



Institut d'astrophysique de Paris



Detection of filaments and large scale structures around DAFT/FADA clusters up to redshift ~ 1

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Durret, Márquez, Acebrón, Adami, Cabrera-Lavers, Capelato, Martinet, Sarron, Ulmer 2016, A&A 588, 69

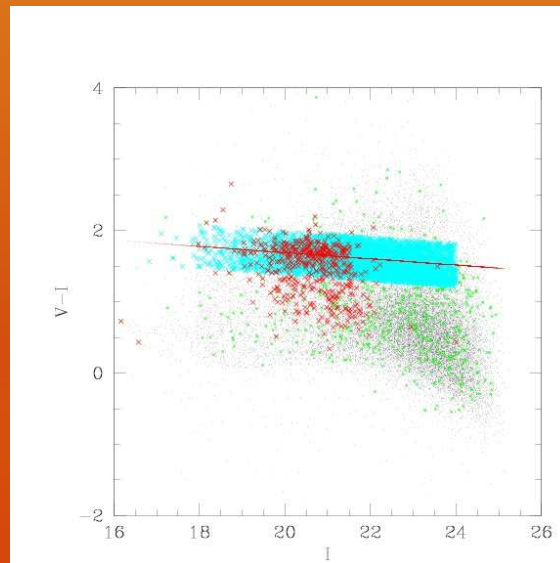
30 DAFT/FADA clusters with large field images (CFHT/Megacam or Subaru/SuprimeCam)



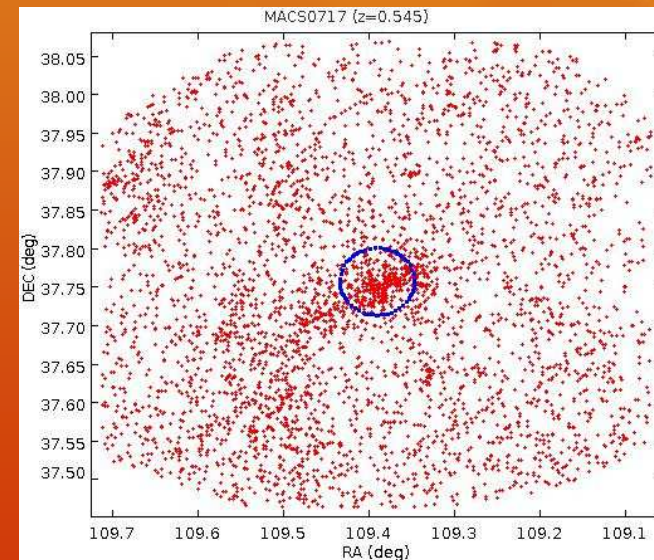
Ana Acebrón
PhD (2014-2017)

Selection of galaxies at cluster redshift

MACS J0717+3745 ($z=0.5458$)

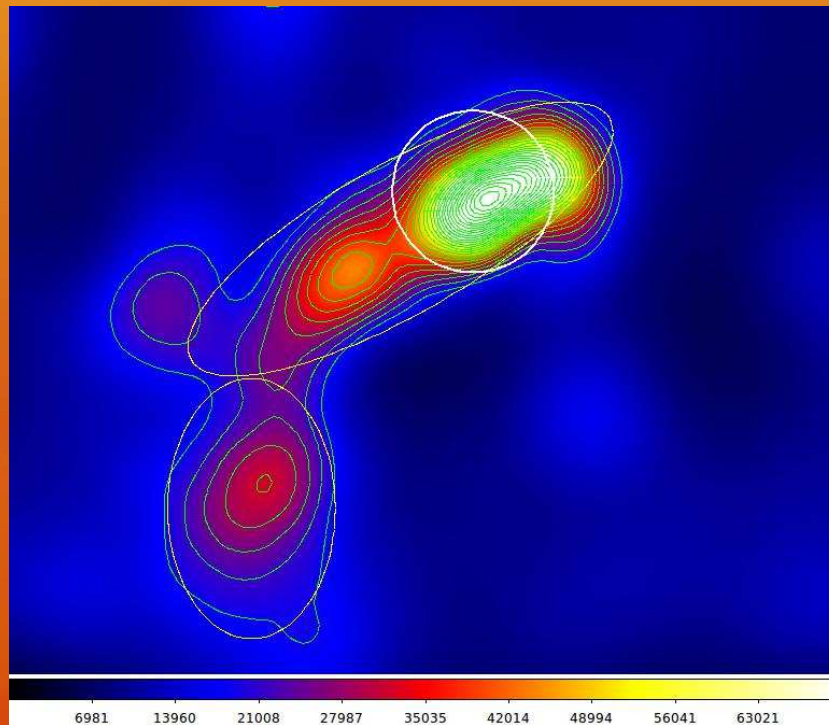


Selection of galaxies along the red sequence



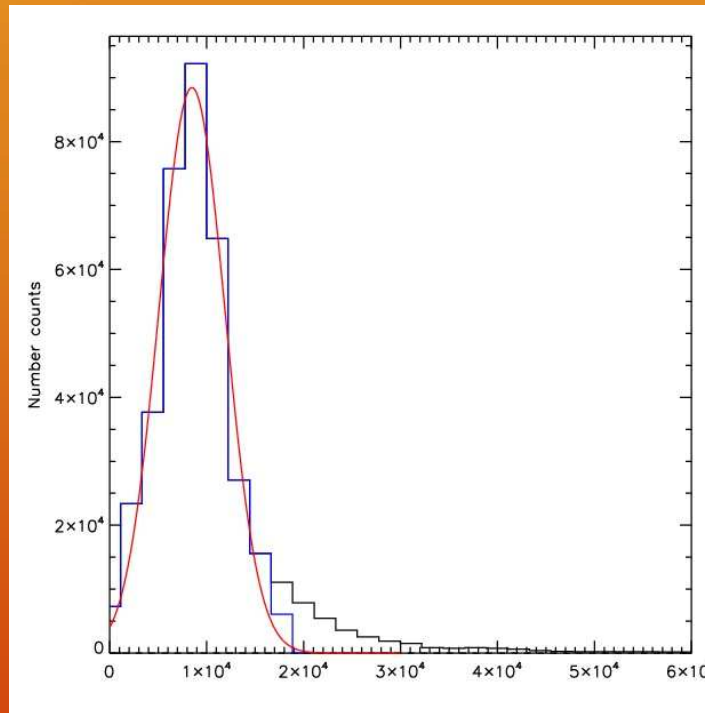
Positions of galaxies located along the red sequence

Computation of density maps with adaptive kernel technique



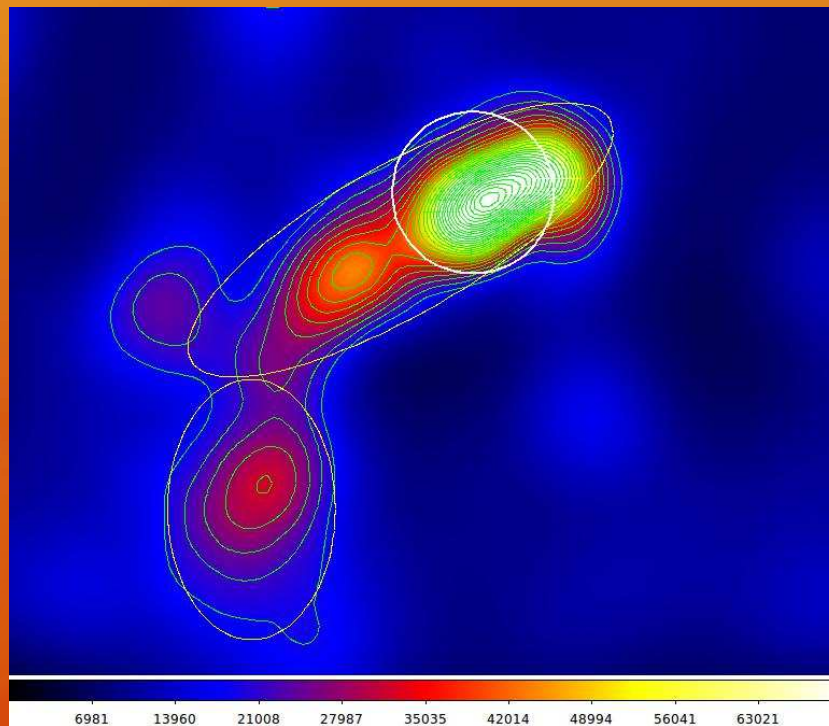
MACS J0717+3745
($z=0.5458$)

Estimation of the background in the density maps



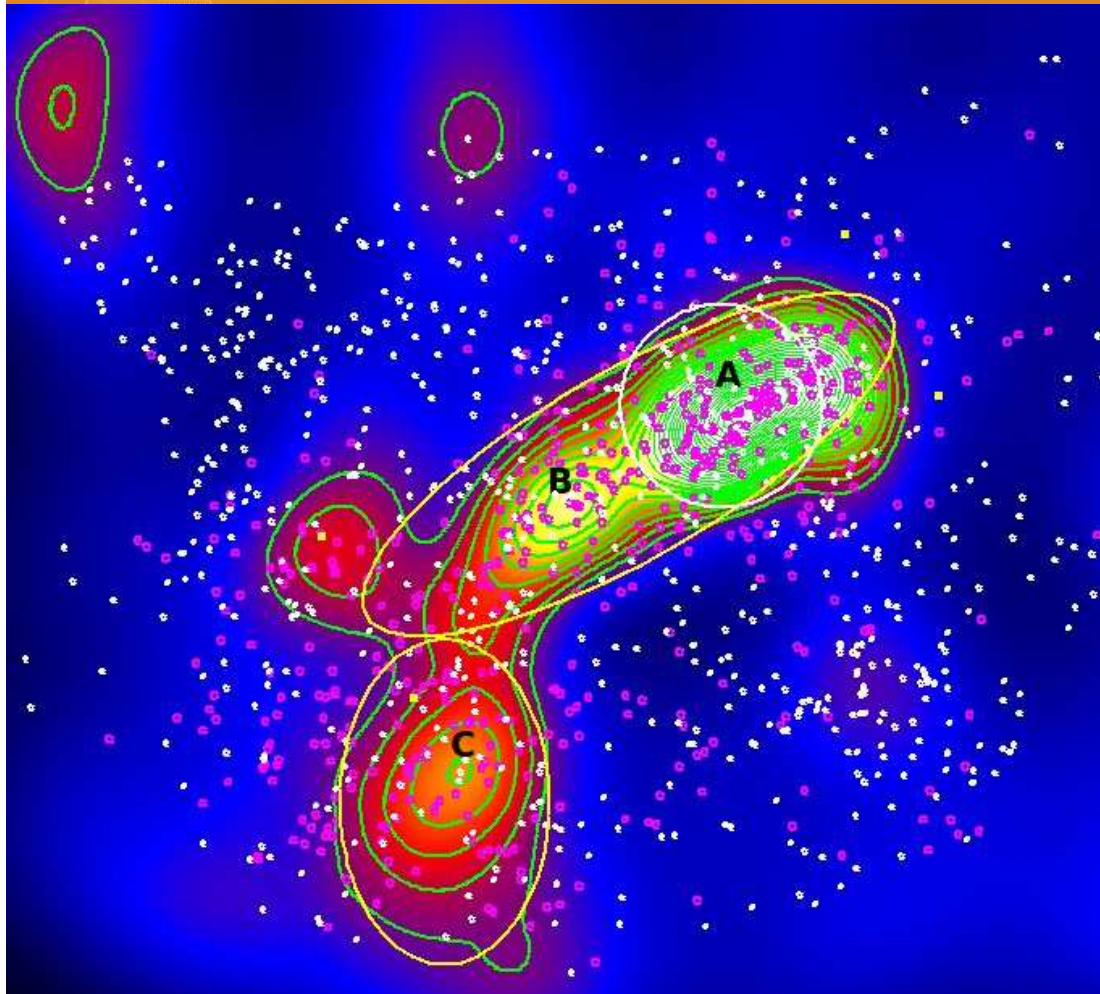
- Histogram of pixel intensities
- Gaussian fit of the background part (obtained after a 2.5σ clipping) gives mean value of the background and dispersion (σ)

Contour levels starting at 3σ



MACS J0717+3745
($z=0.5458$)

Results: galaxy density maps with contours at 3σ and above



MACSJ0717+3745
($z=0.5458$)

Green contours start at 3σ
Circle = 1 Mpc radius
Yellow ellipses=elongations:
6.0x1.8 and 3.2x2.1 Mpc, in
rough agreement with Jauzac et
al.(2012) who give a length of 4.5
Mpc based on their weak lensing
detection

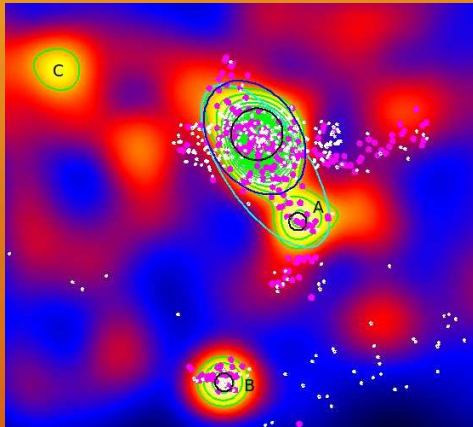
12 clusters with large extensions

Cluster name	a (Mpc)	b (Mpc)
Cl0016+1609	7.4	3.2
	4.8	3.4
MACS J0647.7+7015	6.8	2.2
MACS J0717+3745	6.0	1.8
	3.2	2.1
MACS J0744.9+3927	3.8	1.5
RXC J1206.2-0848	5.7	2.4
ZwCl 1332.8+5043	5.8	5.4
LCDCS 0829	7.5	3.3
MACS J1423.8+2404	6.0	3.0
MACS J1621.4+3810	7.6	2.1
MS 1621.5+2640	6.0	3.8
RX J1716.4+6708	3.5	1.1
MACS J2129.4-0741	3.7	1.6

12 clusters with large extensions

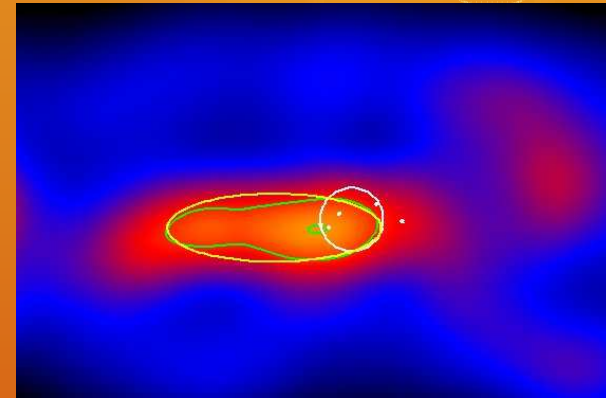
Cl0016+1609 ($z=0.5455$)

7.4 x 3.2 Mpc



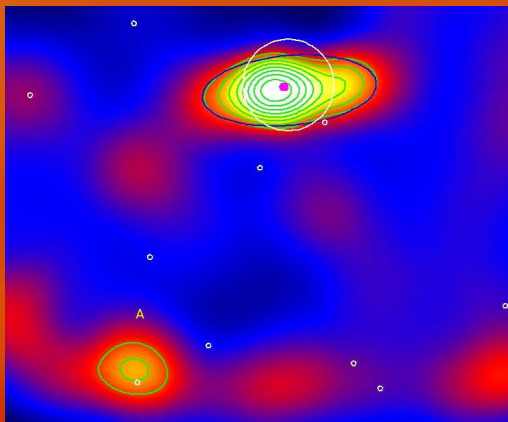
MACSJ0647.7+7015 ($z=0.5907$)

6.8 x 2.2 Mpc



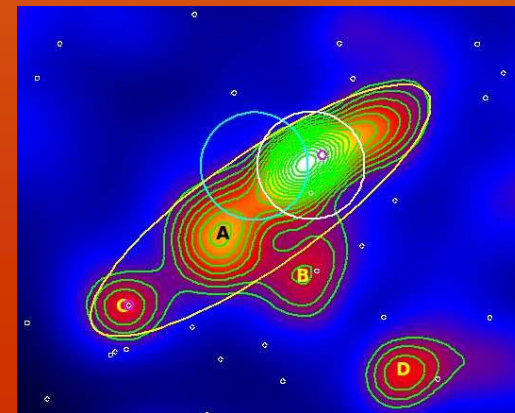
MACSJ0744.9+3927 ($z=0.6860$)

3.8 x 1.5 Mpc



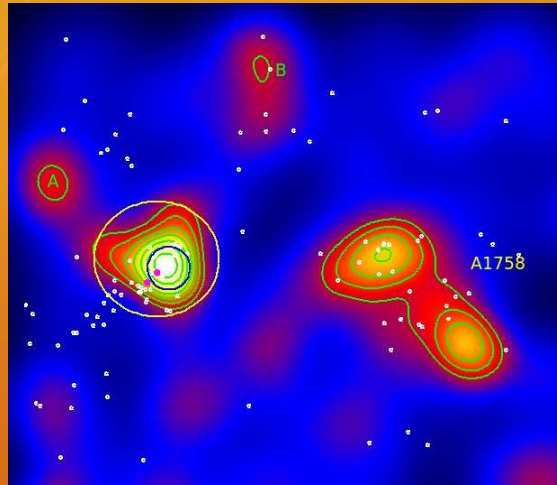
RC J1206.2-0848 ($z=0.4440$)

5.7 x 2.4 Mpc



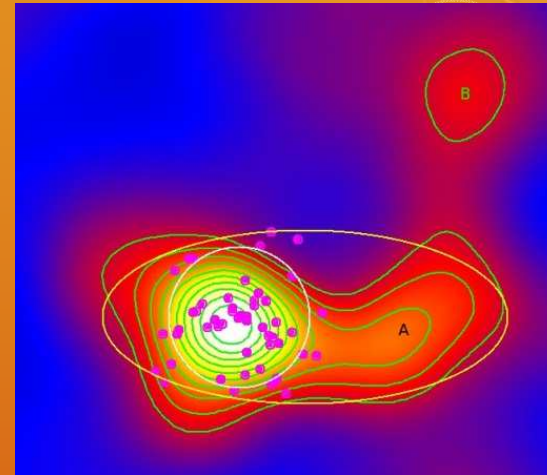
ZwCl 1332.8+5043 ($z=0.6200$)

5.8 x 5.4 Mpc



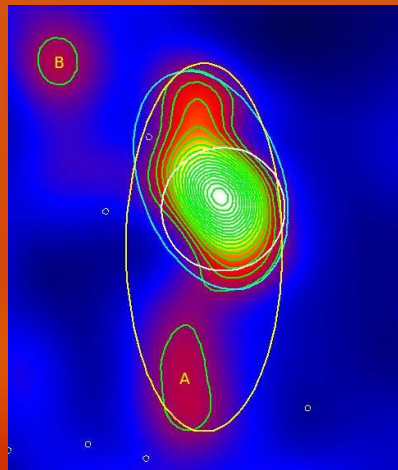
LCDCS 0829 ($z=0.4510$)

7.5 x 3.3 Mpc



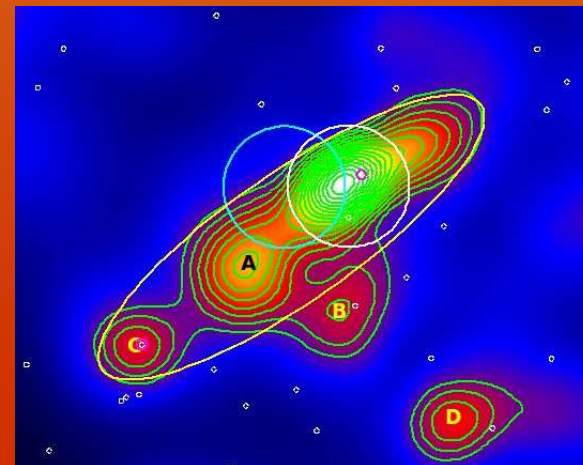
MACS 1423.8+2404 ($z=0.5450$)

6.0 x 3.0 Mpc



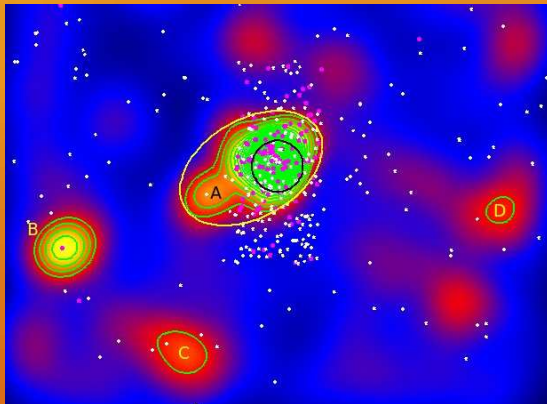
MACS 1621.4+3810 $z=0.4650$

7.6 x 2.1 Mpc



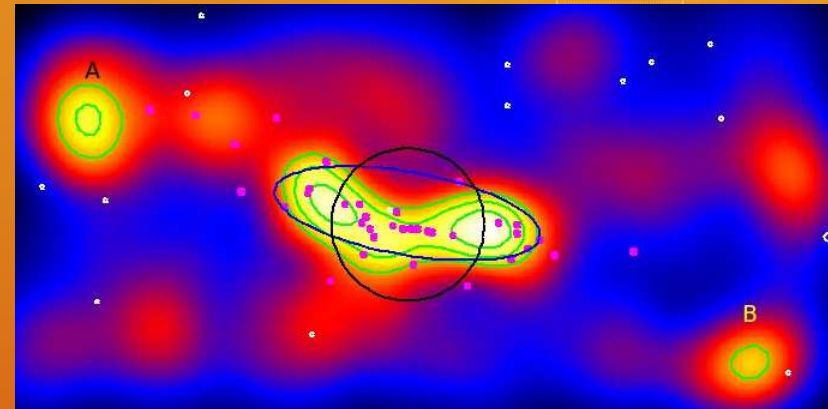
MS 1621.5+2640 ($z=0.4260$)

6.0 x 3.8 Mpc



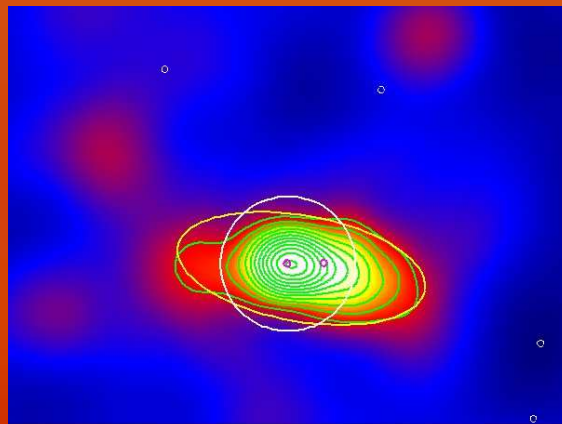
RX J1716.4+6708 $z=0.813$

3.5 x 1.1 Mpc

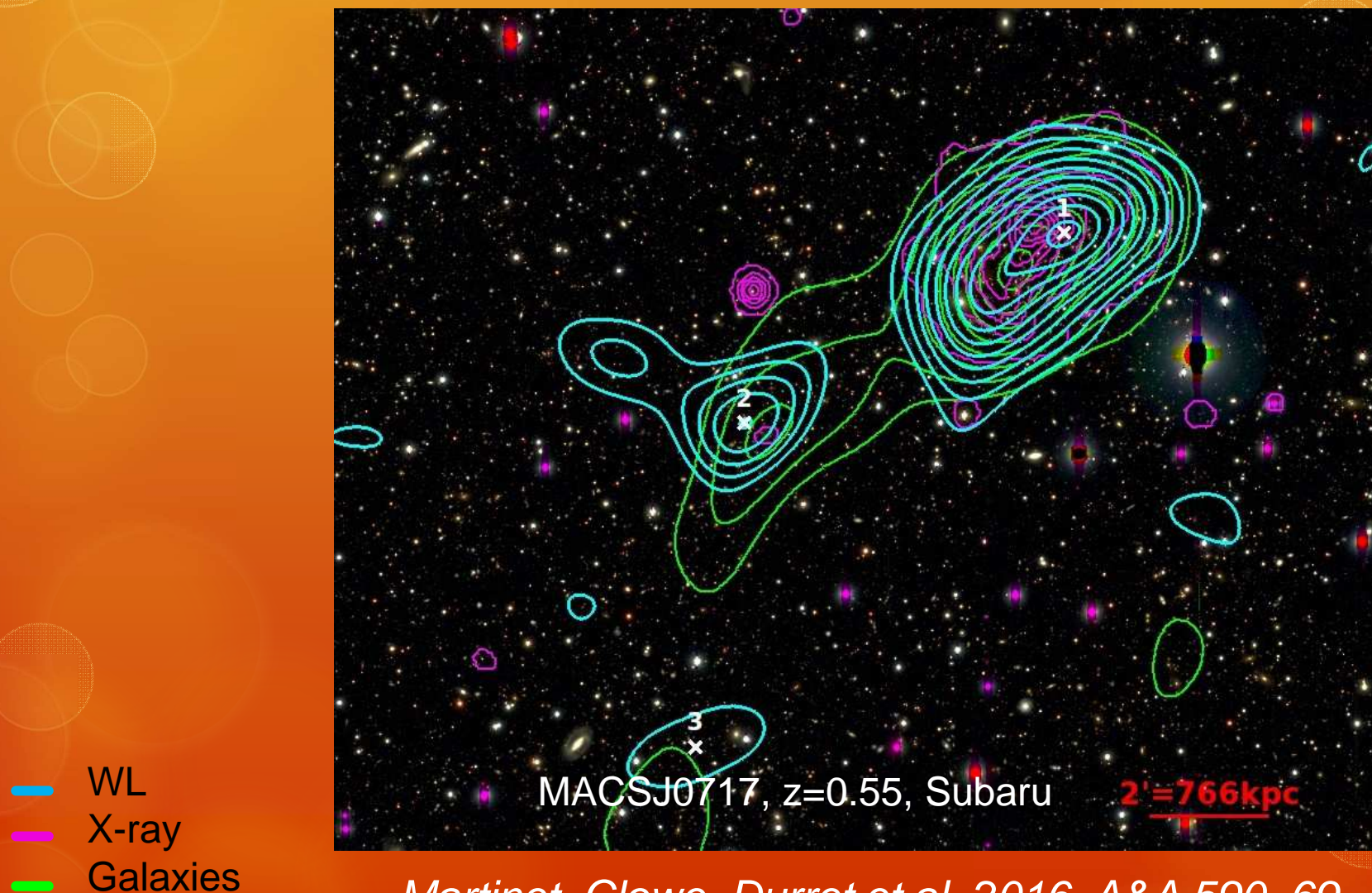


MACSJ2129.4-0741 ($z=0.5889$)

3.7 x 1.6 Mpc

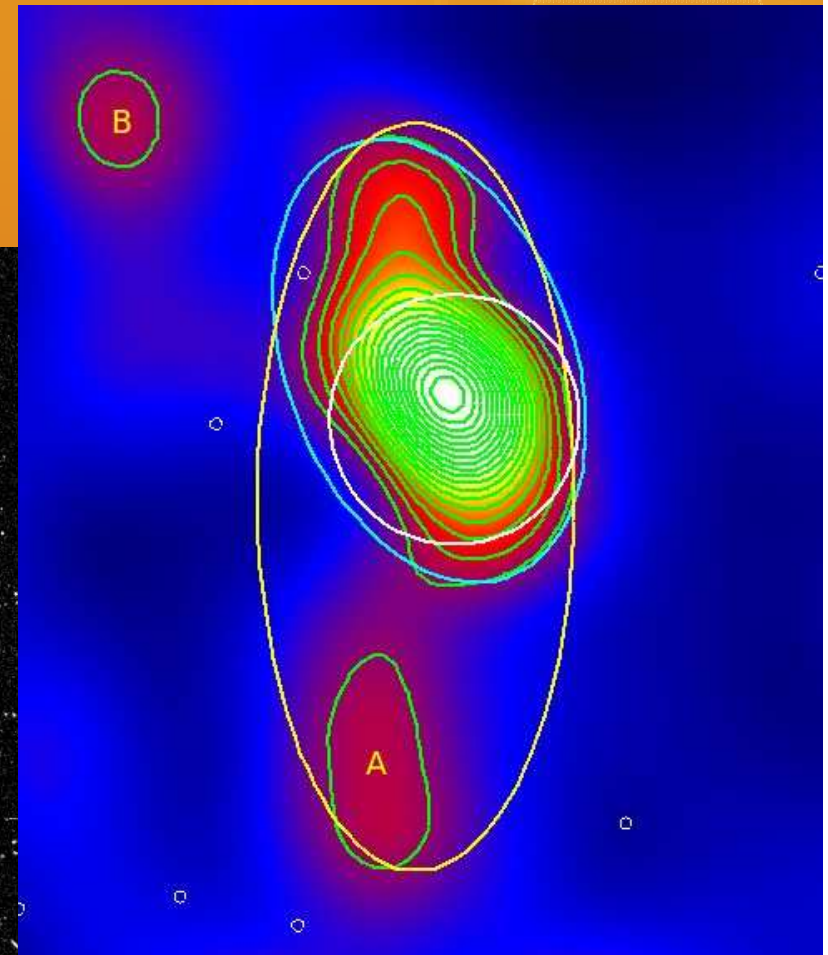
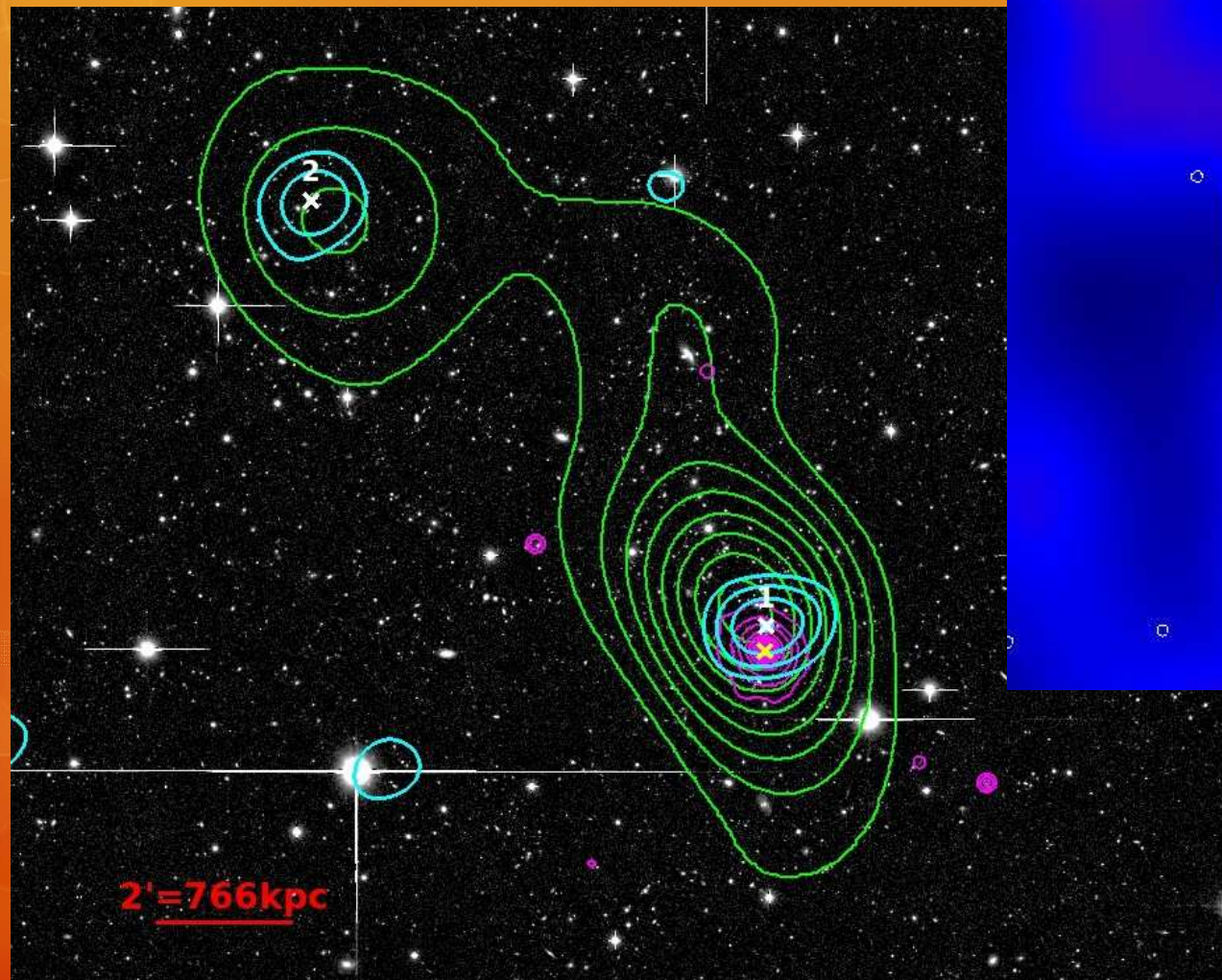


Comparison with mass maps obtained from weak lensing



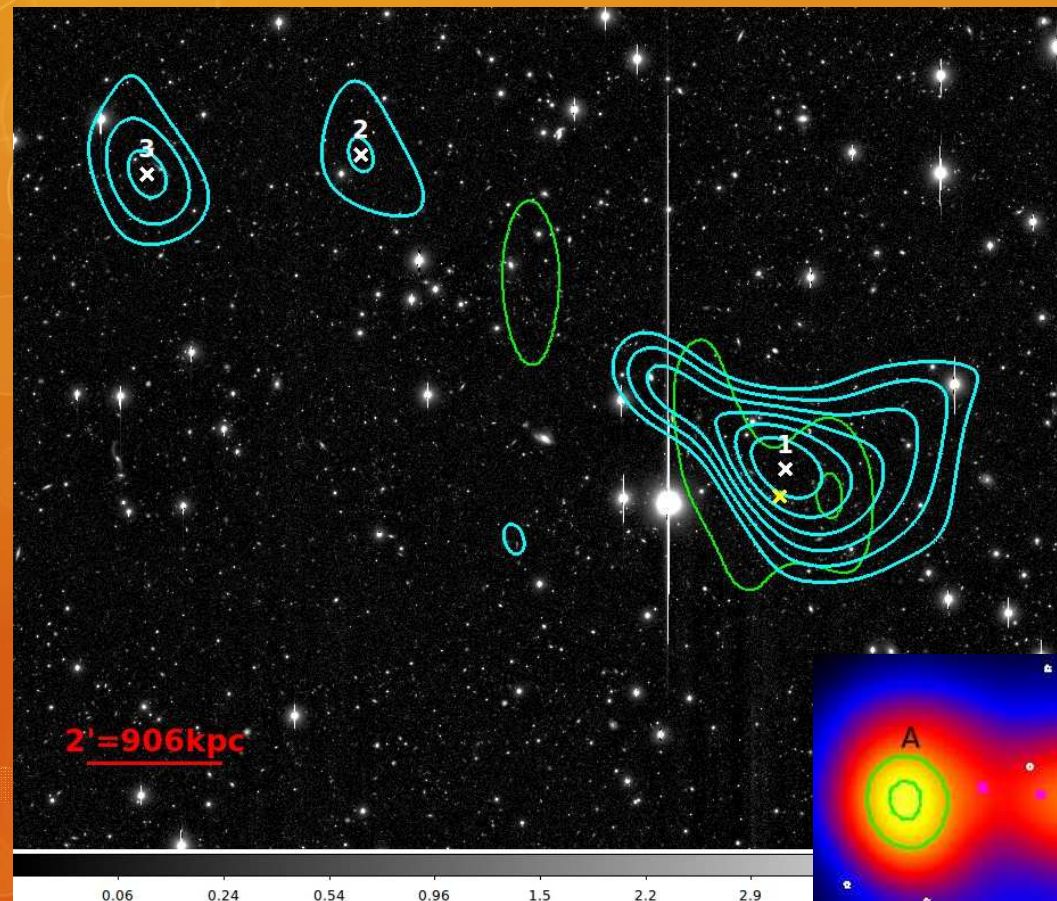
Martinet, Clowe, Durret et al. 2016, A&A 590, 69

**MACS J1423.8+2404
($z=0.5450$)**

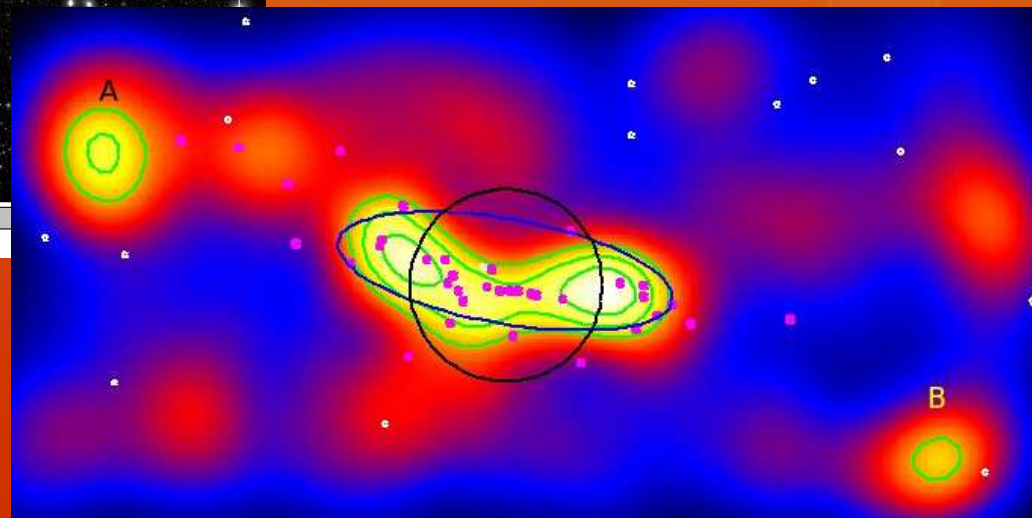


Green: galaxies
Cyan: weak lensing
Purple: X-rays

RX J1716.4+6708 $z=0.813$



Green: galaxies
Cyan: weak lensing



Results

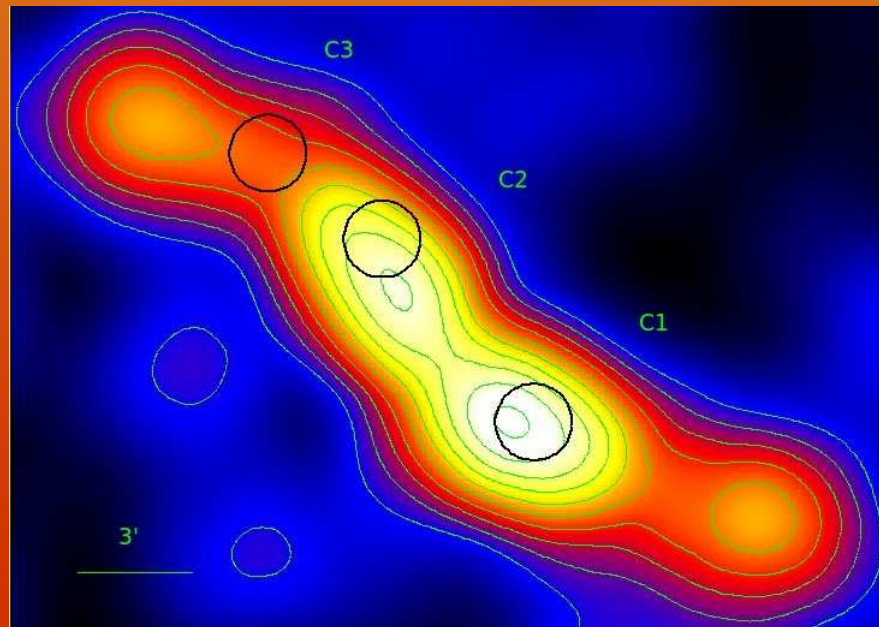
- At least 12 DAFT/FADA clusters out of 30 show an elongation
- Sizes of elongations between 3.2 and 7.6 Mpc
- Comparison with weak lensing (and in a few cases X-ray) maps show relatively good agreement
- Detection level changes with
 - Presence of (a) bright source(s) in the field
 - Level and width of the red sequence

Perspectives

Search for filaments and extensions around clusters in other cluster surveys, for example:

- SDSS/Stripe 82 clusters detected in the optical (Durret et al. 2015, A&A 578, 79) or X-rays (Takey, Durret et al. 2016, A&A in press)

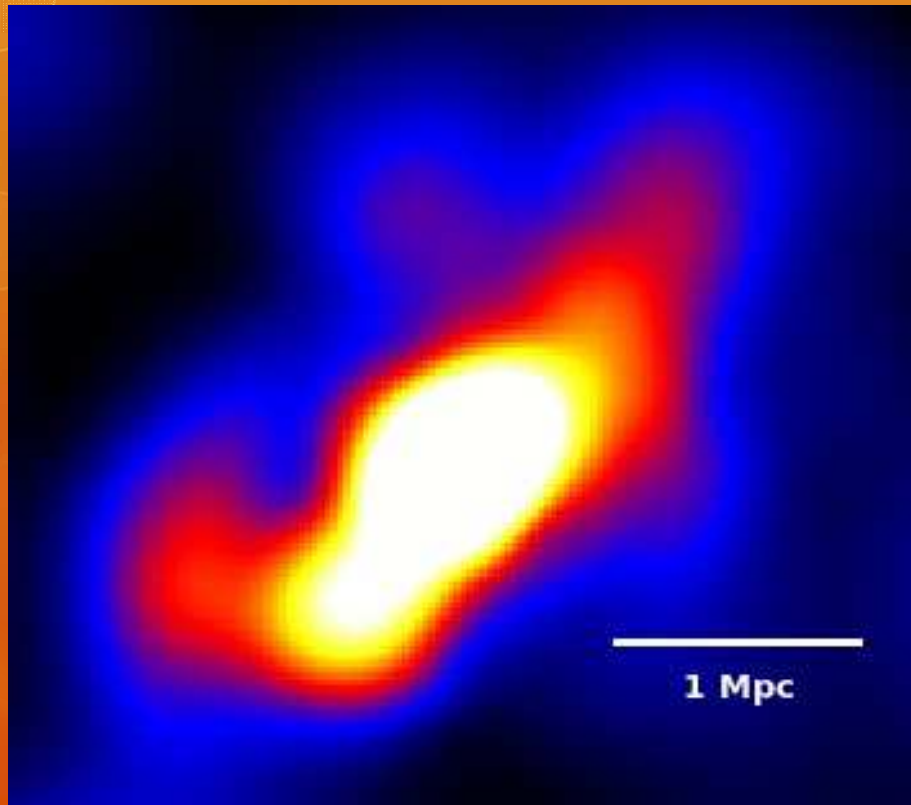
A412
($z=0.1093$)
Total extent=3 Mpc



Search for filaments and extensions around clusters in other cluster surveys:

- CLASH: 25 clusters at $z < 0.6$ (except 2) with Subaru images
- MADCOWS: clusters at $z > 1$

Search for filaments in the Canada France Hawaii Telescope Legacy Survey



Cluster and extension at $z \sim 0.6$



Florian Sarron's
PhD (2015-
2018)

See poster