



# Galaxy Cluster SWG

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*Euclid* France 2015





# The Science Working Group

- ❑ Leads: L. Moscardini (IT), J. Weller (G), J.G. Bartlett (deputy, F)
- ❑ Cosmology and Legacy science with clusters
- ❑ Eight internal and one external work packages established in 2015
  - ❑ <http://euclid.roe.ac.uk/projects/cgswg/wiki/>
- ❑ Cosmology forecast paper submitted to A&A as an official *Euclid* paper
  - ❑ Sartoris et al., arXiv:1505.02165



# SWG Work Packages

## Sample Selection

Gonzalez, Iovino, Moscardini

## Mass Modeling

Von der Linden, Meneghetti, Hoekstra

## Likelihood

Borgani, Weller

## Statistics on Cluster Samples

Weller, [Bartlett](#), Moscardini



# SWG Work Packages

- ❑ Mass-Observable Relation
  - ❑ Bartlett, Biviano, Maurogordato
- ❑ Validation
  - ❑ Bardelli, Stanford
- ❑ Astrophysics of Galaxy Clusters
  - ❑ Mei, De Lucia
- ❑ External Data
  - ❑ Reiprich, Rosati, Melin

# Galaxy Cluster Cosmology

- ❑ Catalog construction and characterization

  - ❑ Baseline – photometric survey: ~60,000 clusters

- $M \sim (1 - 2) \times 10^{14} M_{\odot}$  out to  $z > 1$

  - ❑ Catalog construction challenges on mocks

  - ❑ Studies using grism

- ❑ Cluster observable-mass distribution

  - ❑ Lensing masses – *Euclid* strength

- ❑ Cosmology forecast paper submitted to A&A

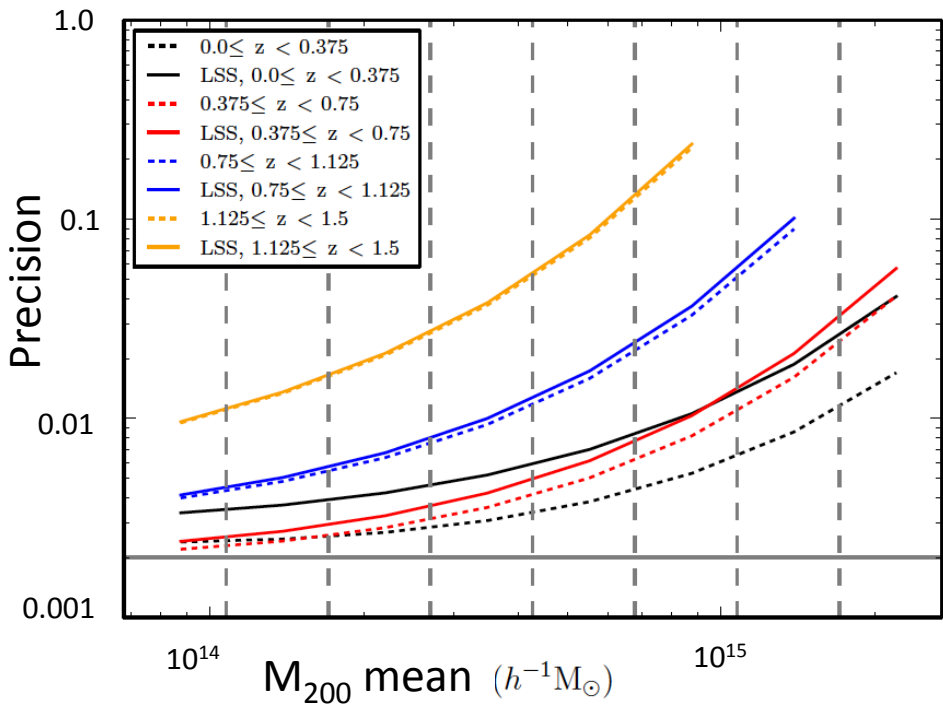
  - ❑ Processed through *Euclid* Editorial Board

  - ❑ Received comments from A&A referee; response in preparation.

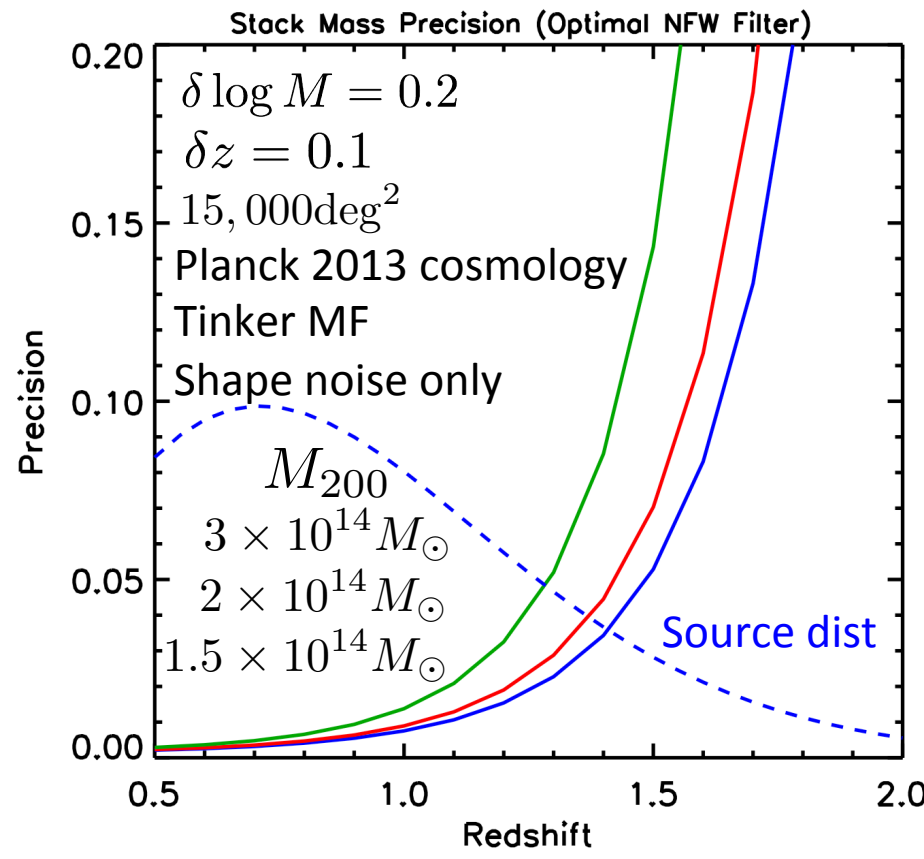


# Mass Calibration from Shear

## Mean Mass of Cluster Stack



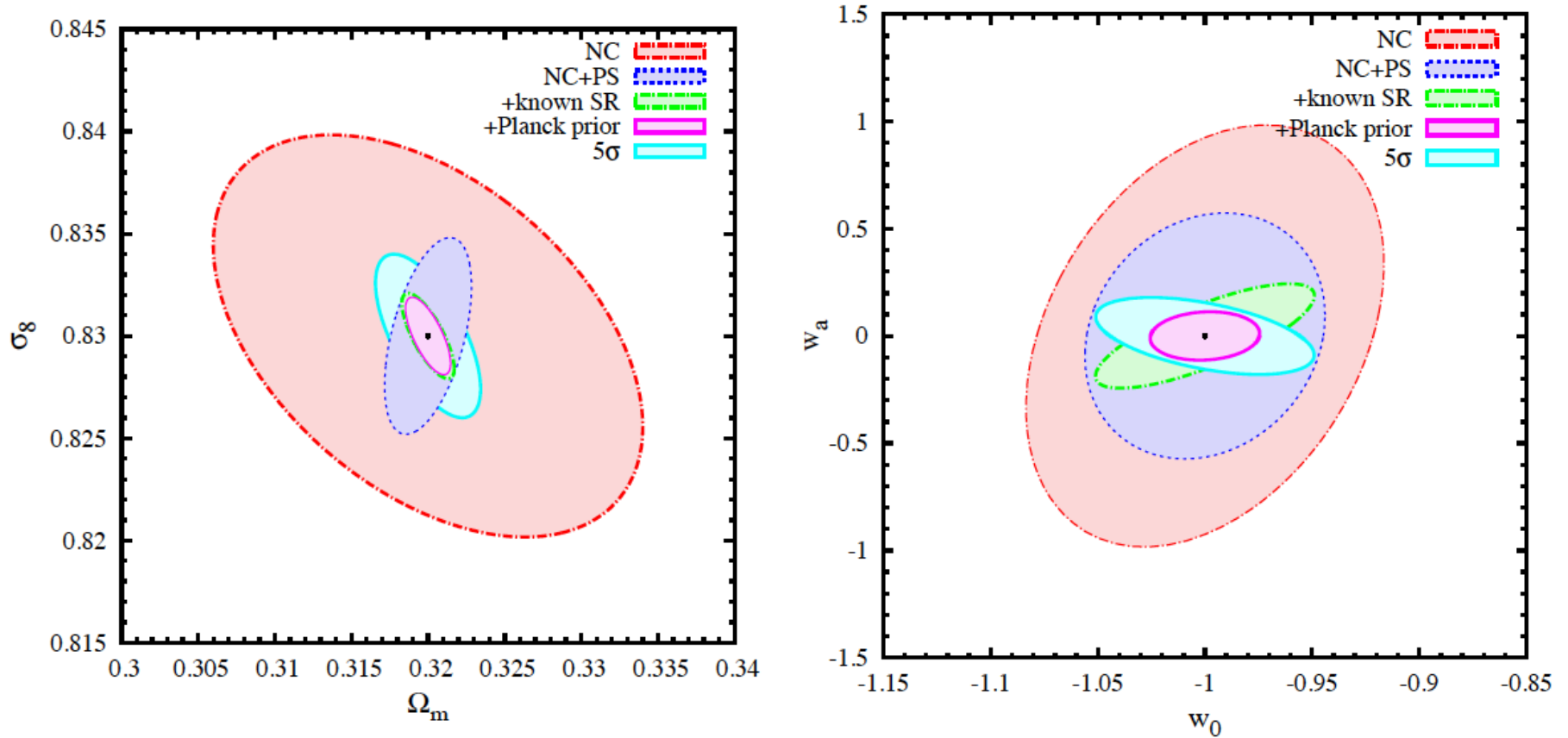
Köhlinger, Hoekstra, Eriksen (2015)



Bartlett (2014), internal note

# Forecast Results

Sartoris et al. (2015)



68% confidence regions

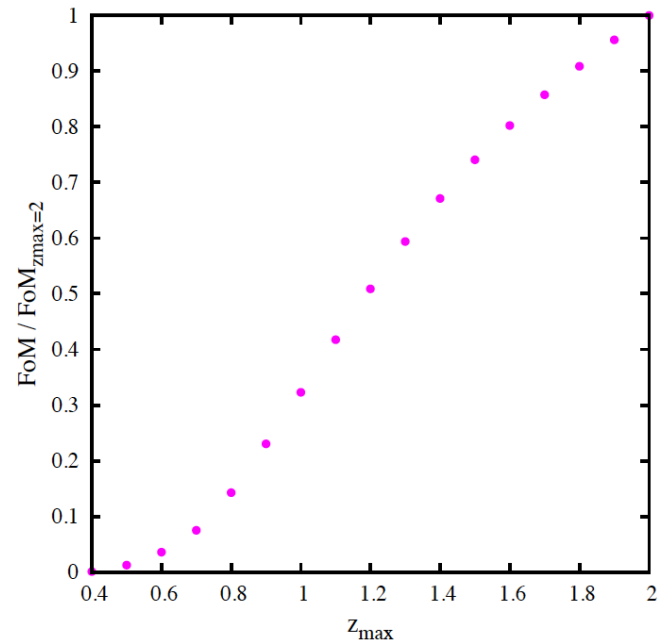


# Forecast Results

Sartoris et al. (2015)

		<b>Gravity</b>				<b>Non-Gauss</b>	<b>Neutrinos</b>	
Parameter arrays:		Eqs. <b>16</b> & <b>28</b>				Eqs. <b>22</b> & <b>28</b>	Eqs. <b>20</b> & <b>28</b>	Eqs. <b>26</b> & <b>28</b>
Constraints:	FoM	$\Delta w_0$	$\Delta w_a$	$\Delta \Omega_m$	$\Delta \sigma_8$	$\Delta \gamma$	$\Delta f_{NL}$	$\Delta \Omega_\nu$
<i><math>N_{500,c}/\sigma_{\text{field}} \geq 3</math> Euclid photometric cluster selection</i>								
NC+PS	73	0.037	0.38	0.0019	0.0032	0.023	6.67	0.0015
NC+PS+known SR	291	0.034	0.16	0.0011	0.0014	0.020	6.58	0.0013
NC+PS+known SR+Planck	802	0.017	0.074	0.0010	0.0012	0.015	4.93	0.0012
<i><math>N_{500,c}/\sigma_{\text{field}} \geq 5</math> Euclid photometric cluster selection</i>								
NC+PS+known SR+Planck	209	0.034	0.12	0.0022	0.0026			

Importance of reaching higher redshifts  
 A specific Euclid strength







# SWG Meeting

- ❑ 1 – 3 February 2016, APC Paris
- ❑ Tentative program
  - ❑ Update on *Euclid* mission (EC Lead)
  - ❑ Update on OU-LE3
  - ❑ SWG WP structure, workflow and interface with LE3
  - ❑ New mechanism for updating requirements
  - ❑ IST combining cosmology probes
  - ❑ Work package reports
  - ❑ Status of simulations
  - ❑ Euclid publication policy
  - ❑ Pertinent topics in cluster science