

Focusing the Frontier Fields with SWUnited

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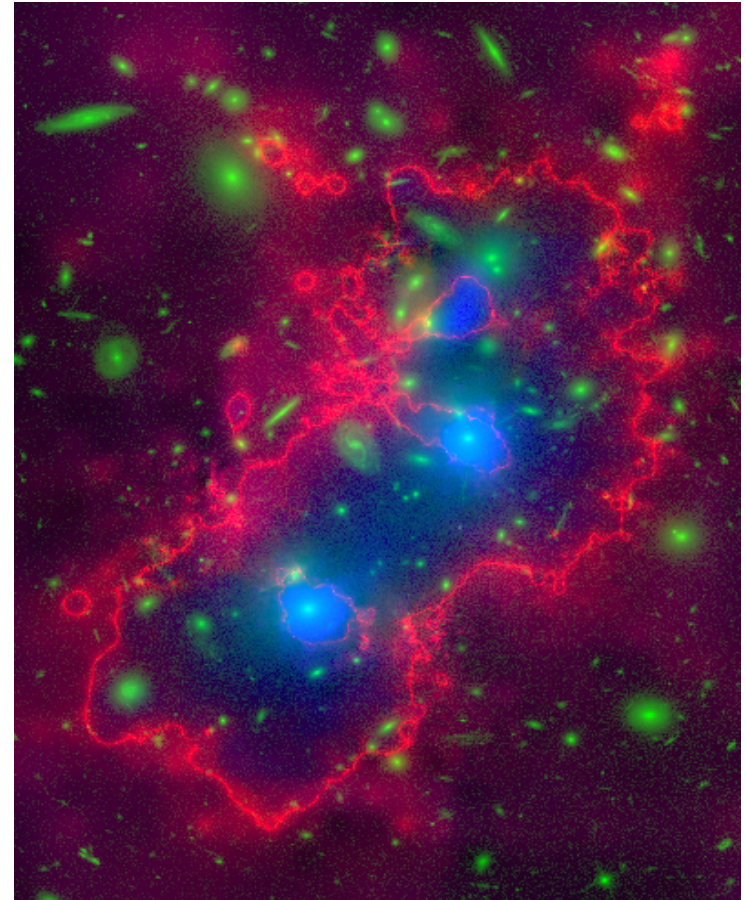
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Austin Hoag

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SWUnited

- “SWUnited” = strong + weak lensing united
- Reconstructs potential on a pixelated grid
- Grid can be non-uniform
- Does not fit analytical model parameters

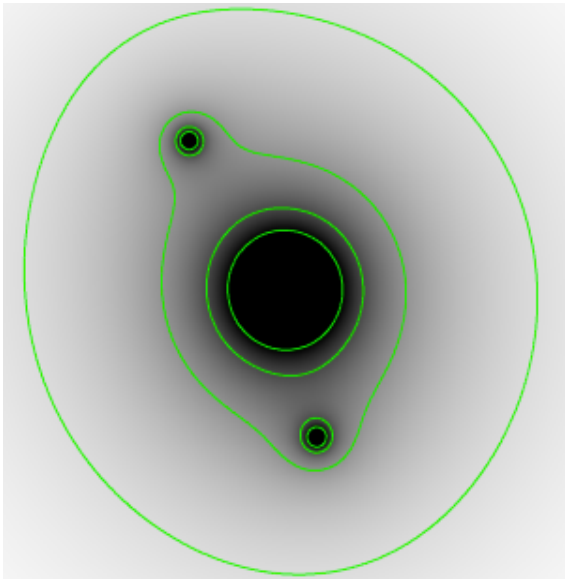


<http://archive.stsci.edu/prepds/frontier/lensmodels/>

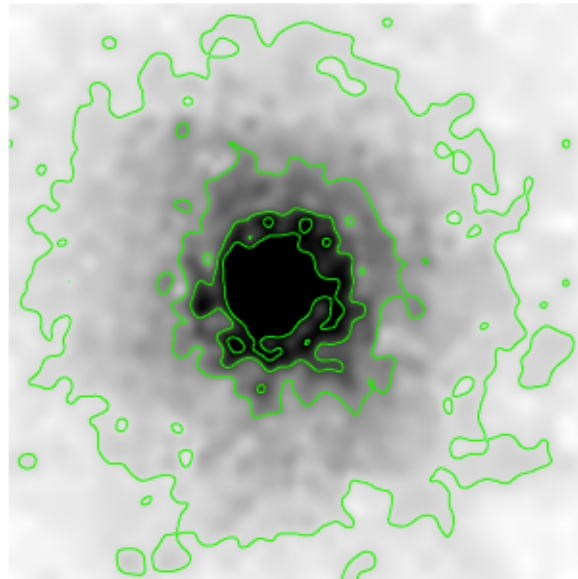
The Next Step: Flexion

- Flexion can reveal otherwise unobserved substructure – on galaxy mass scales (Cain et al., in prep.)

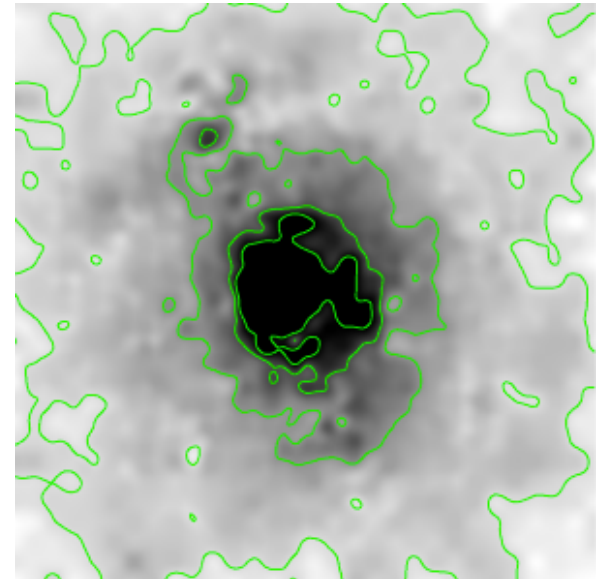
Input Toy Model



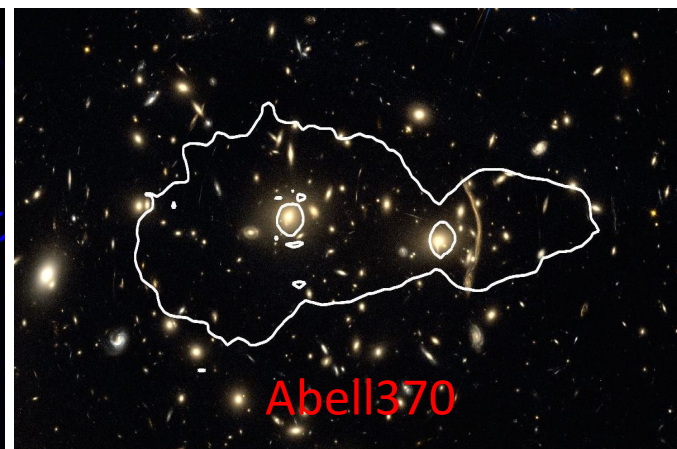
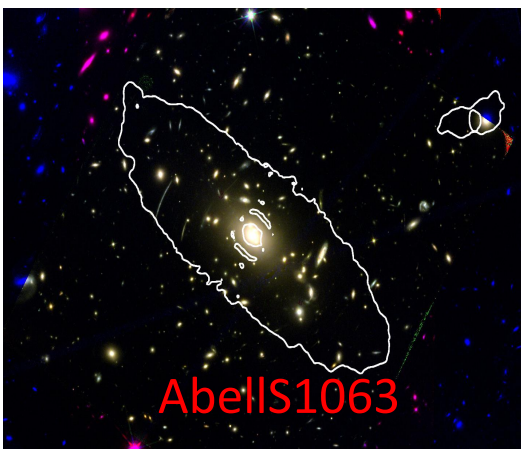
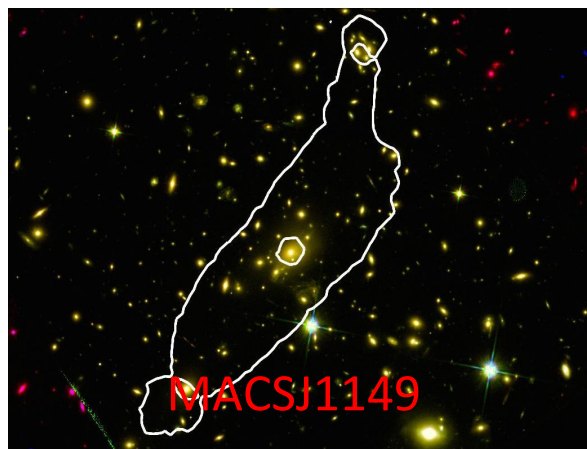
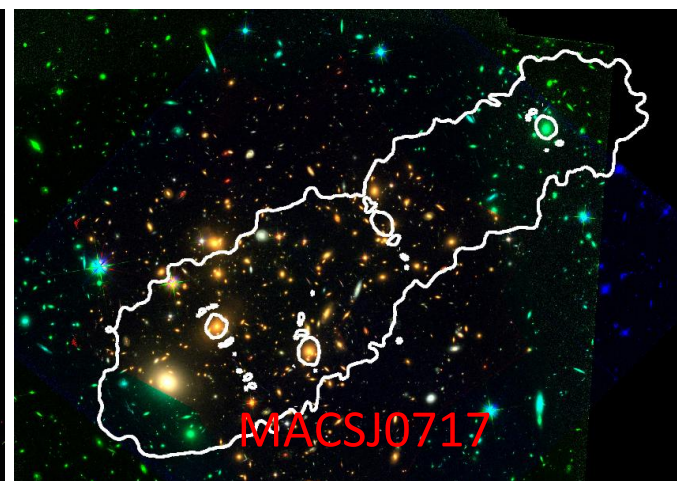
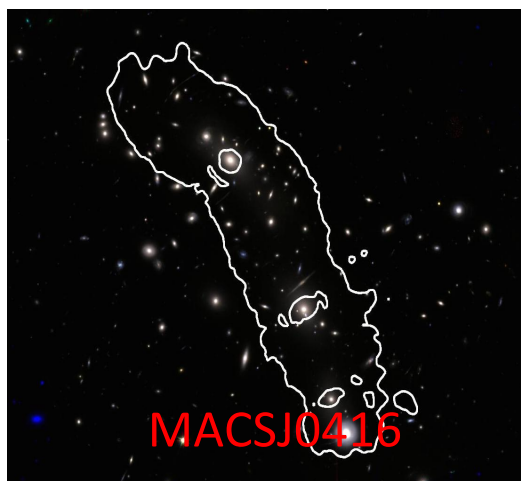
Without Flexion



With Flexion

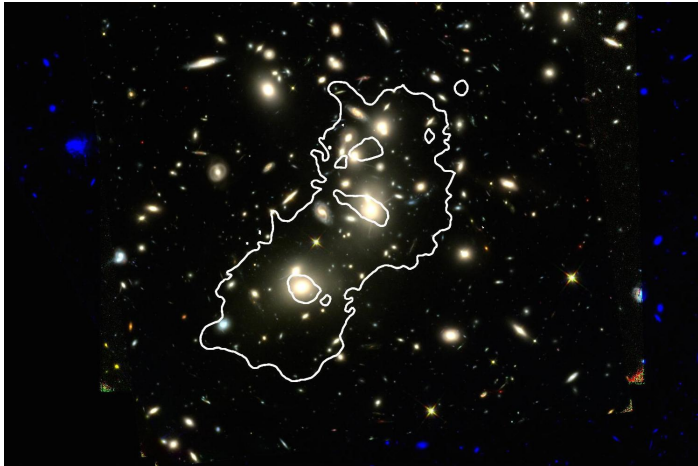


Pre – FF data Magnification Maps ($Z=7$)

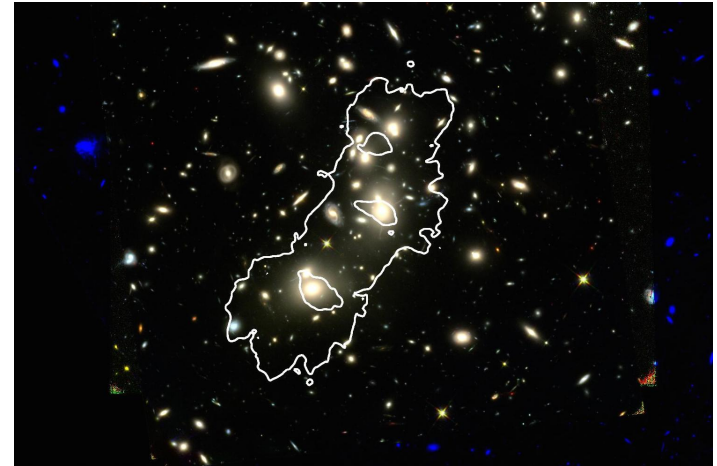


Improved Lens Model (A2744)

Z=7 critical curve using archival data
only



Z=7 critical curve using archival +
FF data



- 11 -> 23 multiple images systems (Jauzac et al. 2014)
- Improved shape measurements and increased number densities of weak lensing galaxies (soon)

RCS2-2327

A Powerful Lens at $Z = 0.7$

RCS2 survey: Gilbank et al. 2011

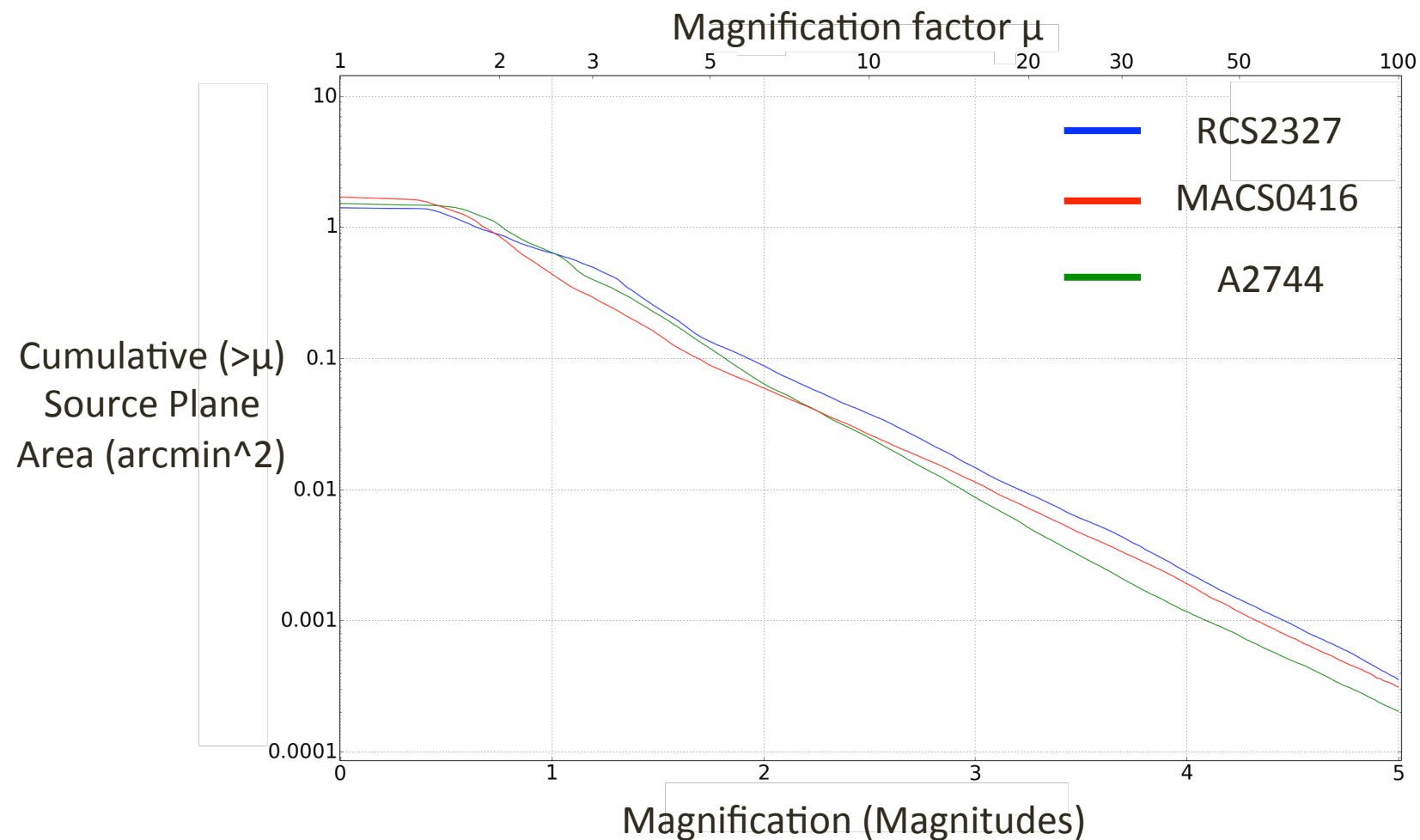
F435W imaging (HST-GO-10846):
Gladders, Sharon et al., in prep.



RCS2-2327 lens model

- 2 multiple image systems identified in previous optical data, later spectroscopically confirmed (Gladders, Sharon et al., in prep.)
- We discovered 6 new multiple image systems in 3 (prev.) + 13 HST orbits (HST-GO-13177)
- Spec-z obtained for 1 system with Keck/MOSFIRE
- Shape catalog containing 800 weak lensing galaxies (Schrabback et al., in prep.)

Comparing Clusters



Z~7 Candidates

ID	$m_H(AB)$	μ	photo-z (best fit)	$L (L_\star)$
RCS2327-1914	25.6	$4.52^{+0.54}_{-0.23}$	6.9	$0.22^{+0.03}_{-0.02}$
RCS2327-1282	24.8	$4.30^{+0.37}_{-0.33}$	7.1	$0.46^{+0.04}_{-0.04}$
RCS2327-2068	26.6	$27.53^{+23.82}_{-9.66}$	6.8	$0.01^{+0.01}_{-0.01}$
RCS2327-1412	27.0	$12.00^{+2.09}_{-0.18}$	6.8	$0.02^{+0.01}_{-0.01}$



All sub- $L_\star$

Spectroscopic Campaign

- Targeted dropout candidates with Keck/MOSFIRE in Y and H-band
- 1 hr/night/band for 3 nights
- Don't see any convincing emission lines in the 4 $z \sim 7$ candidates
- 1- σ Y-band flux limits of $\sim 2\text{--}5 \times 10^{-19}$ erg/s/cm²

Secondary Targets

- Targeted 4 additional objects with less strict selection criteria
- See potential emission line from $z=6.8$ target, but can't reconcile photo- z with spec- z of $z=7.42$

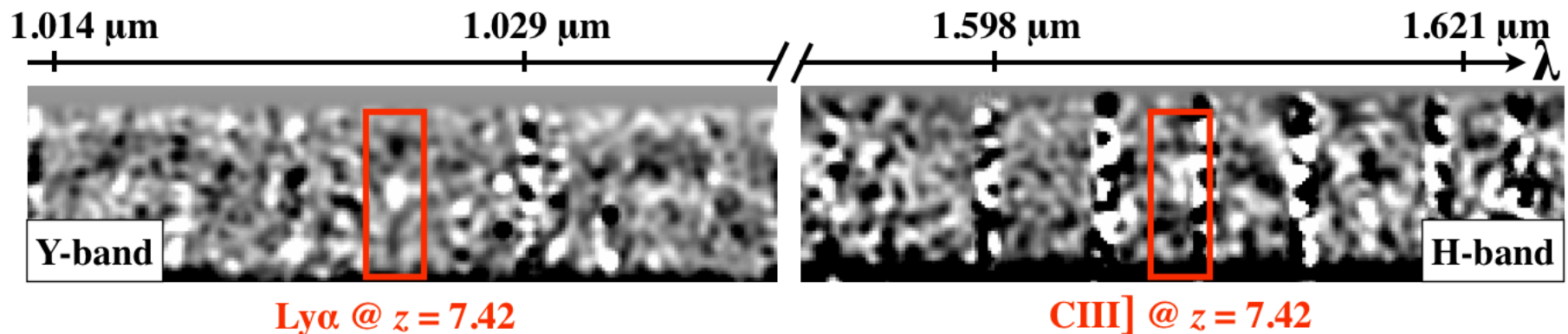


Figure courtesy of K. Schmidt

Summary

- New FF data bringing needed improvement to lens models
- RCS2-2327 is a comparably powerful lens
- Lensing magnification = extra exposure time for spectroscopic studies of faint $z \geq 7$ galaxies