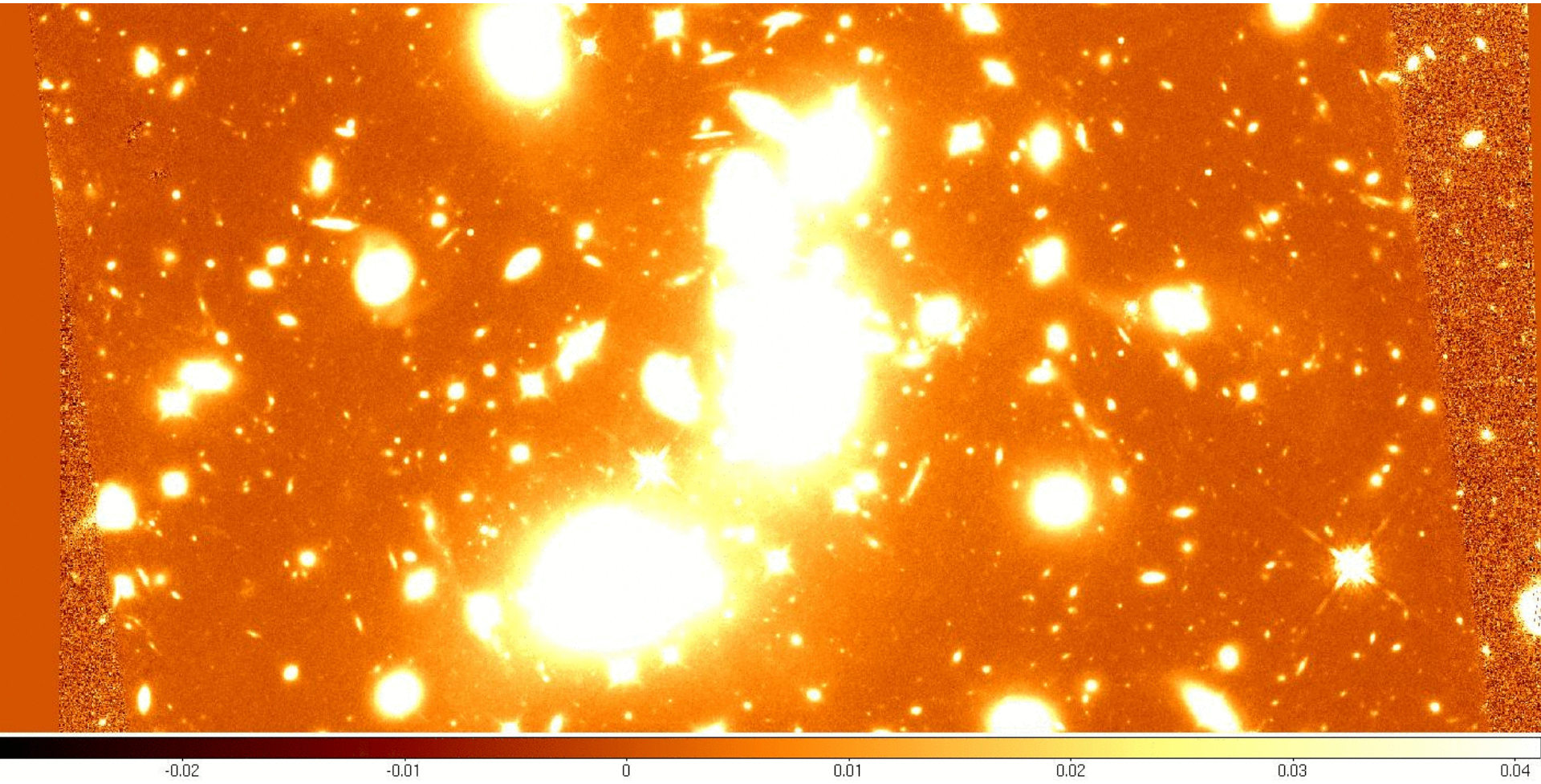
A GALFIT run on the full input image fixing param. at best-fit values is used to produce the "cleaned" mosaic

Frontier Fields: Abell 2744, ACS F814W

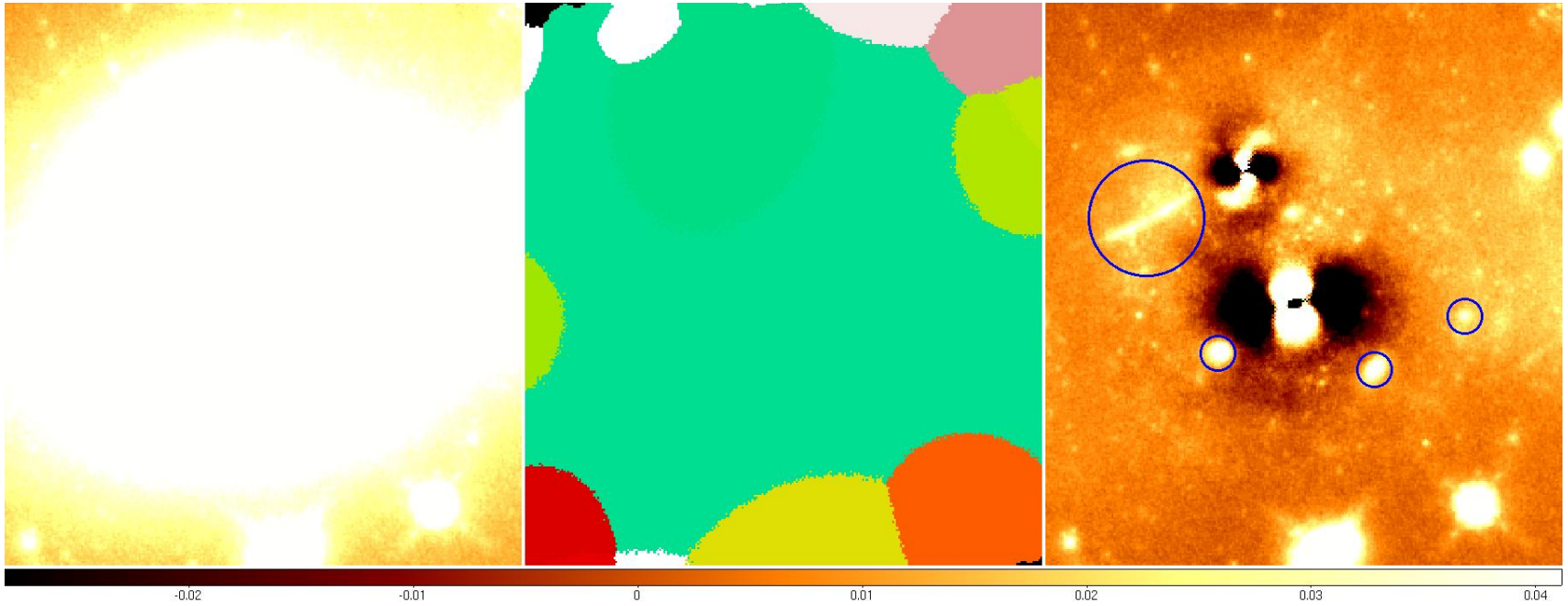


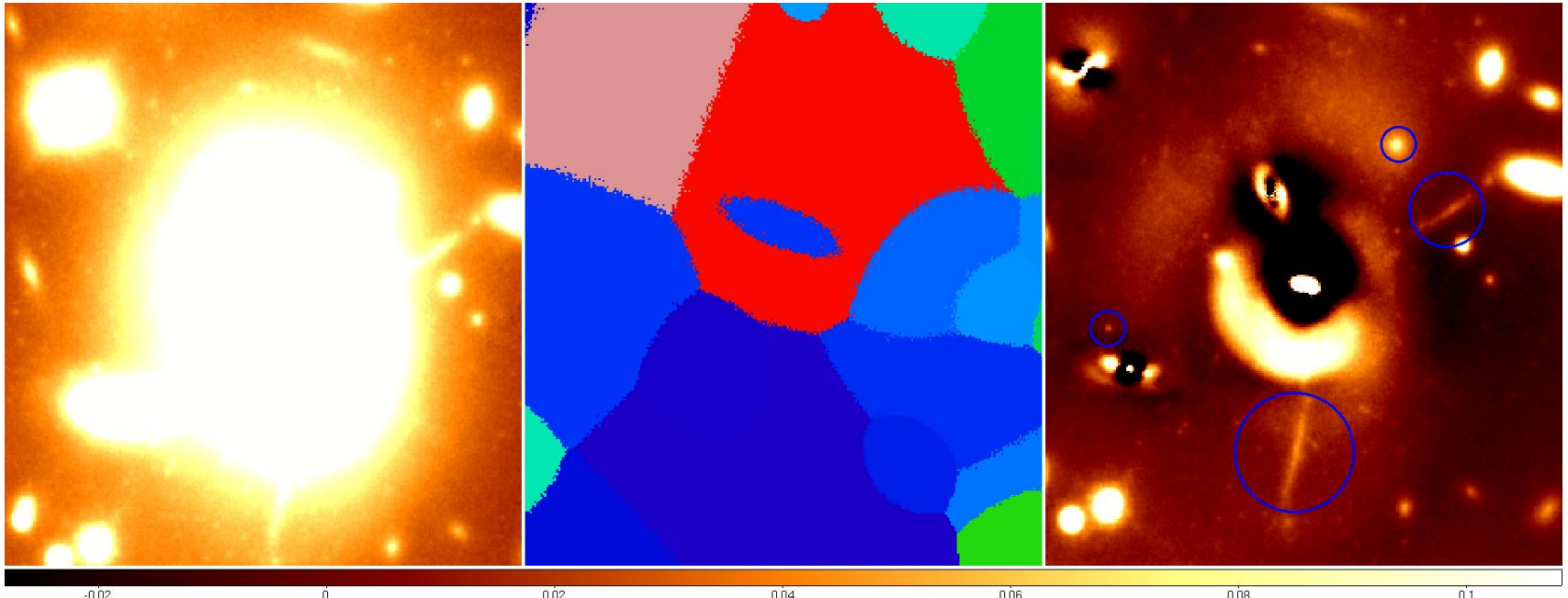


Frontier Fields: Abell 2744, WFC3 F160W

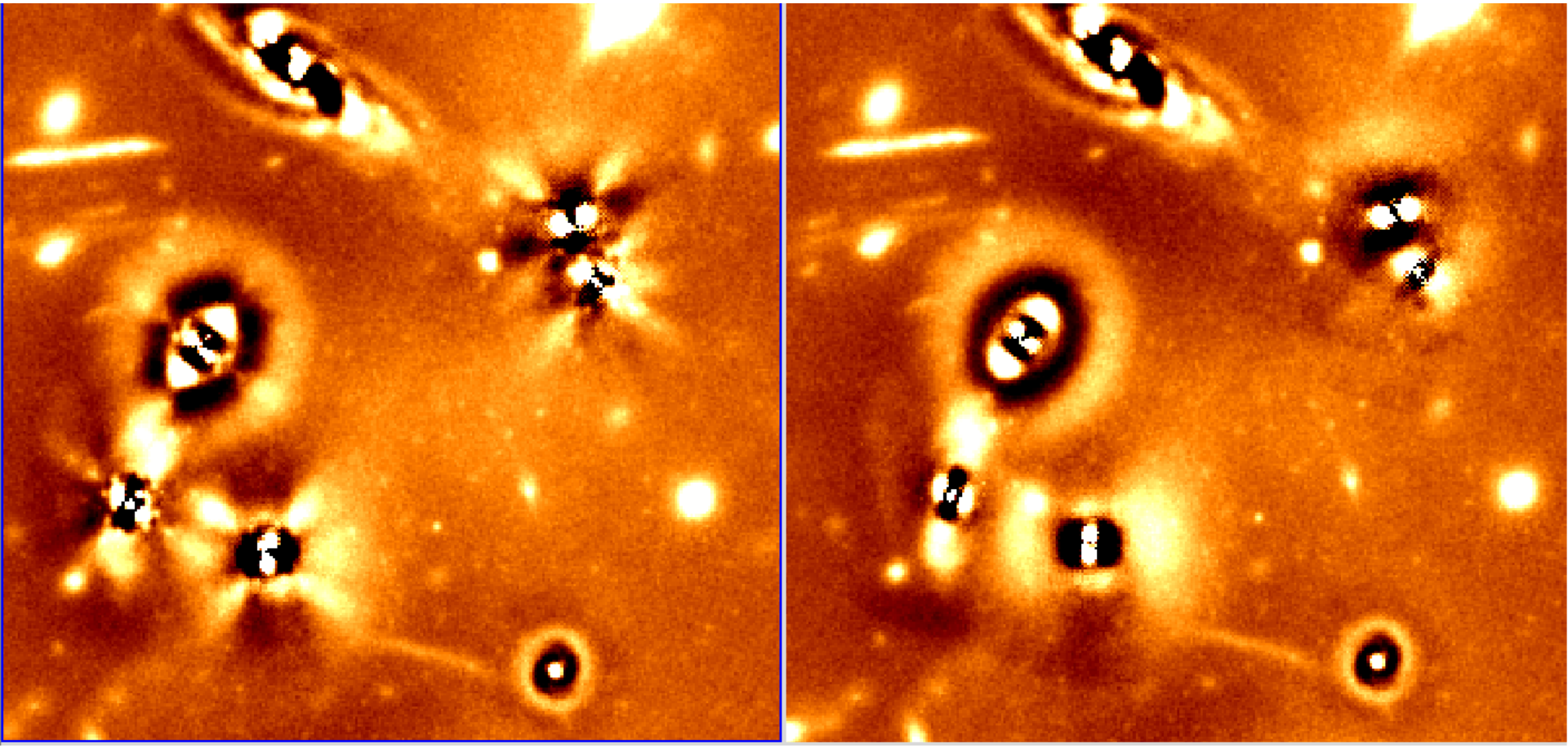


Frontier Fields: Abell 2744, WFC3 F160W





Effect of the PSF:



So far either empirical (right) or CANDELS PSFs (left) used for testing.
A. Koekemoer is available for producing synthetic ACS and WFC3 PSF including all instr. effects

Summary and plan for future work:

Detecting faint galaxies in the Cluster fields is challenging.
Mixed approach:

- GALFIT+Sextractor
- First tests on I814 and H160 are encouraging
- Need to finalize PSFs to run on all bands

Scheme of Multiband catalogue production:

- Individuate brightest sources
- Use GALFIT (through GALAPAGOS) to fit and “remove” foregrounds in ACS and WFC3
- Optimize detection on H160 residual image to detecte faintest sources
- Standard dual-mode phot. on PSF-matched images for ACS and WFC3
- TPHOT on IRAC using segmap and GALFIT models as templates

Challenges:

- Avoid spurious detections on residuals
- How to get rid of ICL? (include them in the GALFIT?)
- Obtain uniform photometry (avoid systematics due to gal-fitting on different bands)