

Clusters of Galaxies SWG

Carlo Giocoli, Jim Bartlett, Barbara Sartoris

OUTLINE

- Introduction of the Clusters of Galaxies Activities
- KP-JC-3

Clusters of Galaxies SWG

Jim Bartlett, Carlo Giocoli, Barbara Sartoris



- The group has ~ 220 members with approximately 40% participating to the weakly telecons.
- We have strong synergy with the CL-OU-LE-3 lead by Sophie Maurogordato and Emiliano Munari, many processing functions have italian leadership like for example: COMB-CL, RICH-CL ...
- The scientific activities within the WP have robust interface with the DR1-KP and natural link also with the LE-3 processing functions: this has been done to optimize the interfaces, facilitate the cross-interactions and maximize the quality and the scientific production

Clusters of Galaxies SWG

Work Packages https://euclid.roe.ac.uk/projects/cgswg/wiki/Work_Packages

#	Name of Work Package	WP Coordinators
WP1	Sample Selection	Gonzalez, Maturi, Murray
WP2	Mass Modelling	Baumont, Grandis, Saro
WP3	Likelihood	Bocquet, Costanzi, Sartoris
WP4	Statistics on Cluster Samples	Fumagalli, Marulli
WP5	Mass–Observable Relation	Pacaud, Pratt
WP6	Validation	Bardelli, Cabanac
WP7	Astrophysics of Clusters of Galaxies	Ettori, Hatch, Pierre
WP8	External Data	Melin, Reiprich, Stanford
WP9	Cluster Simulations	Borgani, Castro, Kay
WP10	Weak Lensing Selected Clusters	Diego , Pires
WP11	Protoclusters	Castignani, Dannerbauer, Dole

Clusters of Galaxies SWG

#	Name of Project	KP Coordinators
📄 DR1-KP-CL-1	Cosmological constraints from galaxy clusters	Costanzi, Maturi, Moscardini
📄 DR1-KP-CL-2	Accurate cluster shear extraction and modelling for Euclid	Baumont, Grandis, Ingolia
📄 DR1-KP-CL-3	Cluster masses and scaling relations in an astrophysical context	Pacaud, Saro, (Pratt)
📄 DR1-KP-CL-4	The DR1 cluster catalogue and its galaxies	Gonzalez, Maurogordato
📄 DR1-KP-CL-5	Intracluster Light	Dimauro, Hatch
📄 DR1-KP-CL-6	Discovery of Galaxy Protoclusters	Castignani, Dannerbauer
📄 DR1-KP-CL-7	Weak Lensing Detection of Galaxy Clusters	Diego , Pires
DR1-KP-CL-8:	Probing Self-Interacting Dark Matter (SIDM) with Galaxy Clusters	

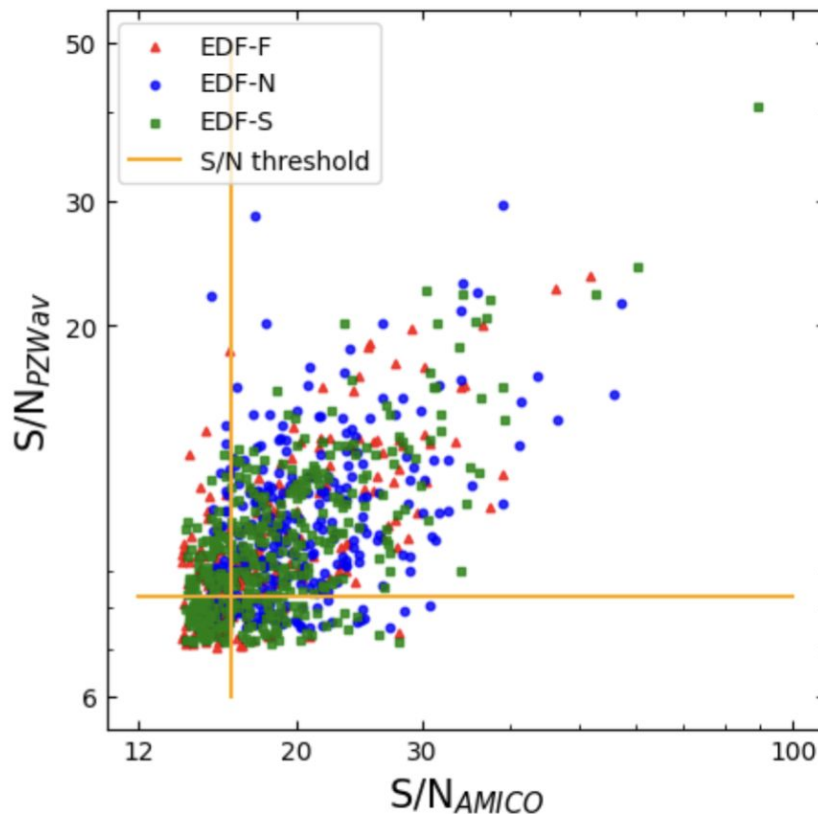
Sample Selection and Cluster Finders

- Two Cluster Finders
 - AMICO: Optimal Matched filter Algorithm
 - PZWav: Wavelet style filter (Difference-of-Gaussians kernel)
- Both codes
 - Selected through a Euclid cluster finding challenge
 - Use full PDZ information to search for cluster overdensities
 - Have been previously validated in other surveys
 - Meet performance criteria for CG-SWG
- Differences
 - PZWav makes minimal assumptions about cluster properties
 - AMICO assumes a cluster model and uses H band

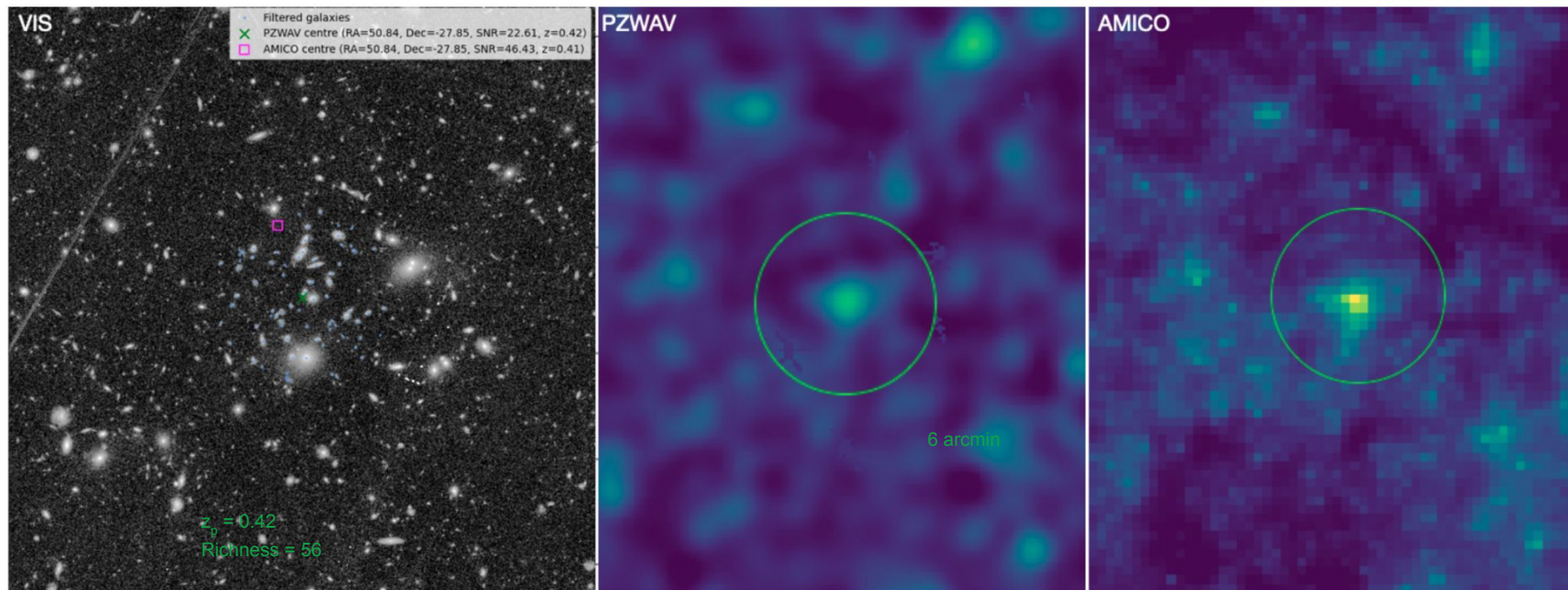
Cluster Detections in Q1

Q1 Published Catalog:

- $z < 1.5$
- Joint AMICO+PZWav detections
- Thresholds set by equal cluster candidate density
AMICO $S/N > 16.1$
PZWav $S/N > 8.3$
- 426 joint detections



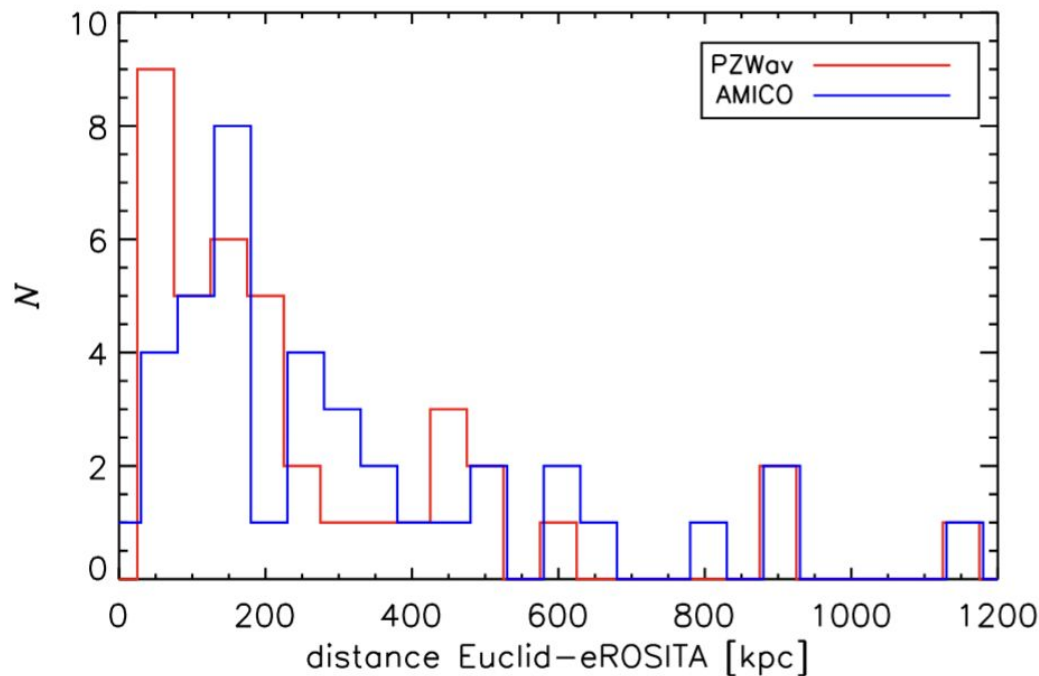
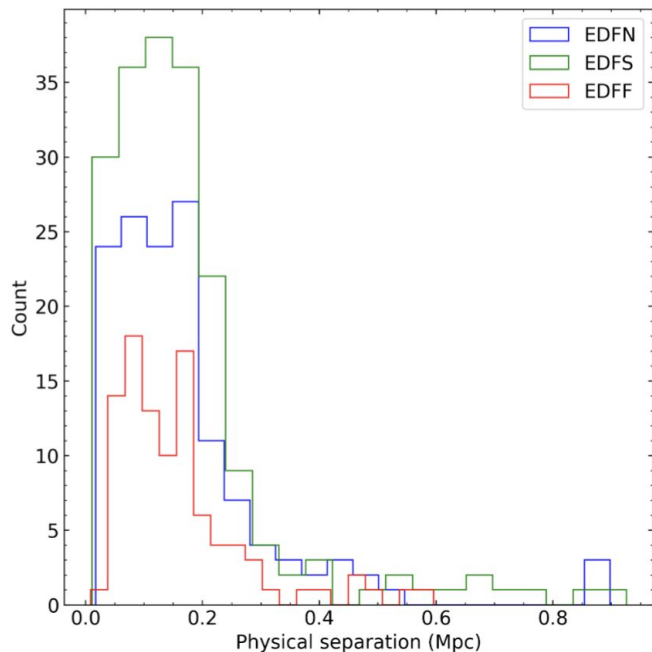
Cluster Detections in Q1



Cluster Detections in Q1

AMICO/PZWav Positions

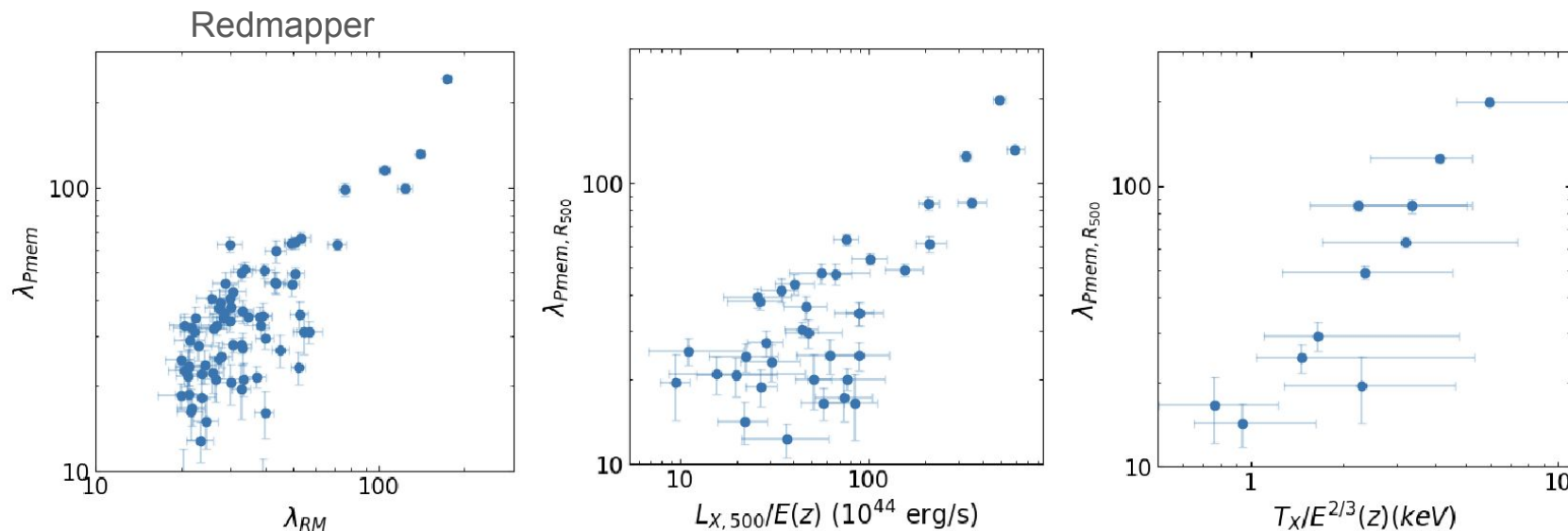
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Cluster Detections in Q1

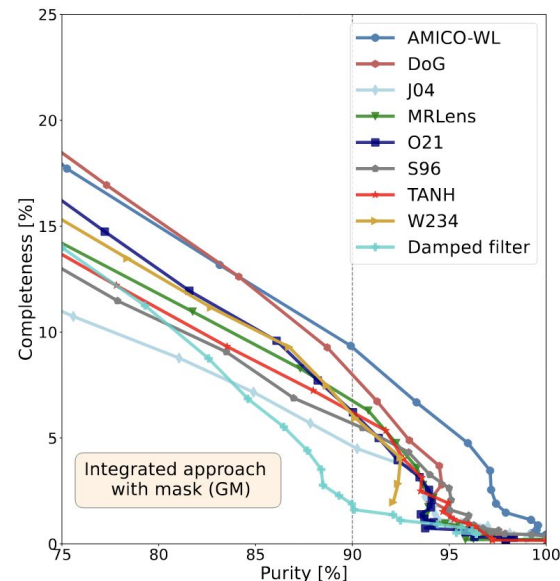
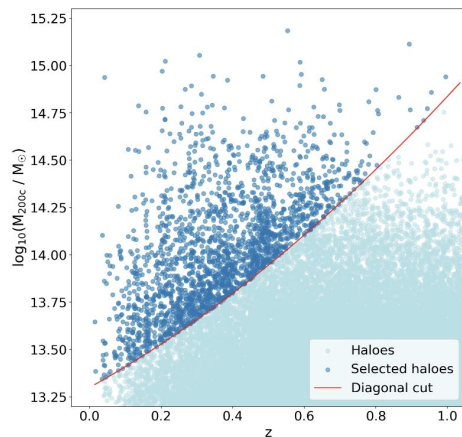
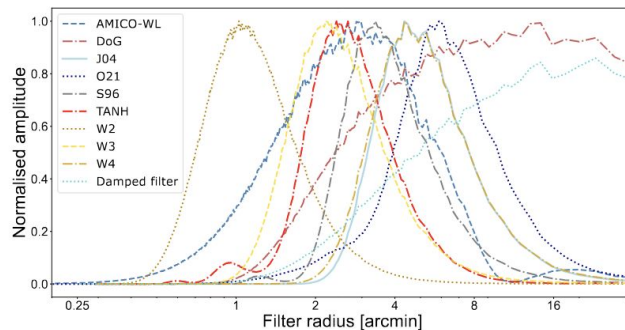
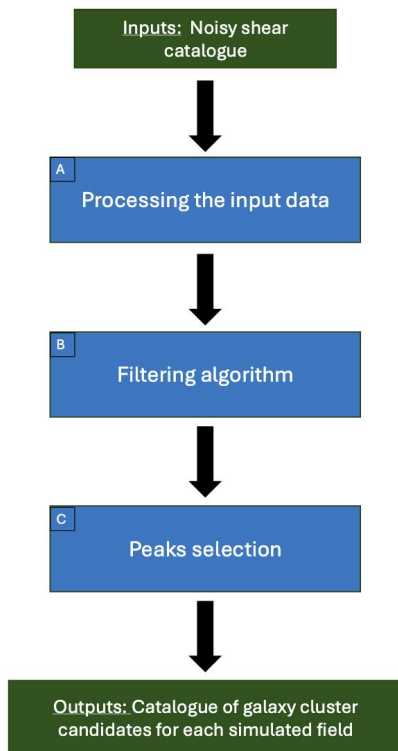
Richnesses: RedMaPPer, eROSITA

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Cluster Detections using WL data

Manjón-García, Leroy et al. to be submitted



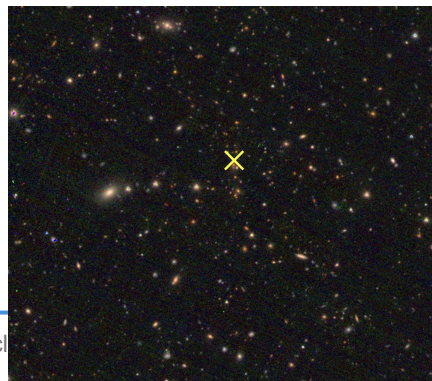
From Q1 to DR1: RR2

Data processing of RR2 is done and available on datalabs (SGS only)

Tests on the cluster side (ongoing)

- Implementation of new masking (same recipe as Q1) is crucial for cluster finders
- Inspection of NIR images: substantial improvement on persistence (masking)
- Selection criteria revisited since Q1
- Test of the merging function after cluster tiling
- Test of the spread of PDzs / Adaptation of the detection codes
- Preliminary runs of cluster detection and pipeline (60 deg2)

Early July (hopefully): Official run of the pipeline on RR2 with a RR2 cluster catalog on the DPS



DR1-KP-JC3

Raphael Gavazzi, Carlo Giocoli, Mauro Sereno

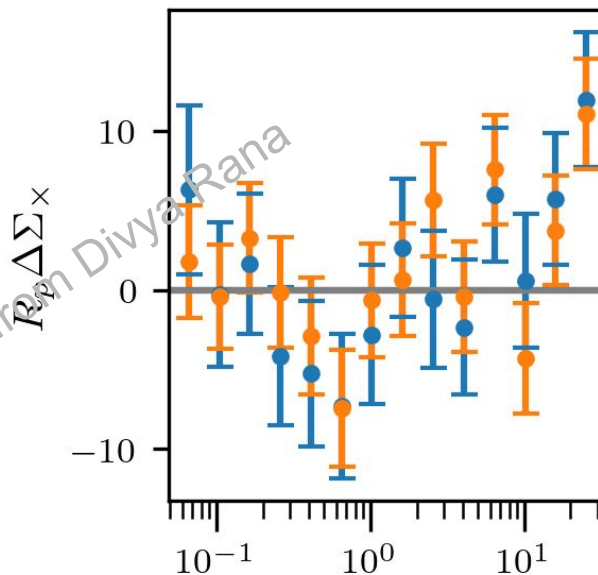
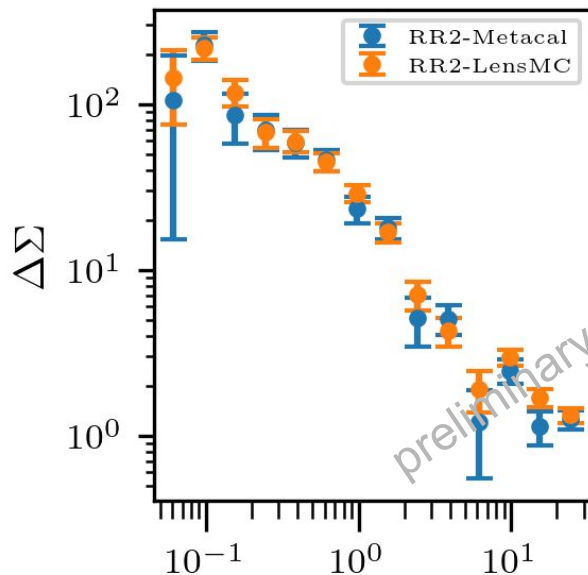


Coordination: CG-SWG, SL-SWG, WL-SWG, GAE-SWG

1. Constraints on HOD models and halo concentrations from joint strong and weak lensing data
2. Halo and sub-halos shape and profile from joint strong and weak lensing data.
3. 3D and 2D density profiles of matter halos of optically selected clusters from lensing analyses
4. Outskirts, infalling matter, and environments of optically selected clusters from weak lensing analyses
5. Morphology and shape of optically selected clusters from weak lensing analyses.
(with kappa maps and shear profiles→ off centering,)
6. Multi-probe analyses of optically selected clusters from weak lensing analyses.

DR1-KP-JC3

not using **official** COMB-CL processing function
see Lucie Baumont's talk!



- We use galaxy clusters from the DES-Y1 redMaPPer catalog as lenses and background galaxies from the Euclid-RR2 dataset.
- To ensure a clean selection of background galaxies, we impose the condition $z_{\text{src}} > z_{\text{lmax}} + z_{\text{diff}}$, with $z_{\text{diff}} = 0.3$, and include only galaxies with $m_{\text{vis}} < 25$.

