

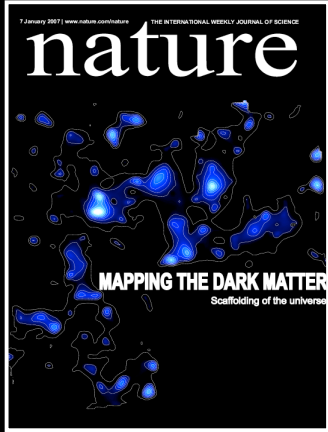
Weak Lensing Mass Maps in Euclid

Sandrine Pires

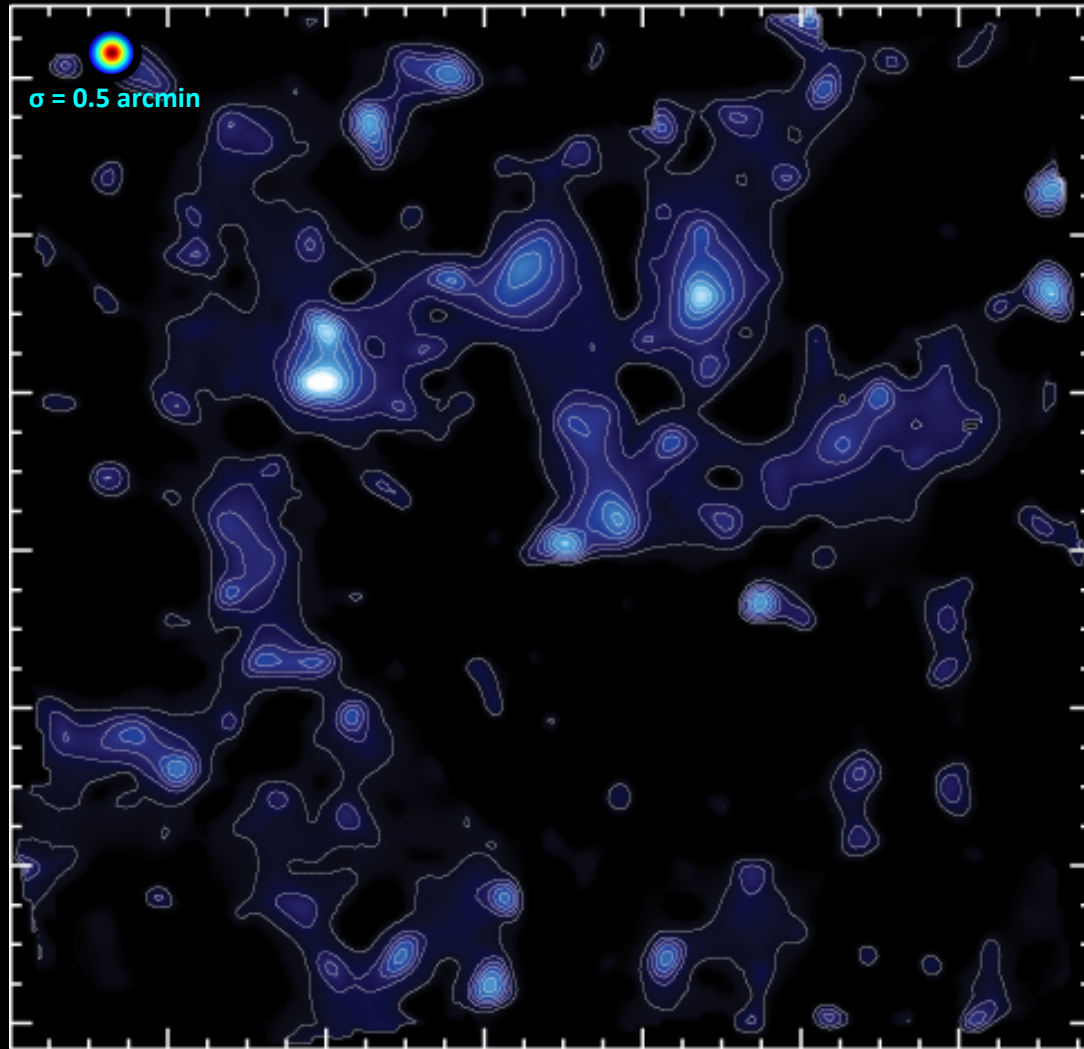
AIM-CEA Saclay/CosmoStat

sandrine.pires@cea.fr

<http://www.cosmostat.org/people/sandrine-pires/>



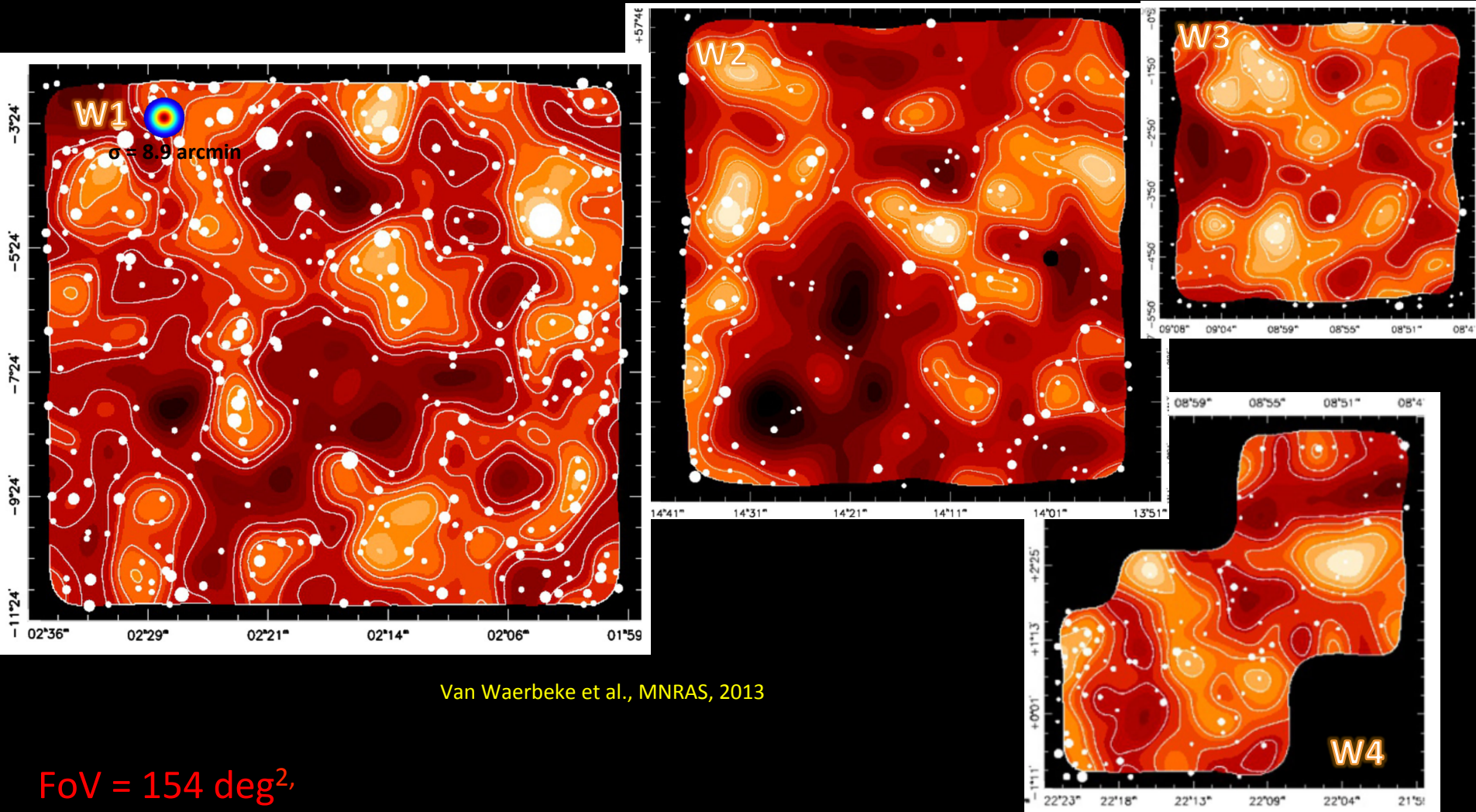
COSMOS Survey (HST)



FoV = 1.64 deg²,
ng = 67 gal/arcmin²

Massey et al., Nature, 2007

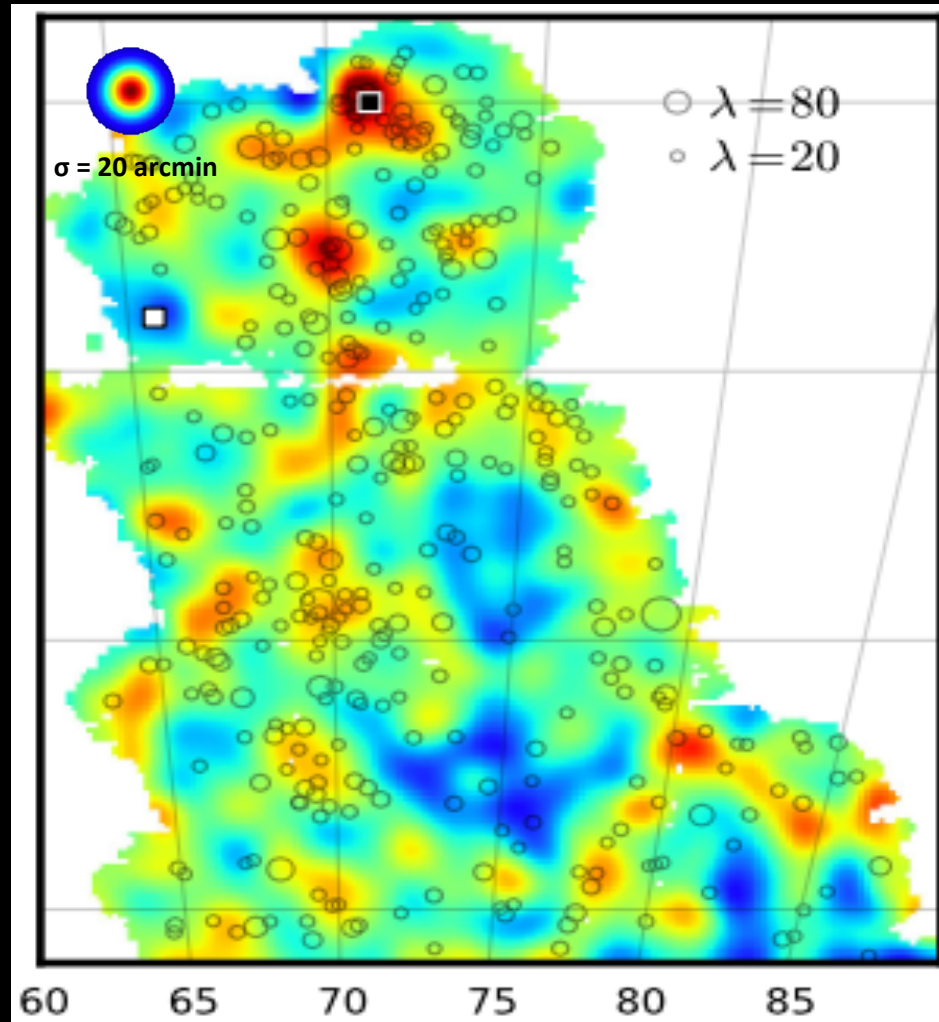
CFHTLenS Survey (CFHT)



Van Waerbeke et al., MNRAS, 2013

FoV = 154 deg^2 ,
 $n_g \approx 12 \text{ gal/arcmin}^2$

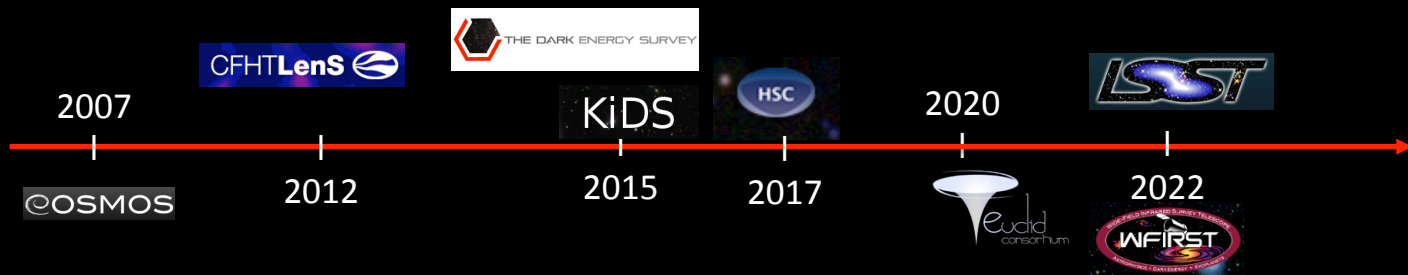
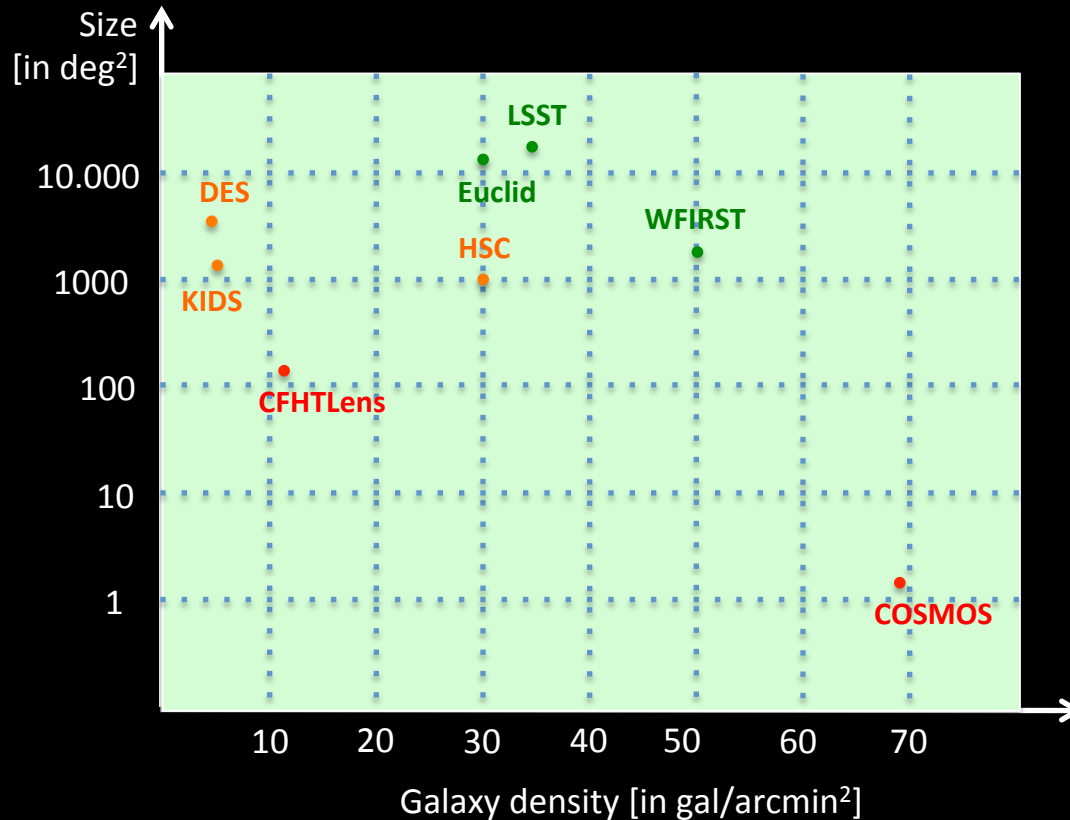
DES Survey



FoV = 139 deg² of 5000 deg²
 ng $\approx$ 4 gal/arcmin²

Chang et al., PRL, Nature, 2015

Weak Lensing Survey



The Euclid mission



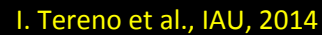
Euclid Mission

- 6-year mission, to be launched in 2020
- 1.2m diameter mirror, field of view : 0.5 deg^2
- Wide Survey : 15000 deg^2 (1/3 of the full sky)
- Deep survey : $2 \times 20 \text{ deg}^2$

Euclid Consortium

- 1200 members
- 130 laboratories from 14 European countries + NASA/US





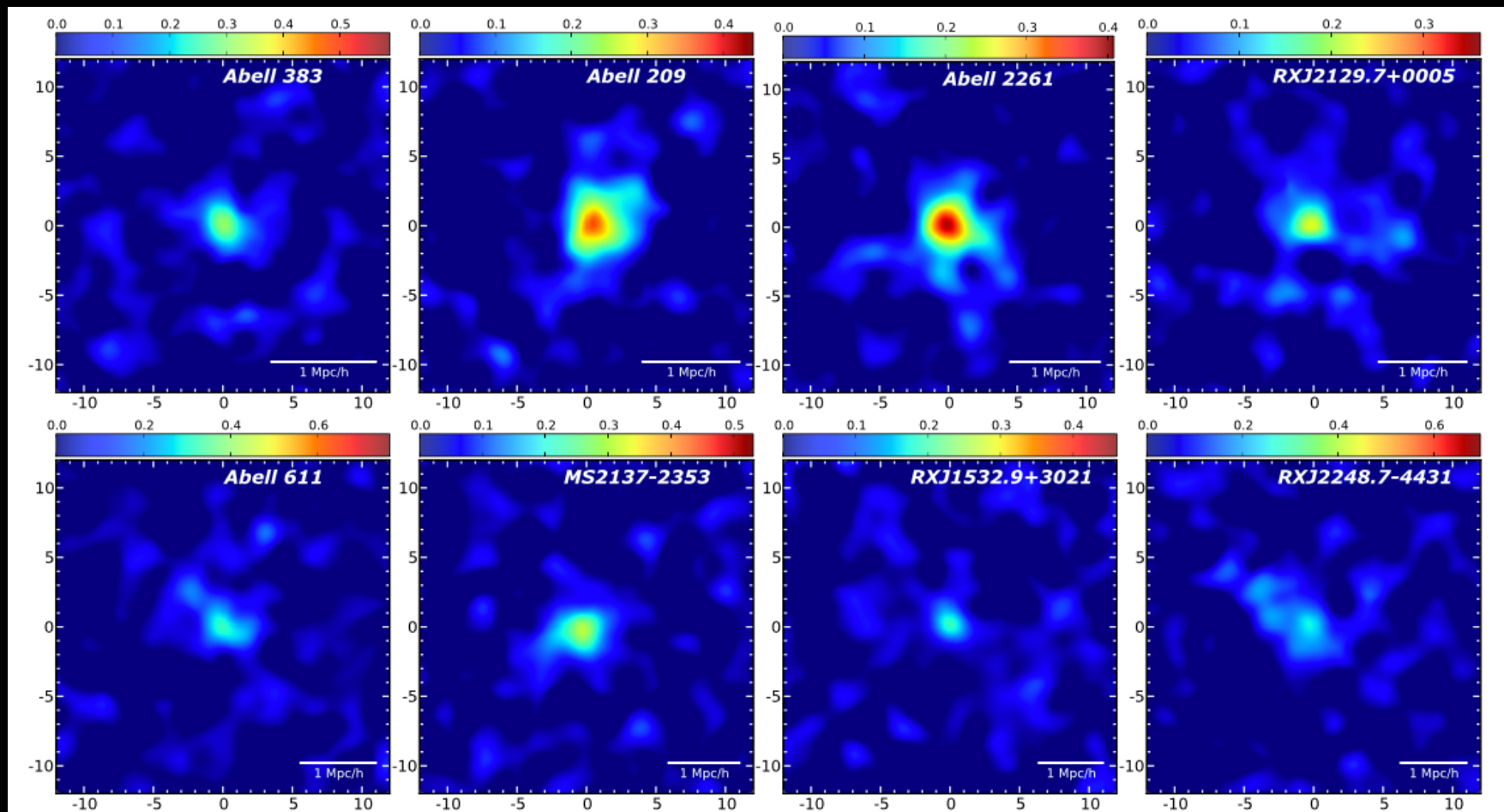
7



Why produce Weak Lensing Mass Maps for Euclid ?

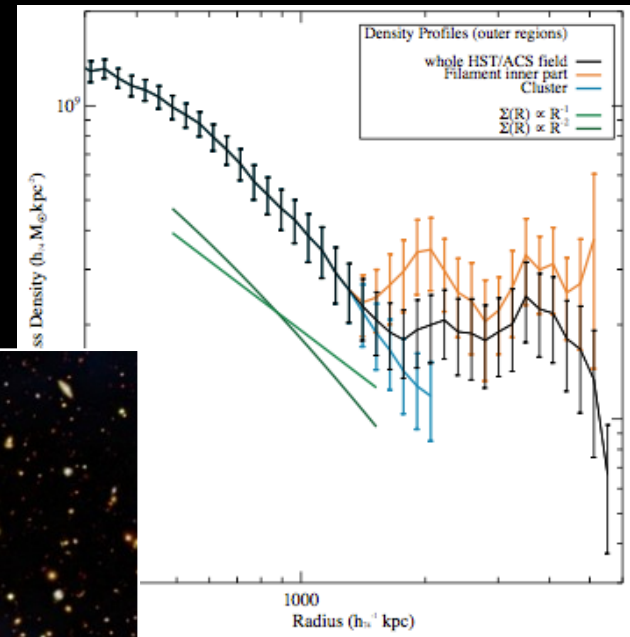
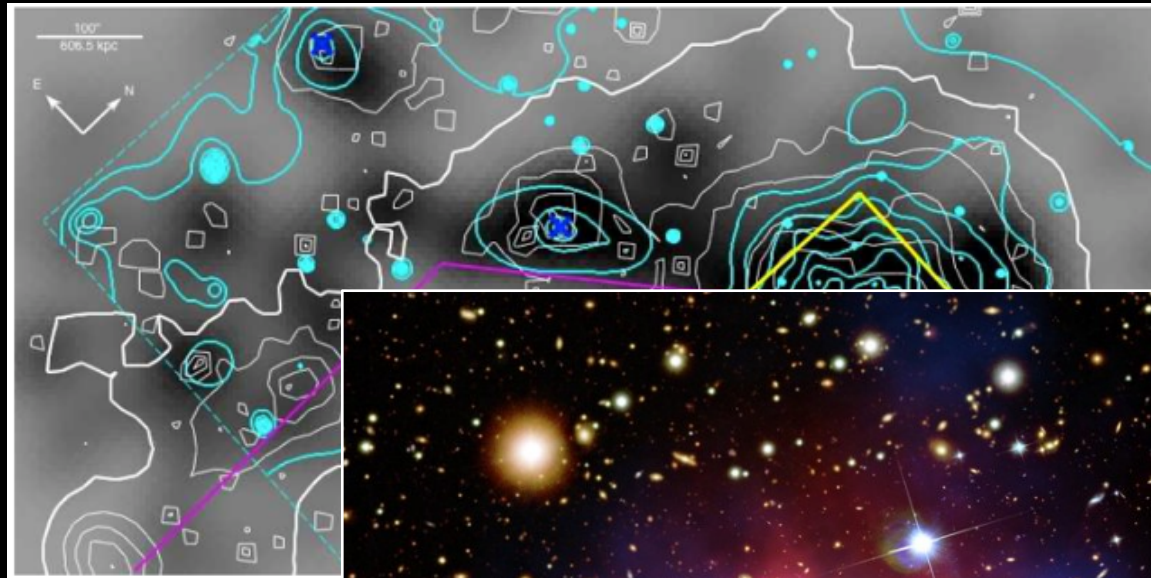
Small field Weak Lensing Mass Maps

Clusters Characterization



Umetsu et al, ApJ, 2014

Other objects characterisation



(MNRAS, 2012)



Courtesy : X-ray: NASA/CXC/CfA/ [M.Markevitch et al.](#); Lensing Map: NASA/STScI; ESO WFI; Magellan/U.Arizona D.Clowe, et al.; Optical: NASA/STScI; Magellan/U.Arizona/D.Clowe et al.;

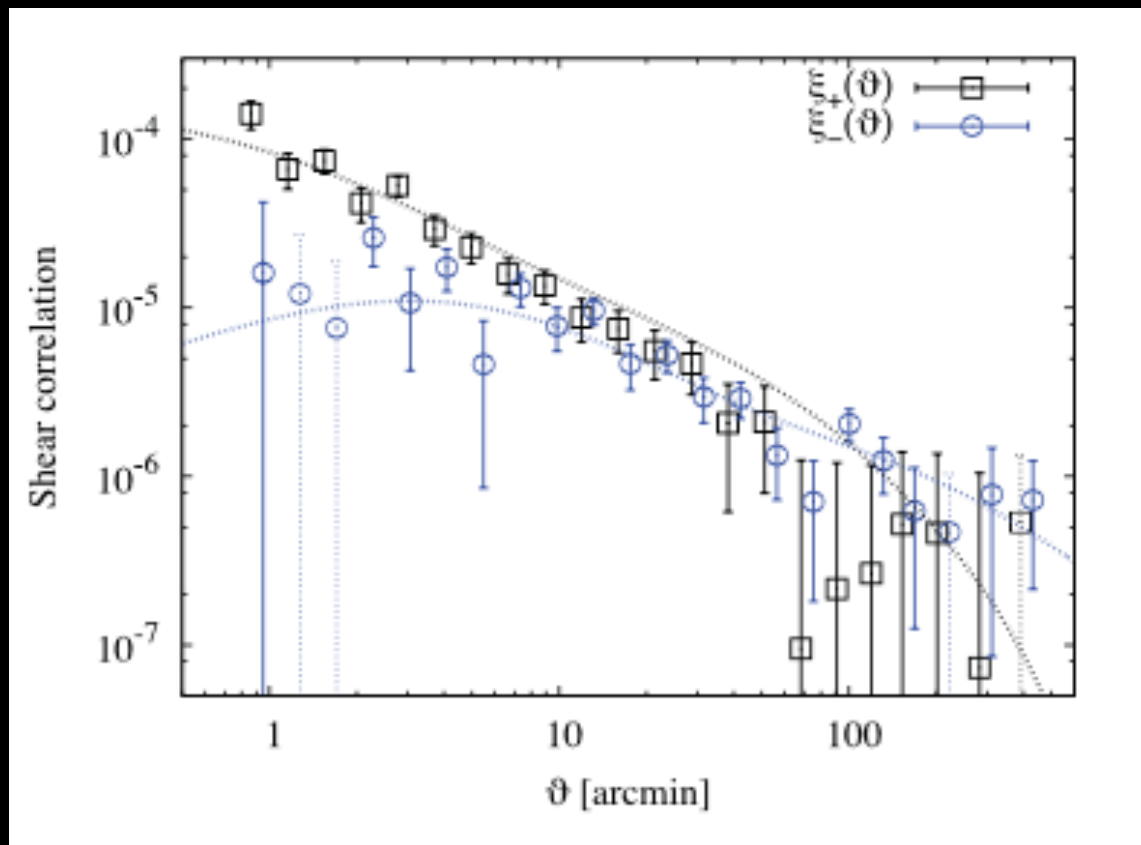
Bullet Cluster, Clowe et al., ApJ, 2006



Why produce Weak Lensing Mass Maps for Euclid ?

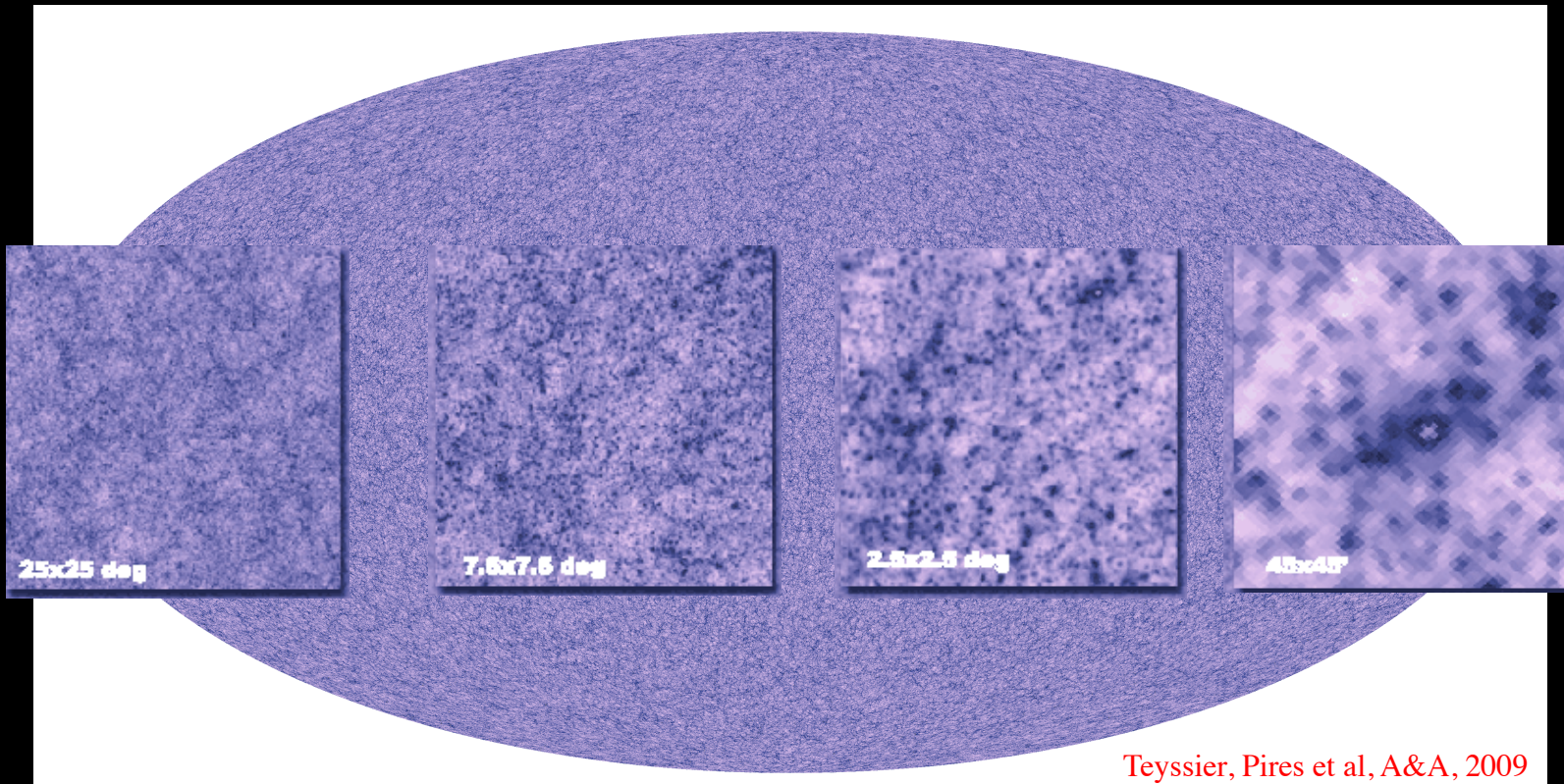
Wide field Weak Lensing Mass Maps

Weak Lensing data analysis



Kilbinger et al., MNRAS, 2013

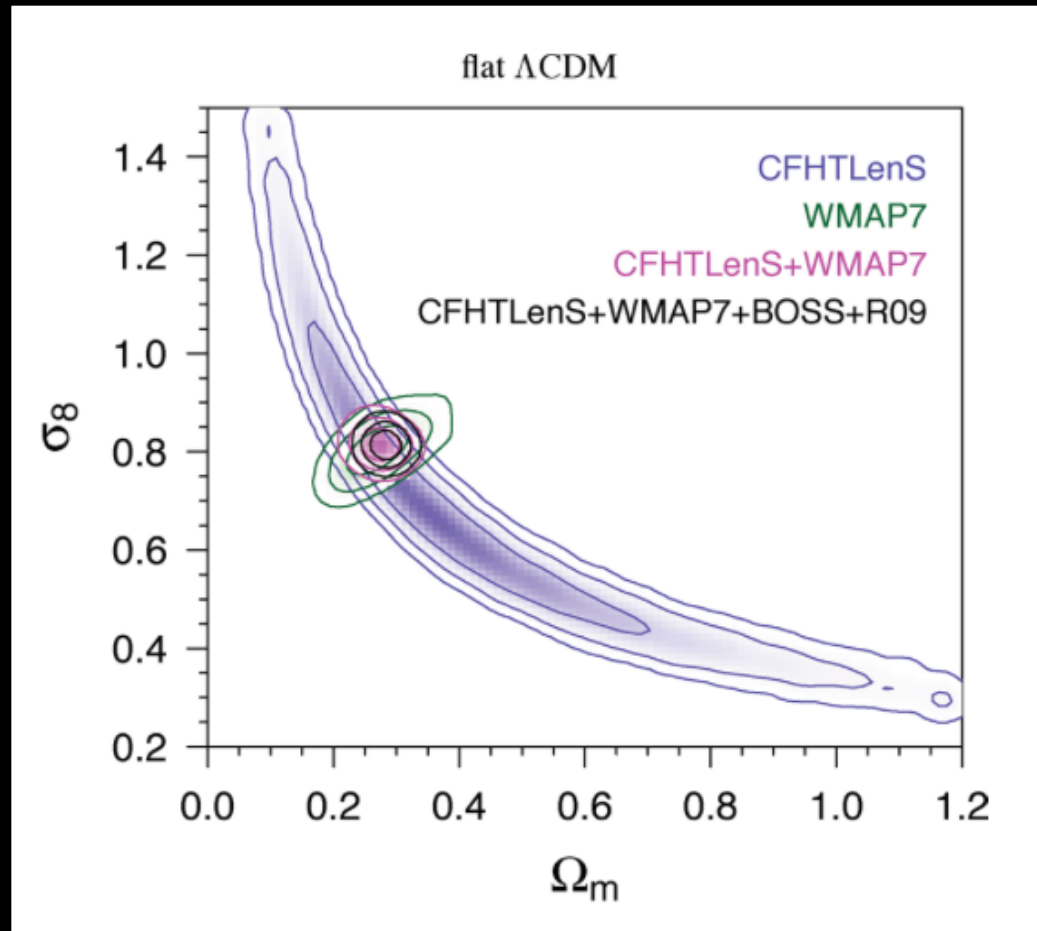
Weak Lensing field



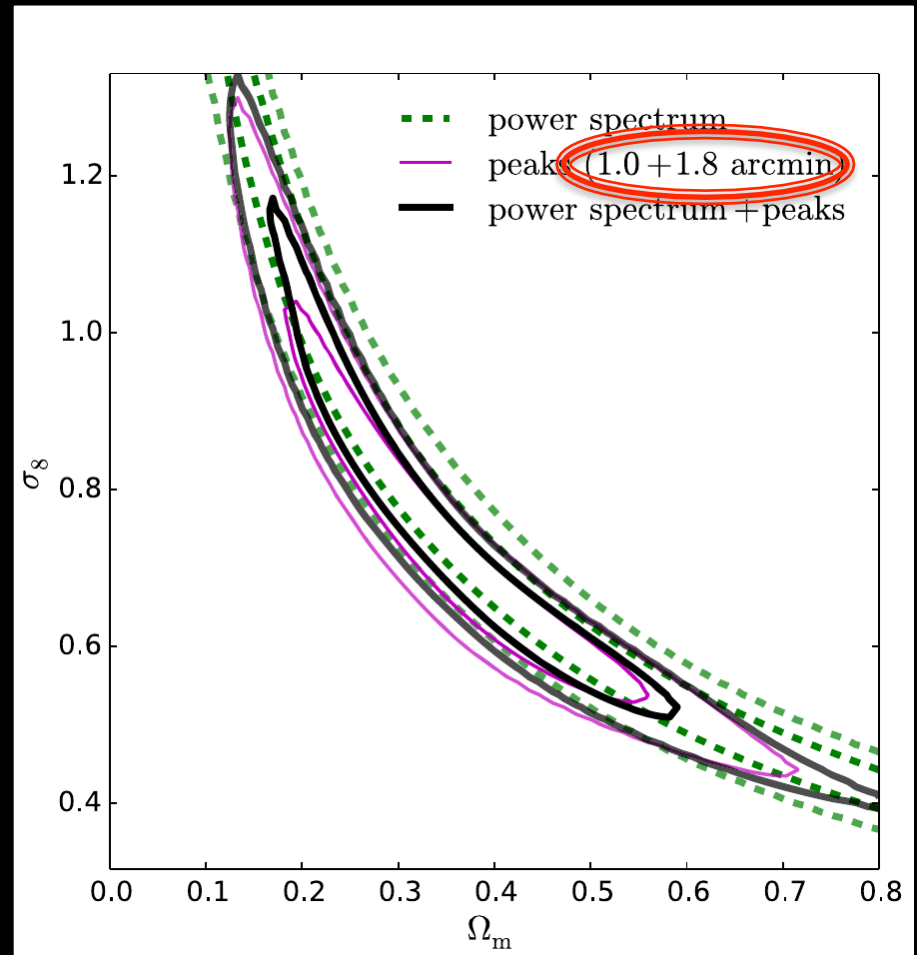
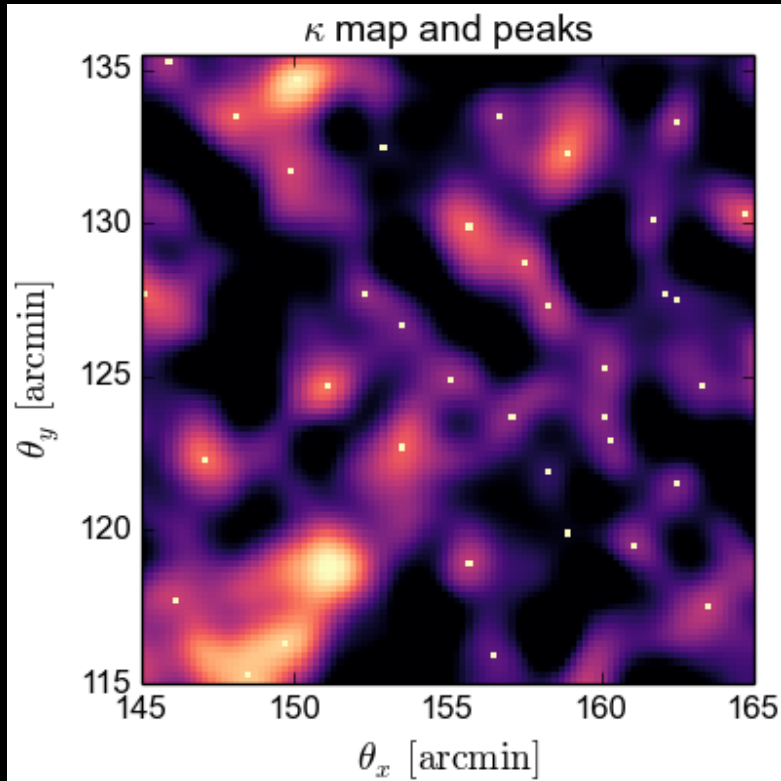
Teyssier, Pires et al, A&A, 2009

Full-sky convergence map derived from the Horizon simulation

Weak Lensing Current state-of-the-art



Peak Count



J. Liu et al., PhRvD, 2015

Constraints on cosmological parameters

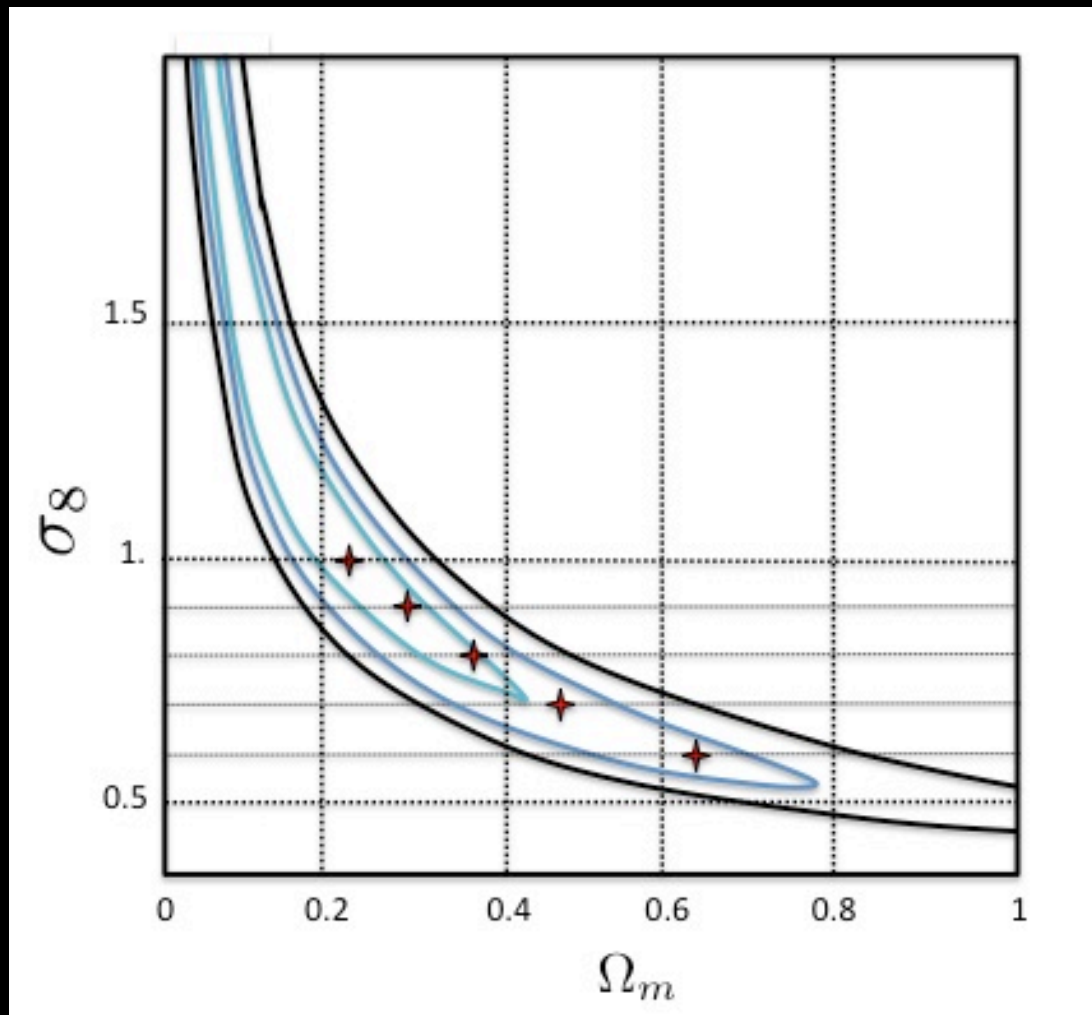
$n_g = 30 \text{ gal/ arcmin}^2$, on a scale corresponding to $\theta=1.85'$

Aperture Mass on shear catalogue	Purity	Completeness
2σ -threshold	10.77%	35.60%
3σ -threshold	33.15%	11.56%

Wavelet Transform on convergence map	Purity	Completeness
2σ -threshold	14.85%	36.31%
3σ -threshold	42.02%	13.11%

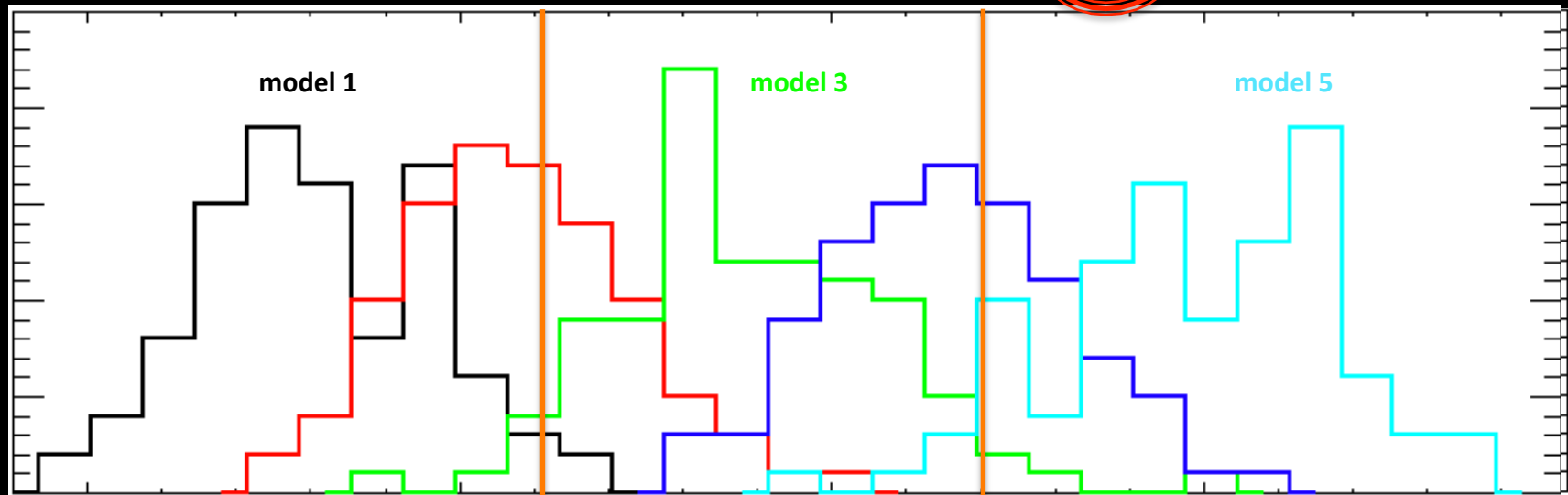
Wavelet Transform on convergence map	Purity	Completeness
MRLens Filter	75.37%	25.92%

Constraints on cosmological parameters



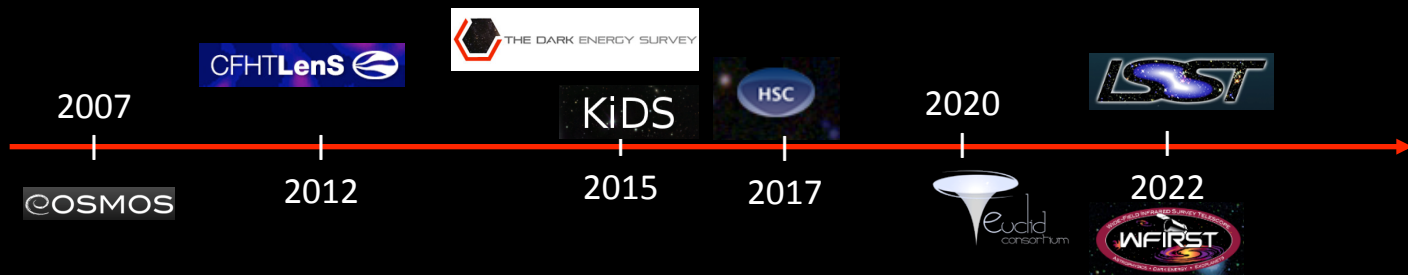
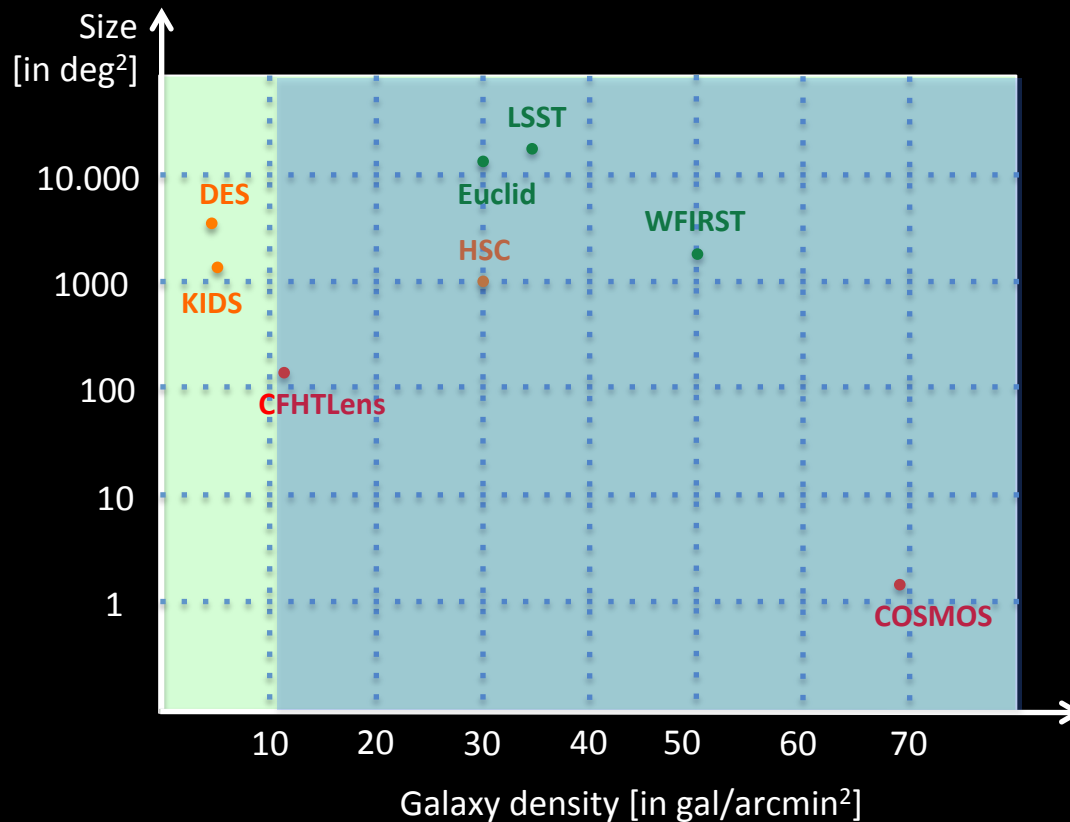
Constraints on cosmological parameters

$n_g = 30 \text{ gal/ arcmin}^2$, on a scale corresponding to $\theta=1.85'$



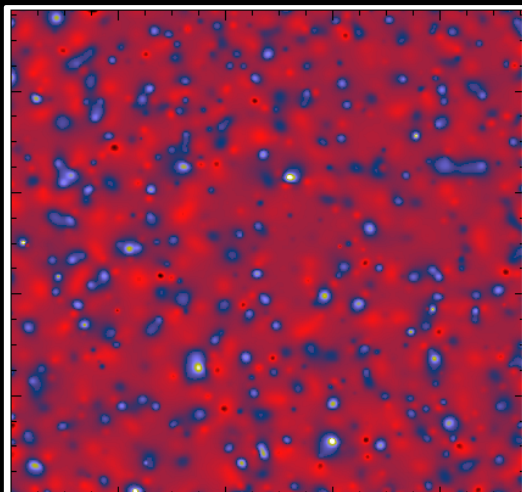
Pires, Leonard & Starck, 2009

Weak Lensing Survey Characteristics

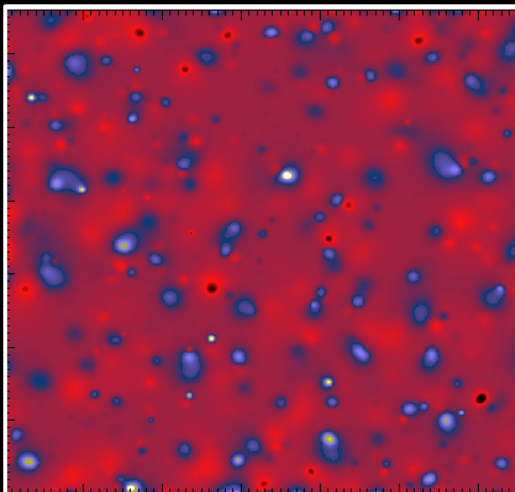


Weak Lensing Maps Resolution

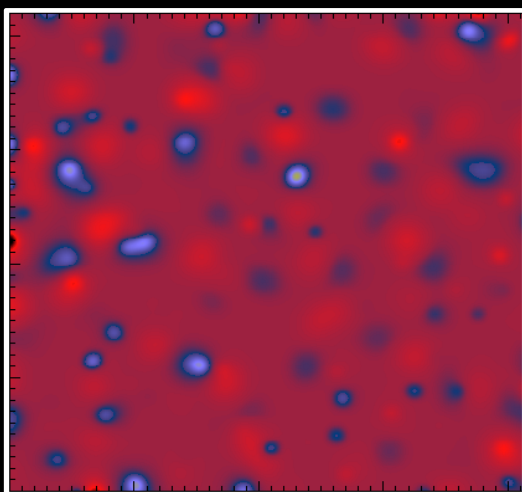
COSMOS



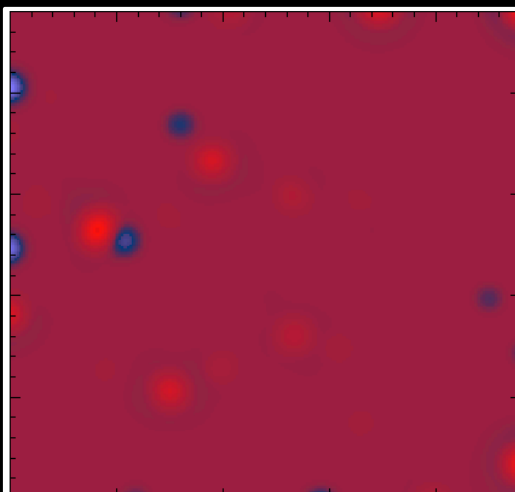
Euclid



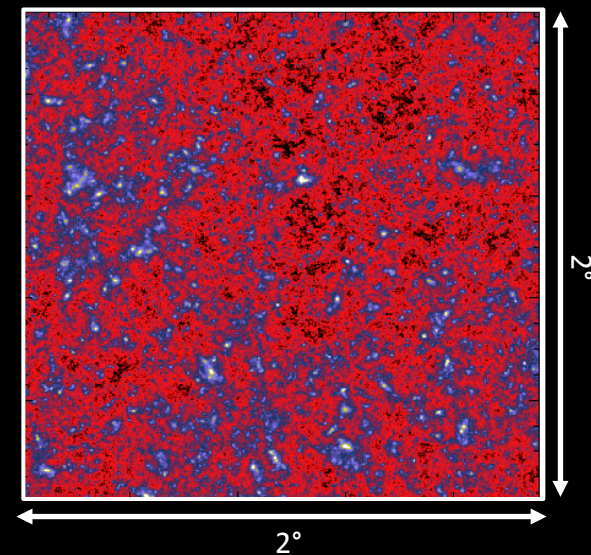
CFHTLens



DES



Noiseless simulation





END

