Indiscriminate R~50 spectroscopy in the entire footprint: the spectro-photometric approach of J-PAS

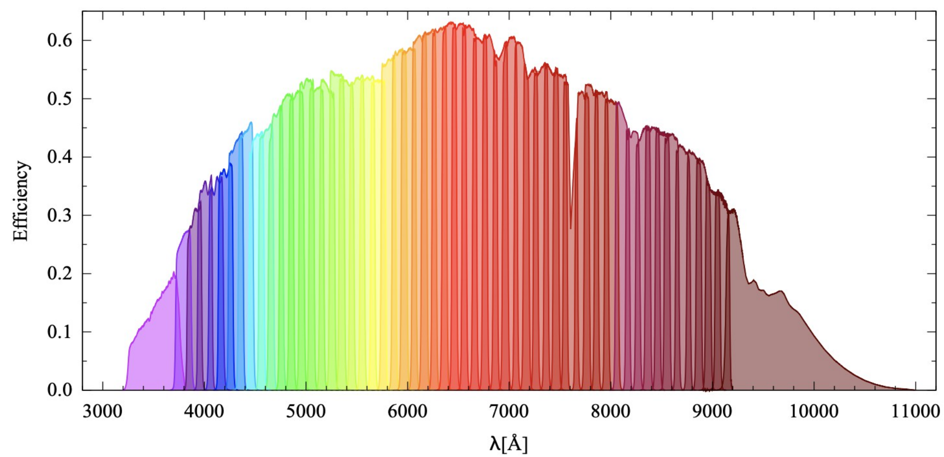

Fig. 2: The measured transmission curves of the J-PAS filters. Effects of the CCD quantum efficiency, the entire optical system of the JST/T250 telescope and sky absorption are included. The HTML color representation of each filter is provided in the miniJPAS database in the table `minijpas.Filter`.

Bonoli et al. 2021

Carlos Hernández-Monteagudo

(On behalf of the **J-PAS collaboration**)

Instituto de Astrofísica de Canarias / Universidad de La Laguna
(Tenerife, Canary Islands, **Spain**)

[IAC/ULL]

OUTLINE

- The context of spectroscopy versus photometry, and the niche for ***spectro-photometry***

- The Astrophysical Observatory at Javalambre Sierra (**OAJ**), the Javalambre Panoramic Camera (**JPCam**), and the filter set on top of JPCam: the **J-PAS** survey

- Outcome of the **Pathfinder** camera: the **miniJPAS** and the **J-NEP** surveys. First hints on **cosmological relevance** of LSS, QSO, and galaxy cluster science

- One of **J-PAS' test-benches**: **J-PLUS** DR3 preliminary **LSS analyses**

SDSS

CFHTLenS

GAMA

SDSS III

VIPERS
VIMOS PUBLIC EXTRAGALACTIC REDSHIFT SURVEY

Pan-STARRS

DARK ENERGY SURVEY

Prime Focus Spectrograph
SuMIRe

Euclid consortium

Hyper Suprime-Cam @ Subaru

eBOSS

WIDE-FIELD INFRARED SURVEY TELESCOPE
WFIRST
ASTROPHYSICS • DARK ENERGY • EXOPLANETS

PAU

DESI
DARK ENERGY SPECTROSCOPIC INSTRUMENT

4MOST

MEAVE

HETDEX
Hobby-Eberly Telescope Dark Energy Experiment

LSST
Large Synoptic Survey Telescope

Photometry vs. Spectroscopy

- Unbiased samples
- Faster & cheaper
- Large Volumes
- High number density

- SED of targets
- Precise redshifts

Photometry vs. Spectroscopy

- Unbiased samples
- Faster & cheaper
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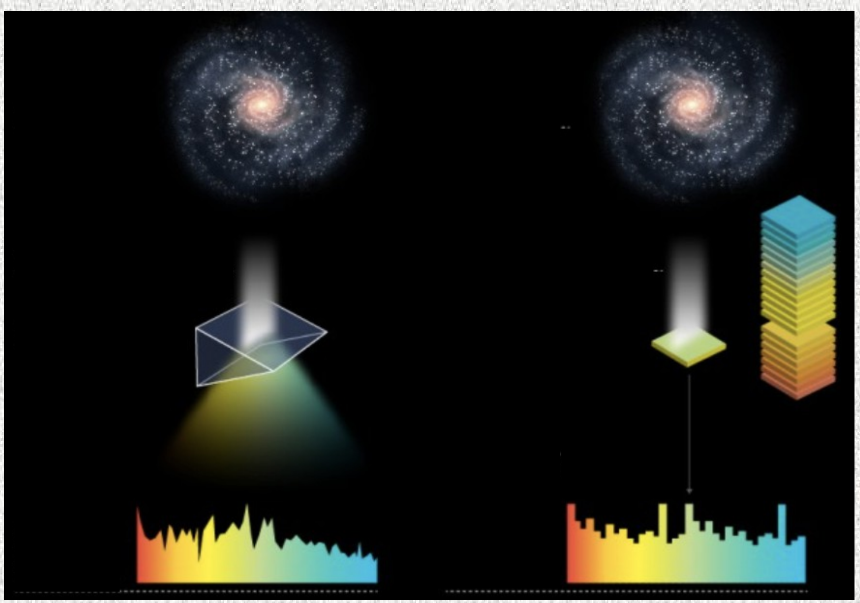
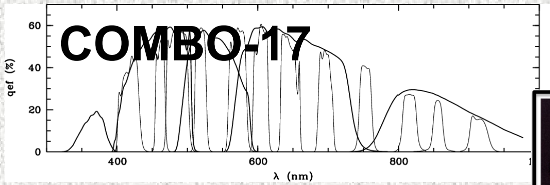
- SED of targets
- Precise redshifts

Spectro-Photometry





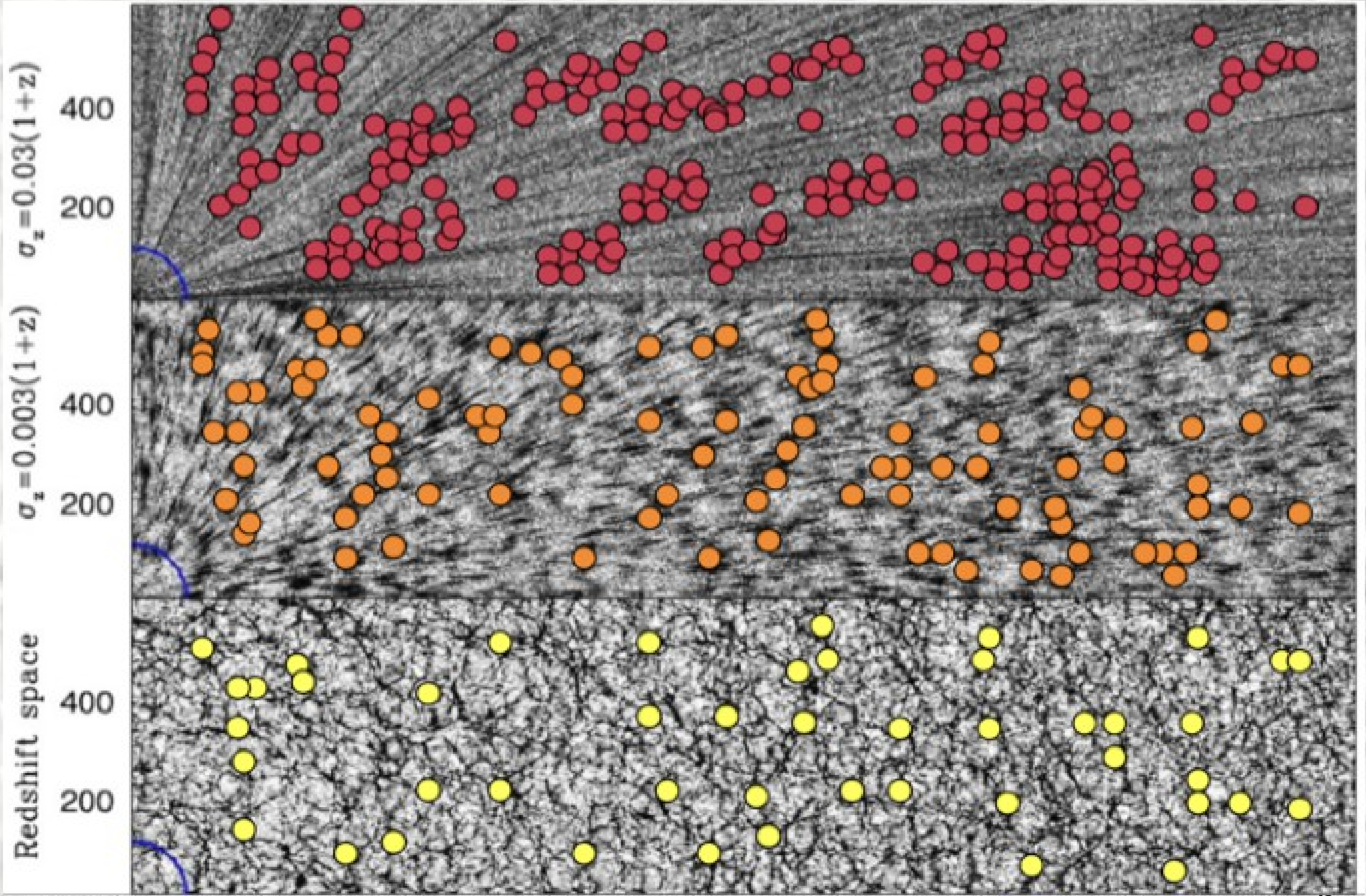
Cosmic Evolution Survey
COSMOS

SHARDS
CONSOLIDER - INGENIO
GTC

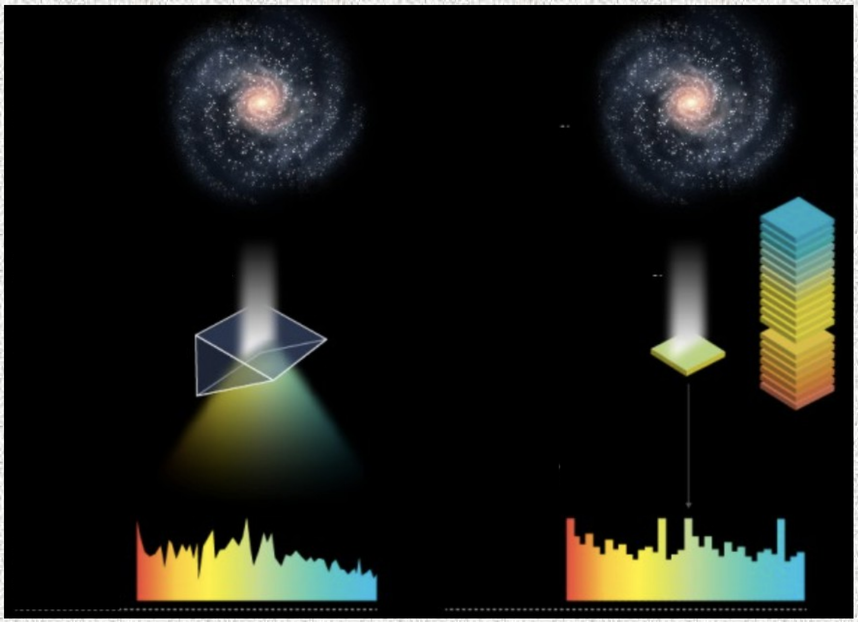
PAU

ALHAMBRA
SURVEY

Spectro-photometry:
the gap between spectroscopy and photometry …



Spectro-Photometry

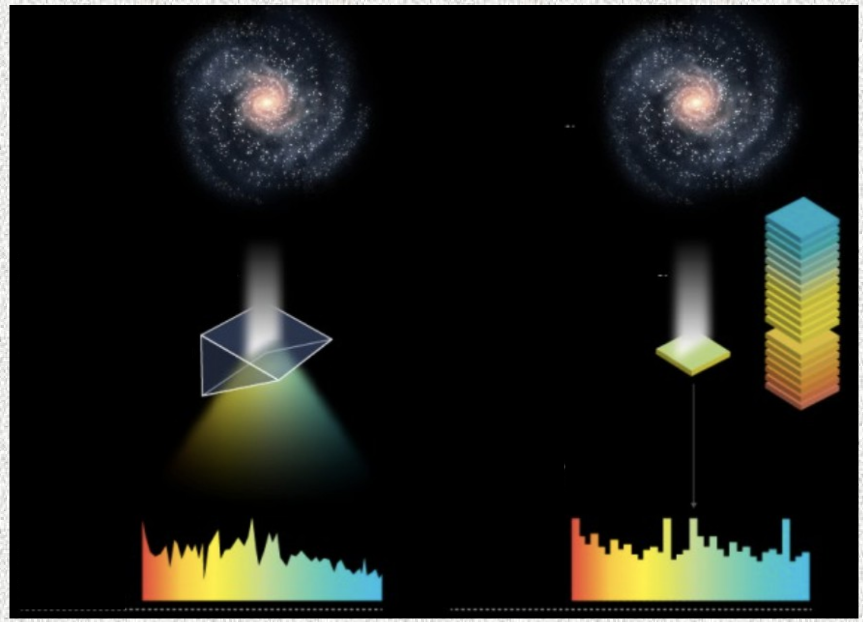


Javalambre **P**hotometric **L**ocal **U**niverse **S**urvey

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

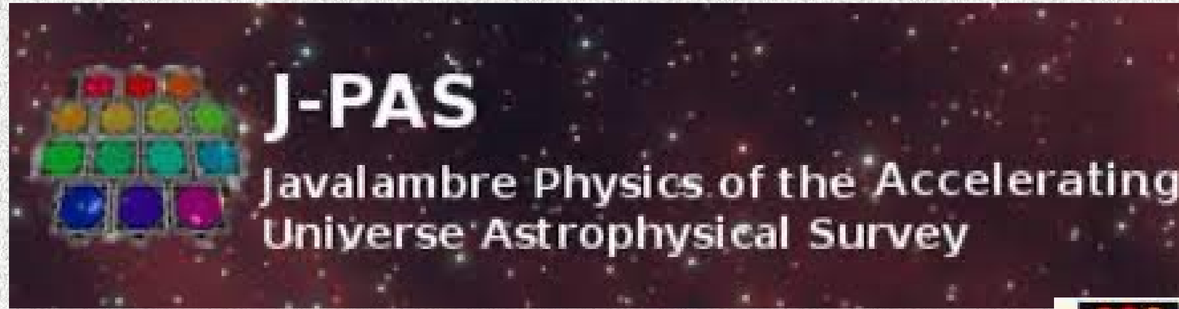
J-PLUS

Spectro-Photometry

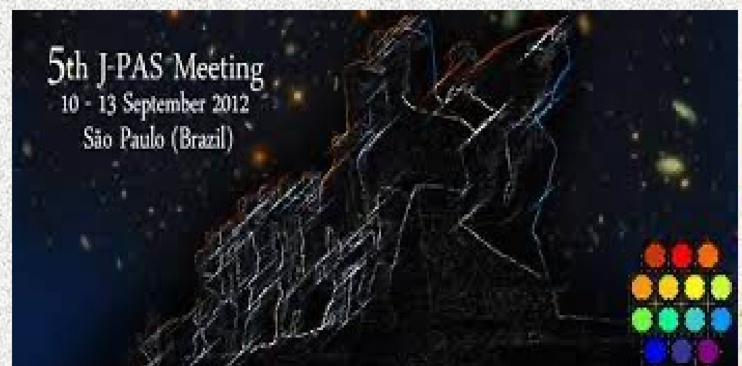


Southern **P**hotometric **L**ocal **U**niverse **S**urvey

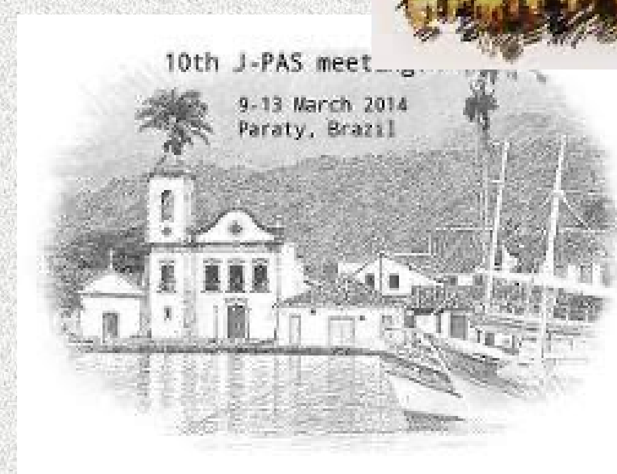
J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey



J-PAS is an international, but mostly **Spanish** & **Brazilian** collaboration, with a **heavy** implication from **many different Brazilian** institutions (ON, USP, UFRJ, UV, etc)



On the **Cosmo** side, **Valerio Marra** is co-coordinating the **LSS** WG, with active participation from **Raul Abramo, Tiago Castro, Miguel Quartin, Rodrigo Von Martens, Pedro Riba, Carolina Queiroz**, **Pedro Baqui**, **Natalia Rodrigues,** etc, just to name a few of those I am working with constantly …



The *Observatorio Astrofísico de Javalambre* (OAJ)

Pico del Buitre (Vulture's Peak), By *Arcos de las Salinas*, about 60' from Teruel and 80' from Valencia

The *Observatorio Astrofísico de Javalambre* (OAJ)

Pico del Buitre (Vulture's Peak), By *Arcos de las Salinas*, about 60' from Teruel and 80' from Valencia

EL PAÍS ESPAÑA

ANDALUCÍA CATALUÑA C. VALENCIANA GALICIA MADRID PAÍS VASCO MÁS COMUNIDADES TITULARES »

La Laponia española

La región de los Montes Universales, entre Teruel y Cuenca, tiene una densidad de población menor que Laponia. Un recorrido por esta zona permite ver cómo es la aislada vida de sus vecinos

NACHO CARRETERO

The "Spanish Lapland"

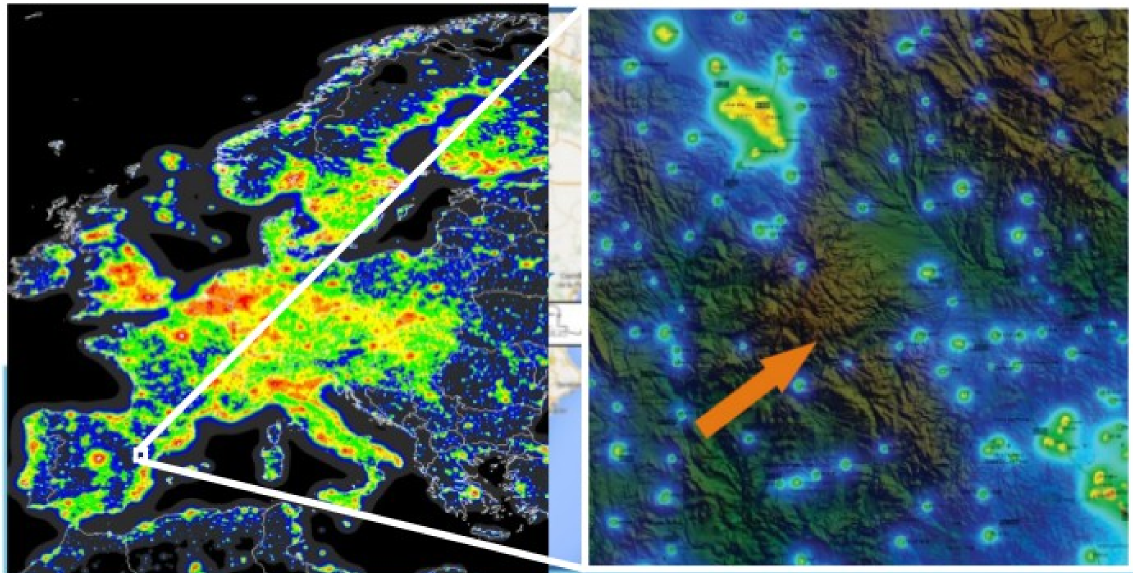
El País, 11/03/17

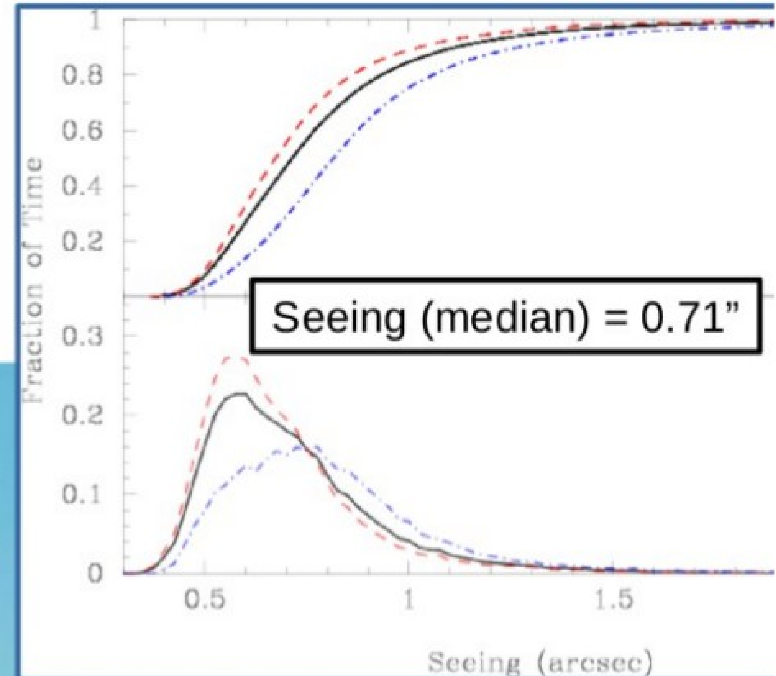
En los Montes Universales, un territorio del tamaño de Guipúzcoa, la densidad de población es de 1,63 habitantes por km². En Laponia, la región más septentrional de Escandinavia, hay 1,87.

The Javalambre Observatory (OAJ)

In the "Sierra de Javalambre" @1960m

now officially a Spanish "scientific and technical facility" (20% available for open-time)





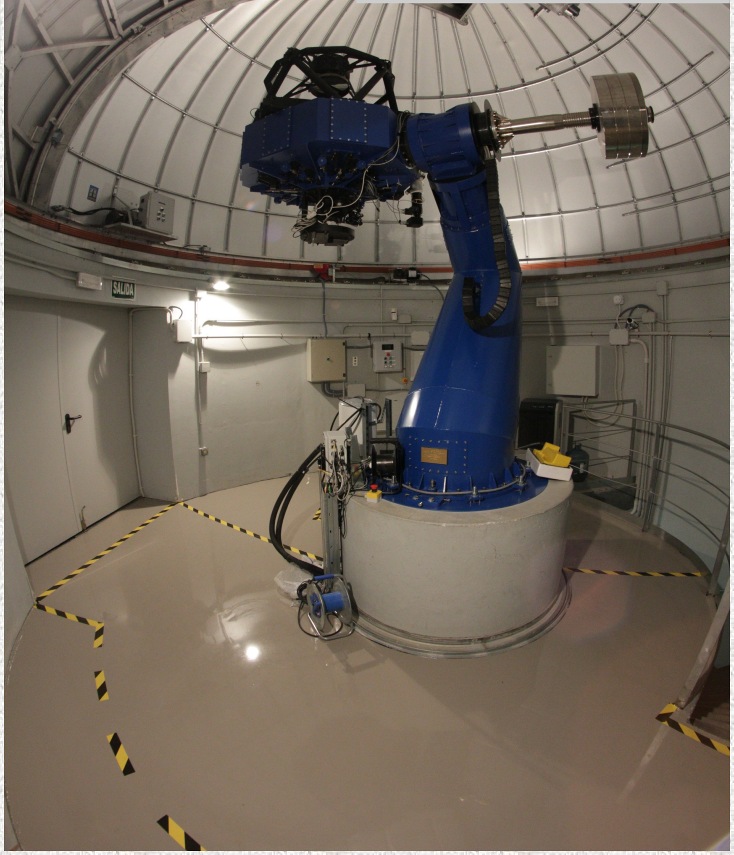
The OAJ exploits the niche of a site and instrumentation devoted to **spectro-photometric** surveys: telescopes with **wide field-of-views** and **multi-narrow band filter** systems

The Telescopes

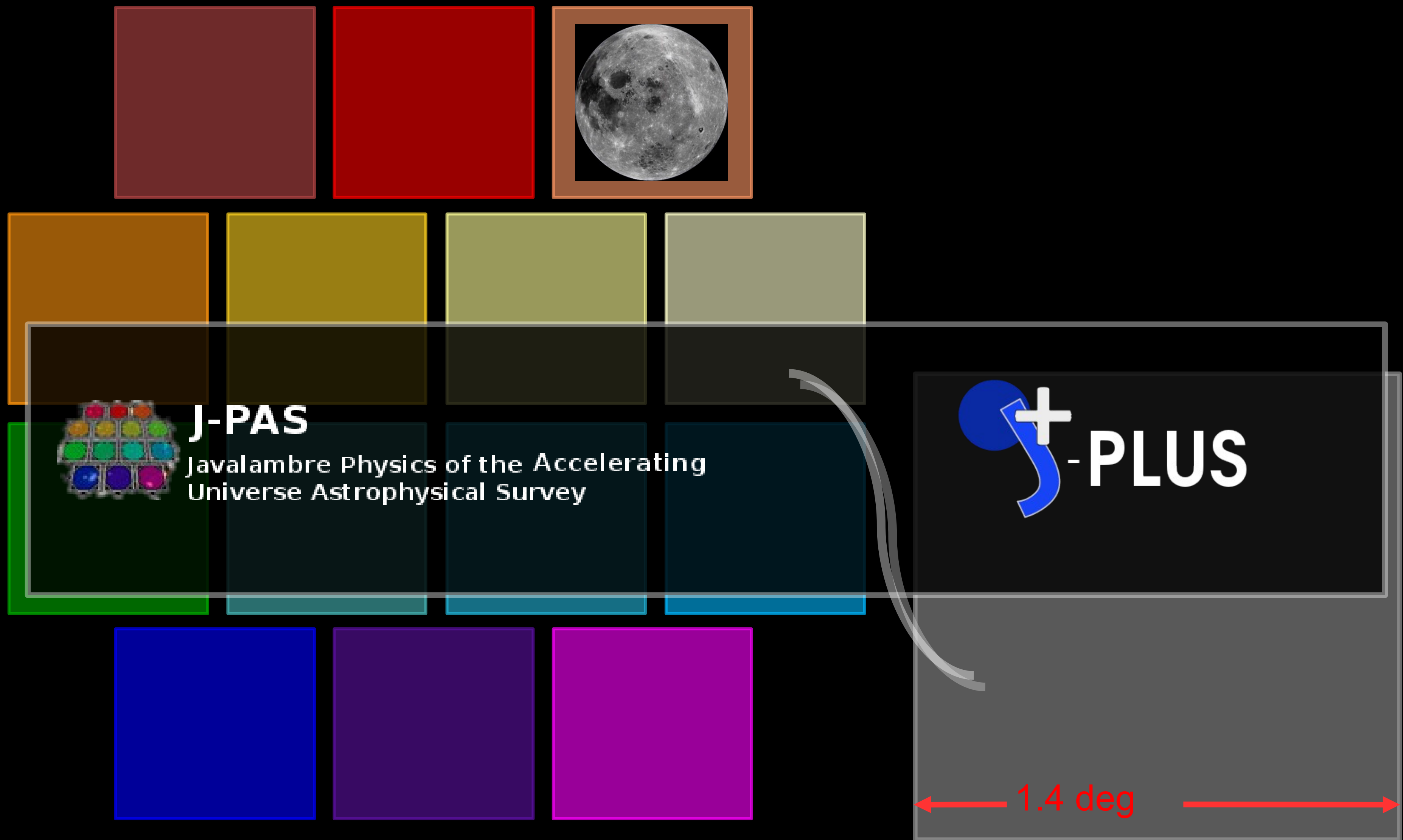
M1 (Ø) = 2.55 m
FoV (Ø) = 3 deg = 476 mm at FP
Etendue = 27.5 $m^2 deg^2$

Currently equipped with the “pathfinder” camera

M1 (Ø) = 0.8 m
FoV (Ø)) = 2 deg



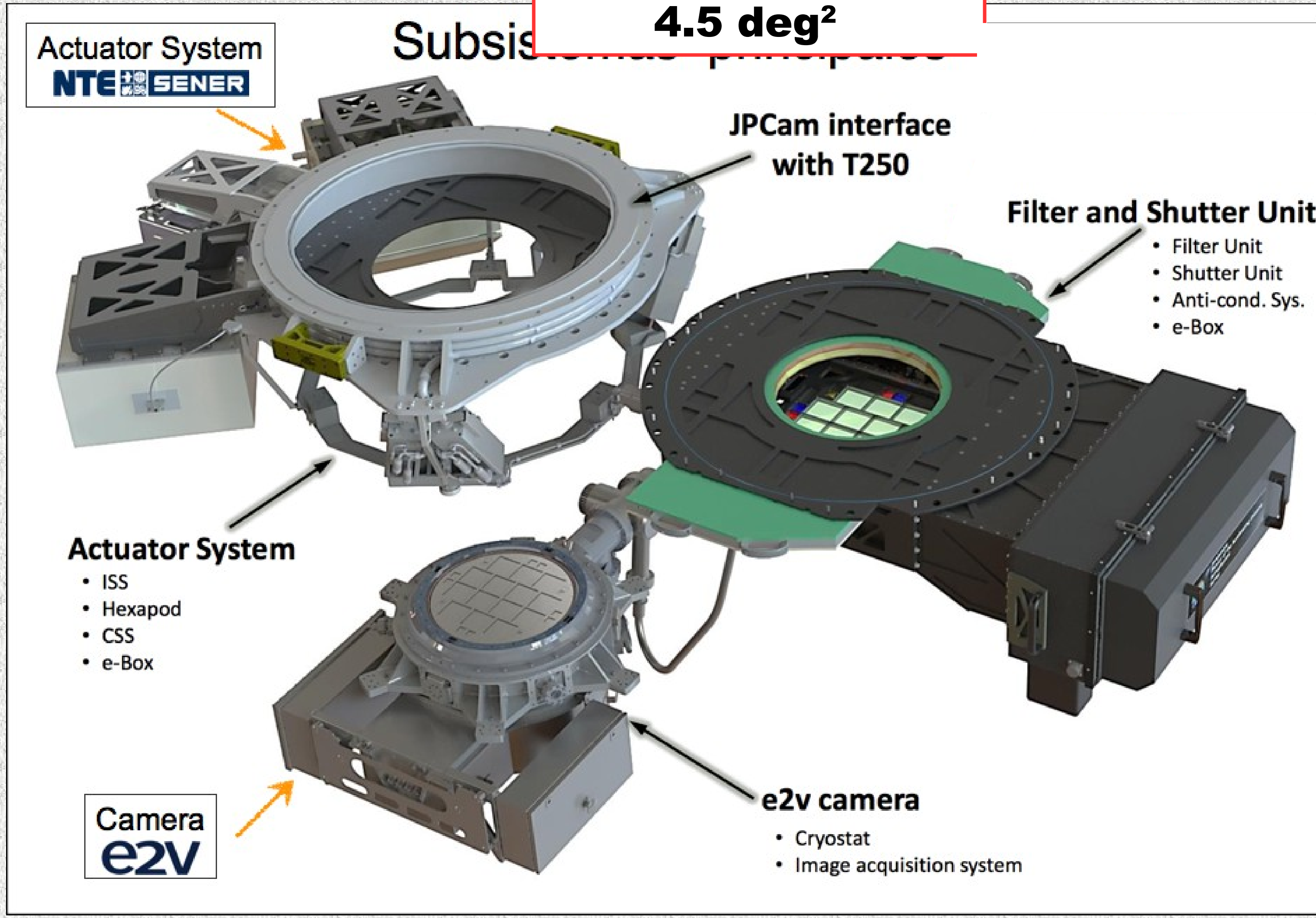
JPCam T80Cam



The camera JPCam

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

1.2 Giga pixels (14 CCD of 9200x9200)
0.22 arcsec/pixel
$4.5\ \mathrm{deg}^2$



The camera JPCam

1.2 Giga pixels (14 CCD of 9200x9200)
0.22 arcsec/pixel
4.5 deg^2

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

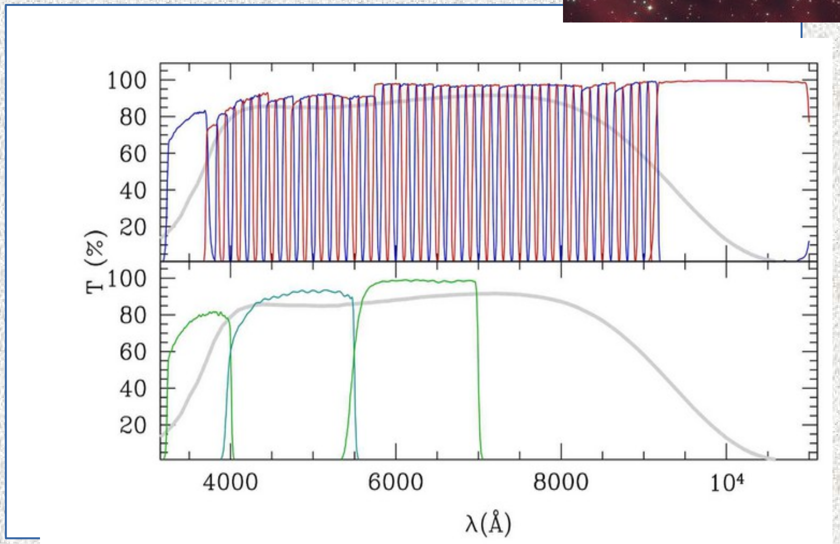
	Telescope		Camera					
	Size	FoV	# CCDs	CCD format	# of pixels	Resolution	Filters
LSST	8.4m	9.6 sq. deg.	189	4096 x 4096	3.2 Gpixels	0.2''/pix	u, g, r, i, z, y
PanStarrs	1.8m	6.7 sq. deg.	60	4600 x 4600	1.3 Gpixels	0.26''/pix	g, r, i, z, y
JPCam	**2.5m**	**4.9 sq. deg.**	**14**	**9231 x 9216**	**1.2 Gpixels**	**0.23''/pix**	**54NB + 2BB**
HyperSuprimeCam	8.2m	1.8 sq. deg.	112	2048 x 4096	940 Mpixels	0.18''/pix	r, i, z, y
VIS (Euclid)	1.2m	0.5 sq. deg.	36	4096 x 4096	520 Mpixels	0.1''/pix	R, I, Z
DECam	4m	3 sq. deg.	62	2048 x 4096	500 Mpixels	0.27''/pix	g, r, i, z, y
Megacam	3.6m	1 sq. deg.	32	2048 x 4096	340 Mpixels	0.19''/pix	u, g, r, i, z
Omegacam	2.6m	1 sq. deg.	32	2048 x 4096	340 Mpixels	0.21''/pix	u, g, r, i, z
JPAS-Path Finder	**2.5m**	**0.45 sq. deg.**	**1**	**10580x10560**	**110 Mpixels**	**0.23''/pix**	**g, r, i + NBs**
T80Cam	**0.8m**	**2.1 sq. deg.**	**1**	**10580x10560**	**110 Mpixels**	**0.5''/pix**	**u, g, r, i, z + 7NB**
SuprimeCam	8.2m	0.25 sq. deg.	10	2048 x 4096	80 Mpixels	0.2''/pix	g, r, i, z, y

e2v

- Cryostat
- Image acquisition system

The filter system

- **54 NB filters** (FWHM~145Å; ∞ϴ10nm) From 3785Å to 9100Å

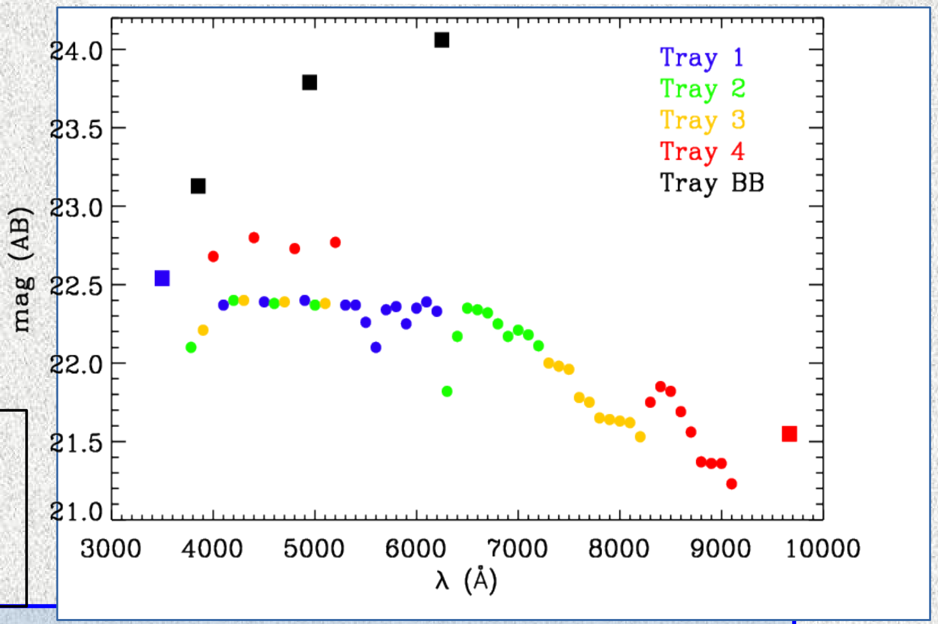


- **1 Blue MB filter** (FWHM~260Å; ϴ~3600Å)

- **1 Red BB filter** (FWHM~620Å; ϴ~9500Å)

- **Sloan u, g, r**

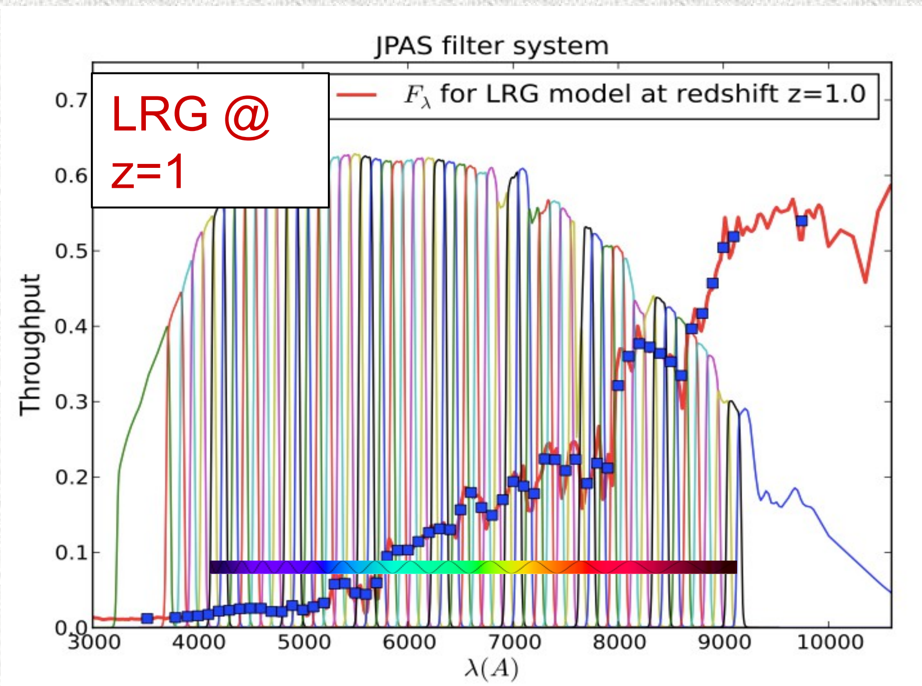
5σ
3”
aperture



Pseudo-spectrum (R~50) for every pixel of the sky

The filter system

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey



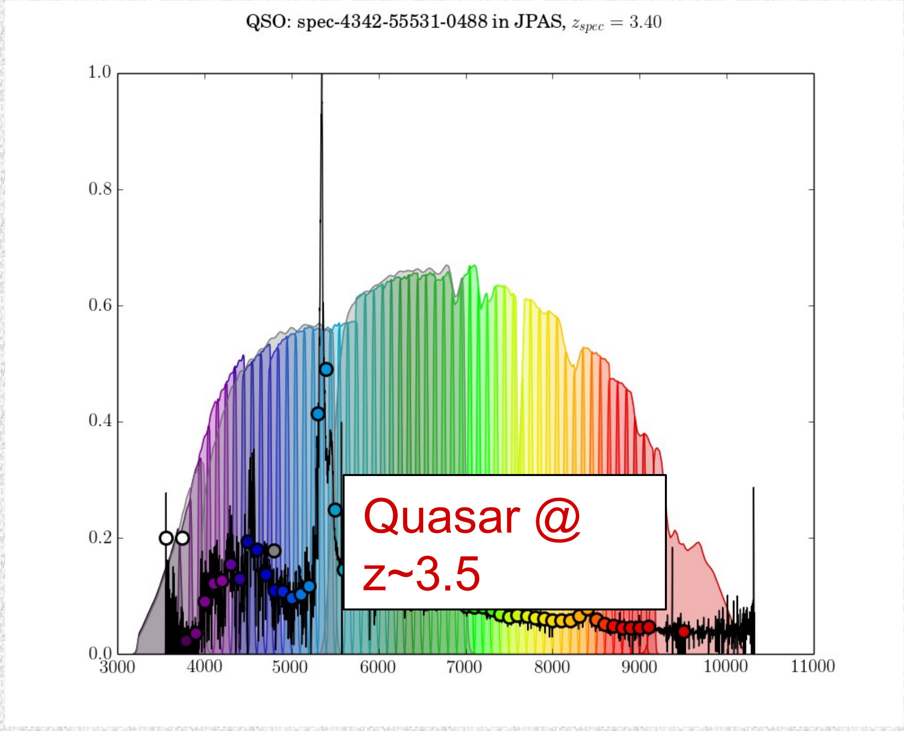
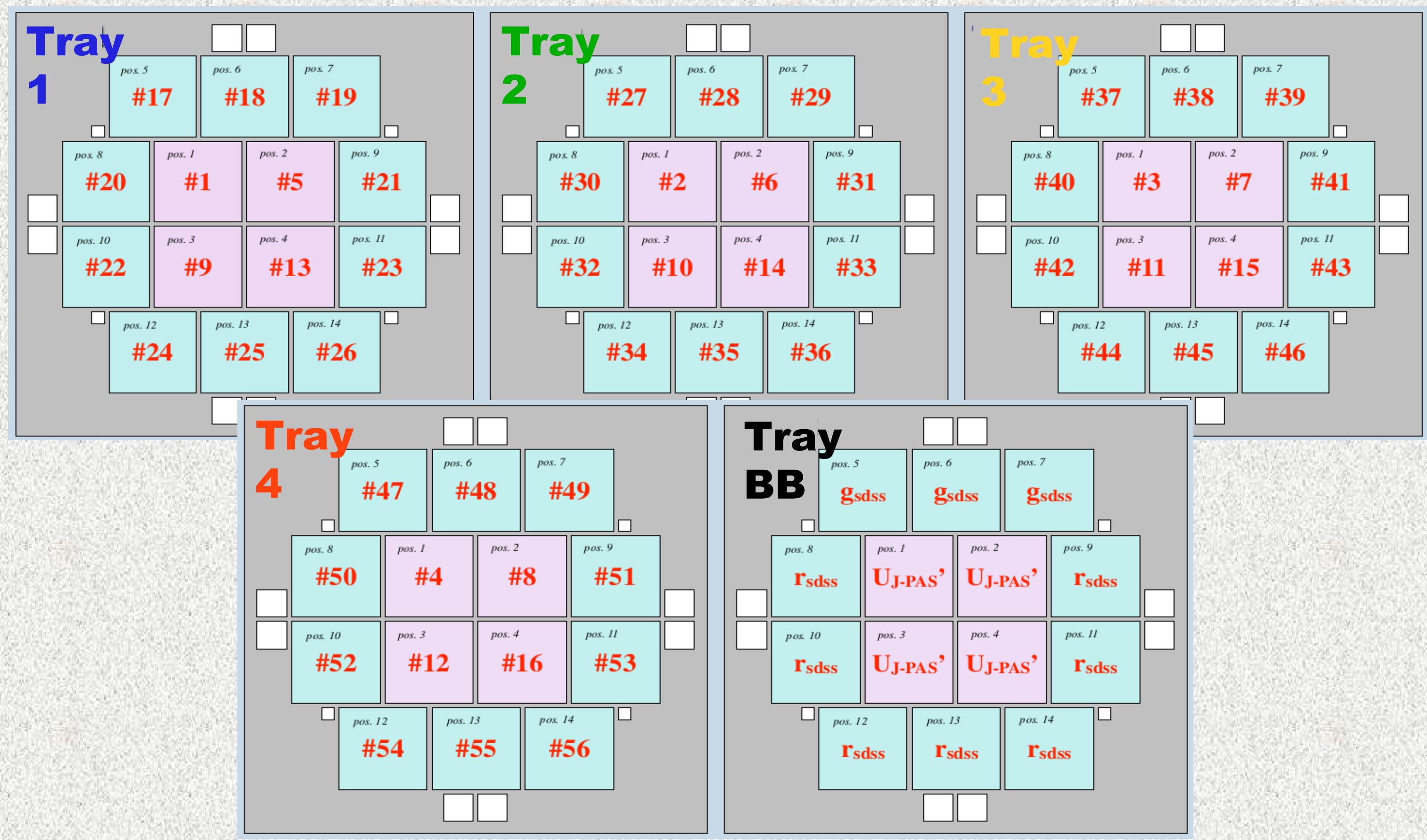
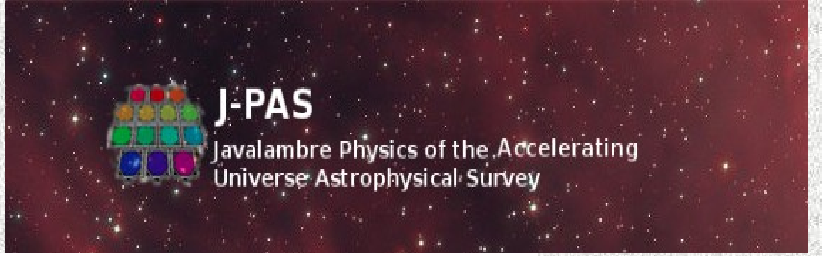


Photo-z precision as good as 0.003(1+z)

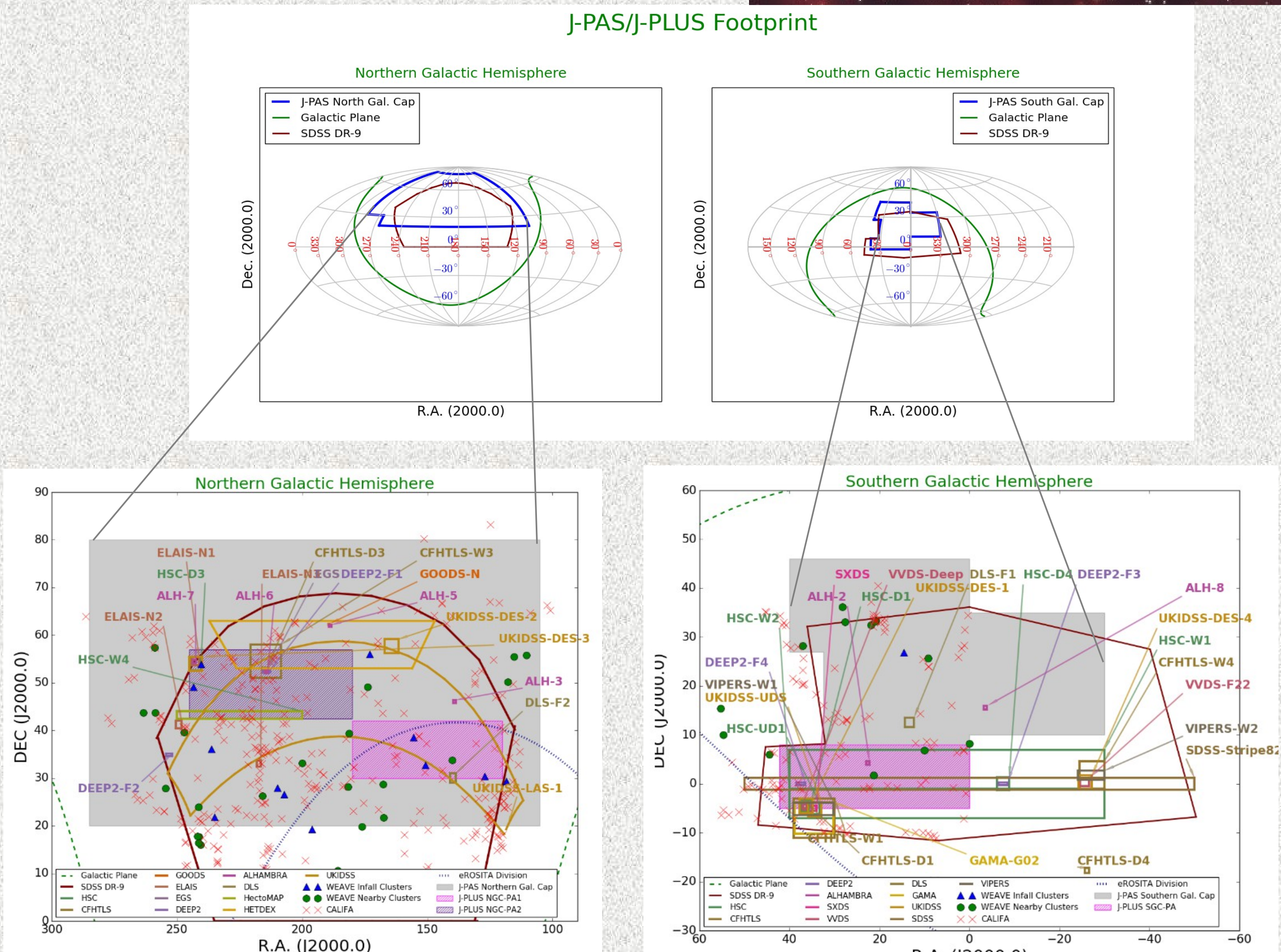
The camera + filters



Footprint



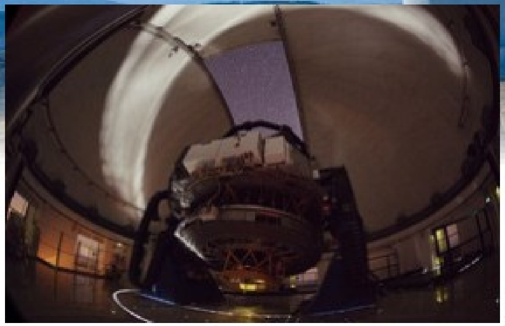
J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey



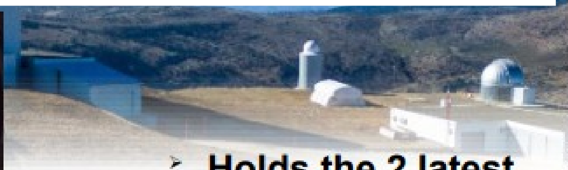
J-PAS/J-PLUS Footprint
Northern Galactic Hemisphere
Southern Galactic Hemisphere
J-PAS North Gal. Cap
J-PAS South Gal. Cap
Galactic Plane
SDSS DR-9
Dec. (2000.0)
R.A. (2000.0)
DEC (J2000.0)
R.A. (J2000.0)
ELAIS-N1
HSC-D3
ALH-7
ELAIS-N2
HSC-W4
DEEP2-F2
CFHTLS-D3
ELAIS-N1
EGS
DEEP2-F1
ALH-6
CFHTLS-W3
GOODS-N
ALH-5
UKIDSS-DES-2
UKIDSS-DES-3
ALH-3
DLS-F2
UKIDSS-LAS-1
SXDS
VVDS-Deep
DLS-F1
HSC-D4
DEEP2-F3
UKIDSS-DES-1
ALH-2
HSC-D1
ALH-8
HSC-W2
DEEP2-F4
VIPERS-W1
UKIDSS-UDS
HSC-UD1
UKIDSS-DES-4
HSC-W1
CFHTLS-W4
VVDS-F22
VIPERS-W2
SDSS-Stripe82
CFHTLS-W1
CFHTLS-D1
GAMA-G02
CFHTLS-D4
GOODS
ELAIS
EGS
DEEP2
HSC
CFHTLS
ALHAMBRA
DLS
HectoMAP
HETDEX
UKIDSS
WEAVE Infall Clusters
WEAVE Nearby Clusters
CALIFA
eROSITA Division
J-PAS Northern Gal. Cap
J-PLUS NGC-PA1
J-PLUS NGC-PA2
GAMA
SXDS
VVDS
VIPERS
SDSS
J-PAS Southern Gal. Cap
J-PLUS SGC-PA

Data processing and storage

J-PAS: 1.3Tb of data per observing night

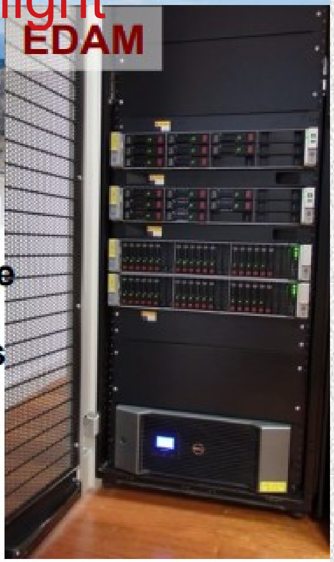


- Image acquistion
- Internal raw data publication



- Holds the 2 latest releases of the Science DBs
- Provides data access to the products
- Web services

EDAM



OAJ-CPD

- Handle data transference
- Do a quick data processing for QC.

UPAD

- Archive data
- Process the data
- Store permanent copies of products, catalogs, DB

Cosmology experiments

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

Type Ia Supernovae

~4000 SNIa
- exposure cadence
- redshift from SN SED or host galaxy
- characterization of environment

Clustering

- 90M galaxies (LRG, ELG) with photo-z precision of 0.3%
- 2M QSOs
- ks LAE

Clusters

- 700k clusters with more than 10 members – down to ~few 10^{13} M_{sun}
- Combine lensing and optical richness for mass calibration

Lensing

- Optimization of BB observations in the best nights
- Redshift precision for lenses and background galaxies

The first ~1.25 sq.deg of J-PAS data: miniJPAS and JNEP surveys

Astronomy & Astrophysics manuscript no. mini_jpas
July 10, 2020

The miniJPAS survey: a preview of the Universe in 56 colours

S. Bonoli[1,2,3⋆], A. Marín-Franch[4], J. Varela[4], H. Vázquez Ramió[4], L. R. Abramo[5], A. J. Cenarro[4], R. A. Dupke[6,31,32⋆⋆], J. M. Vílchez[7], D. Cristóbal-Hornillos[1], R. M. González Delgado[7], C. Hernández-Monteagudo[4], C. López-Sanjuan[4], D. J. Muniesa[1], T. Civera[1], A. Ederoclite[13], A. Hernán-Caballero[1], V. Marra[8], P.O. Baqui[8], A. Cortesi[20], E.S. Cypriano[13], S. Daflon[6], A. L. de Amorim[24], L. A. Díaz-García[11], J. M. Diego[12], G. Martínez-Solaeche[7], E. Pérez[7], V. M. Placco[17,18], F. Prada[7], C. Queiroz[5], J. Alcaniz[6,45], A. Alvarez-Candal[22,6], J. Cepa[41,42], A. L. Maroto[23], F. Roig[6], B. B. Siffert[15], K. Taylor[34], N. Benitez[7], M. Moles[1,7], L. Sodré Jr.[13], S. Carneiro[10], C. Mendes de Oliveira[13], E. Abdalla[5], R. E. Angulo[2,3], M. Aparicio Resco[23], A. Balaguera-Antolínez[41,42], F. J. Ballesteros[50], D. Brito-Silva[13], T. Broadhurst[2,3,40], E. R. Carrasco[48], T. Castro[25,26,27,28], R. Cid Fernandes[24], P. Coelho[13], R. B. de Melo[6,32], L. Doubrawa[13], A. Fernandez-Soto[12,39], F. Ferrari[14], A. Finoguenov[37], R. García-Benito[7], J. Iglesias-Páramo[7], Y. Jiménez-Teja[7], F. S. Kitaura[41,42], J. Laur[29], P. A. A. Lopes[20], G. Lucatelli[14], V. J. Martínez[39,50,51], M. Maturi[35,36], M. Quartin[19,20], C. Pigozzo[10], J. E. Rodrìguez-Martìn[7], V. Salzano[58], A. Tamm[29], E. Tempel[29], K. Umetsu[11], L. Valdivielso[1], R. von Marttens[6], A. Zitrin[16], M. C. Díaz-Martín[1], G. López-Alegre[1], A. López-Sainz[1], A. Yanes-Díaz[1], F. Rueda-Teruel[1], S. Rueda-Teruel[1], J. Abril Ibañez[1,30], J.L Antón Bravo[1], R. Bello Ferrer[1], S. Bielsa[1], J. M. Casino[1], J. Castillo[1], S. Chueca[1], L. Cuesta[1], J. Garzarán Calderaro[1], R. Iglesias-Marzoa[1], C. Íniguez[1], J. L. Lamadrid Gutierrez[1], F. Lopez-Martinez[1], D. Lozano-Pérez[1], N. Maícas Sacristán[1], E. L. Molina-Ibáñez[1], A. Moreno-Signes[1], S. Rodríguez Llano[1], M. Royo Navarro[1], V. Tilve Rua[1], U. Andrade[6], E. J. Alfaro[7], S. Akras[14], P. Arnalte-Mur[50,51], B. Ascaso[55], C. E. Barbosa[13], J. Beltrán Jiménez[63], M. Benetti[59,60], C. A. P. Bengaly[6], A. Bernui[6], J. J. Blanco-Pillado[3,40], M. Borges Fernandes[6], J. N. Bregman[31], G. Bruzual[53], G. Calderone[26], J. M. Carvano[6], L. Casarini[9], A L Chies-Santos[45], G. Coutinho de Carvalho[49], P. Dimauro[6], S. Duarte Puertas[7], D. Figueruelo[63], J. I. González-Serrano[12], M. A. Guerrero[7], S. Gurung-López[1,47], D. Herranz[12], M. Huertas-Company[41,42,43,44], J. A. Irwin[32], D. Izquierdo-Villalba[1], A. Kanaan[24], C. Kehrig[7], C. C. Kirkpatrick[37], J. Lim[56], A. R. Lopes[6], R. Lopes de Oliveira[9,6], A. Marcos-Caballero[40], D. Martínez-Delgado[7], E. Martínez-González[12], G. Martínez-Somonte[12,62], N. Oliveira[6], A. A. Orsi[1], R. A. Overzier[6], M. Penna-Lima[33], R. R. R. Reis[19,20], D. Spinoso[1], S. Tsujikawa[61], P. Vielva[12], A. Z. Vitorelli[13], J. Q. Xia[21], H. B. Yuan[21], A. Arroyo-Polonio[7], M. L. L. Dantas[13], C. A. Galarza[6], D. R. Gonçalves[20], R. S. Gonçalves[6], J. E. Gonzalez[6,45], A. H. Gonzalez[54], N. Greisel[1], R. G. Landim[38], D. Lazzaro[6], G. Magris[52], R. Monteiro-Oliveira[13], C.B. Pereira[6], M. J. Rebouças[57], J. M. Rodriguez-Espinosa[42], S. Santos da Costa[6], E. Telles[6]

(Affiliations can be found after the references)

July 10, 2020

Bonoli et al. 2021

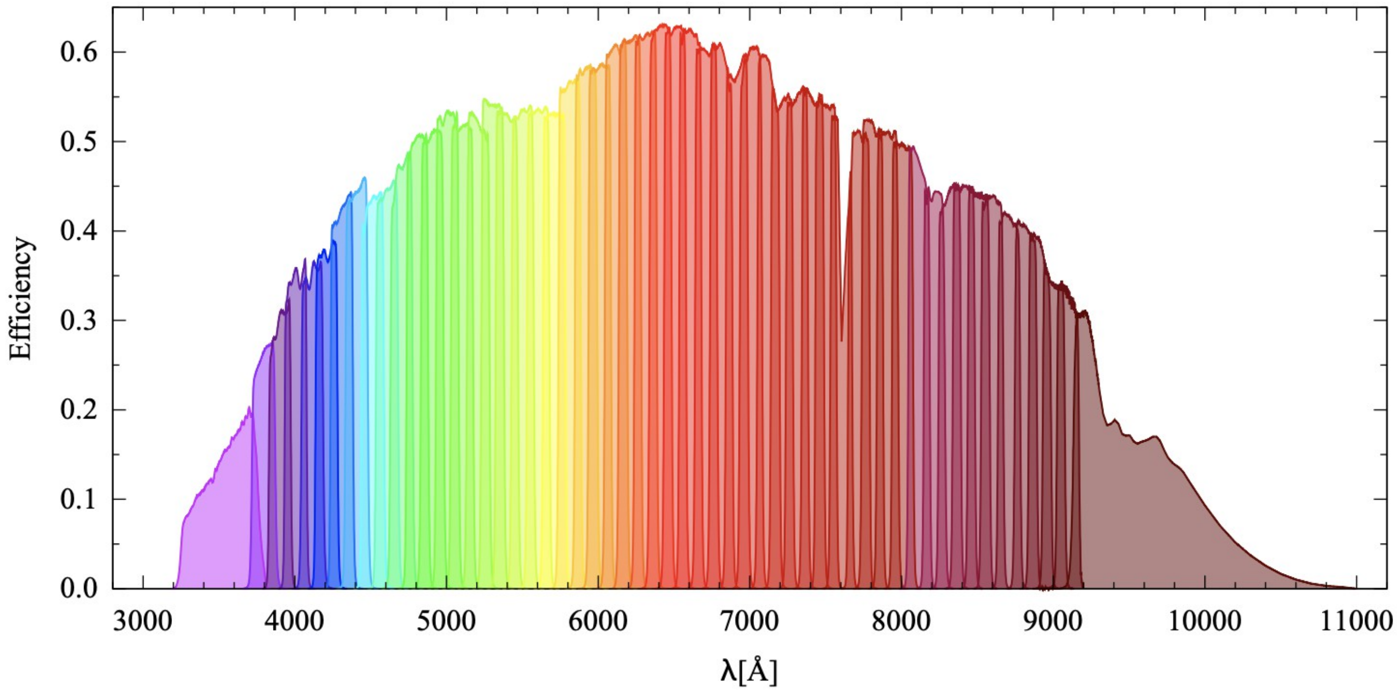


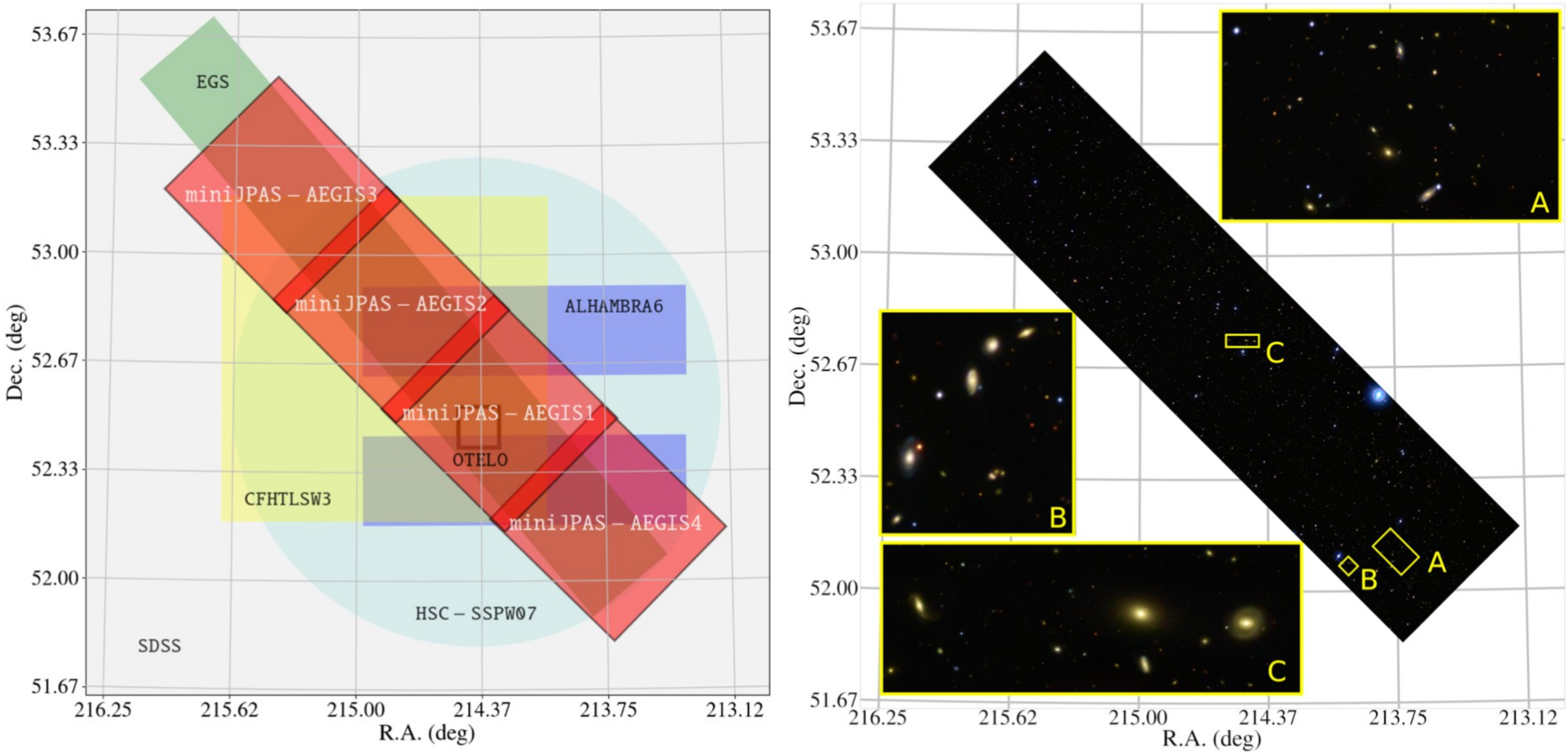
Fig. 2: The measured transmission curves of the J-PAS filters. Effects of the CCD quantum efficiency, the entire optical system of the JST/T250 telescope and sky absorption are included. The HTML color representation of each filter is provided in the miniJPAS database in the table `minijpas.Filter`.

Table 3: Filter system main characteristics. The full table is available in the miniJPAS database in the ADQL table `minijpas.Filter`.

Filter #	Filter name	Central Wavelength [Å]	FWHM [Å]
1	*uJAVA*	3497	495
2	*J*0378	3782	155
3	*J*0390	3904	145
4	*J*0400	3996	145
5	*J*0410	4110	145
...	...	...	...
54	*J*0900	9000	145
55	*J*0910	9107	145
56	*J*1007	9316	*High-pass filter*

miniJPAS AEGIS fields

A&A proofs: manuscript no. mini_jpas



The miniJPAS depth and FWHM values

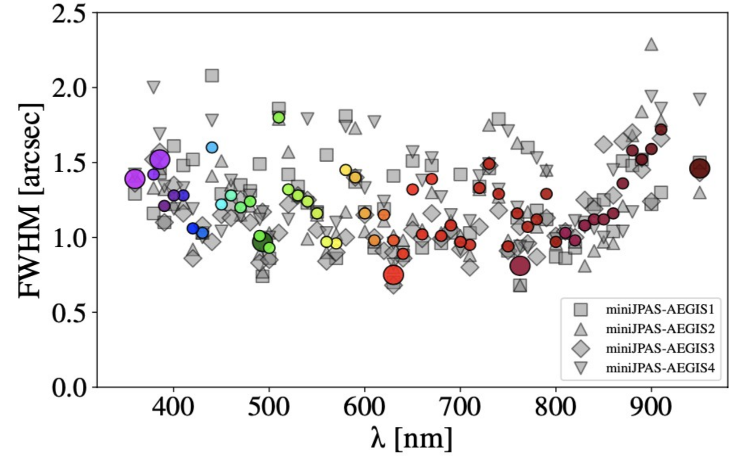
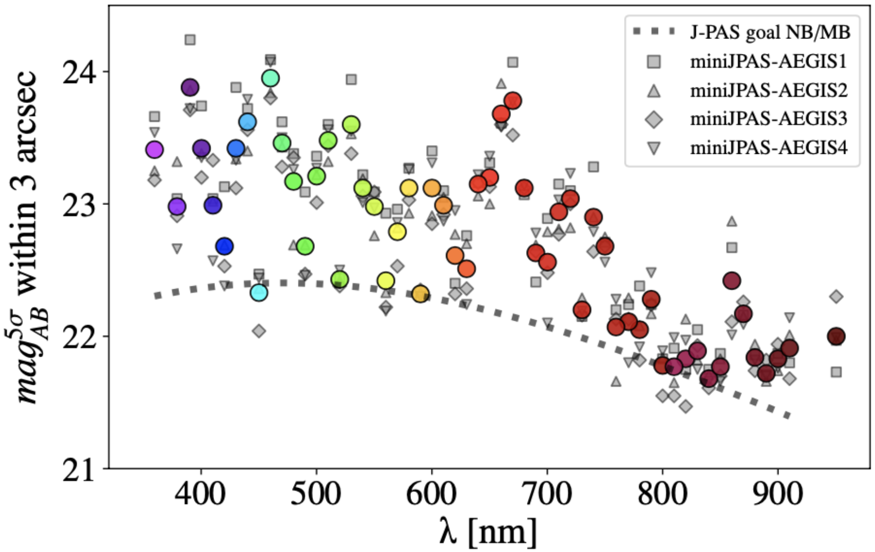


Fig. 5: Statistics of the PSF FWHM. The coloured symbols represent the average values for each filter, while the gray ones are the value for each pointing. The larger symbols indicate the FWHM of the the broad bands.



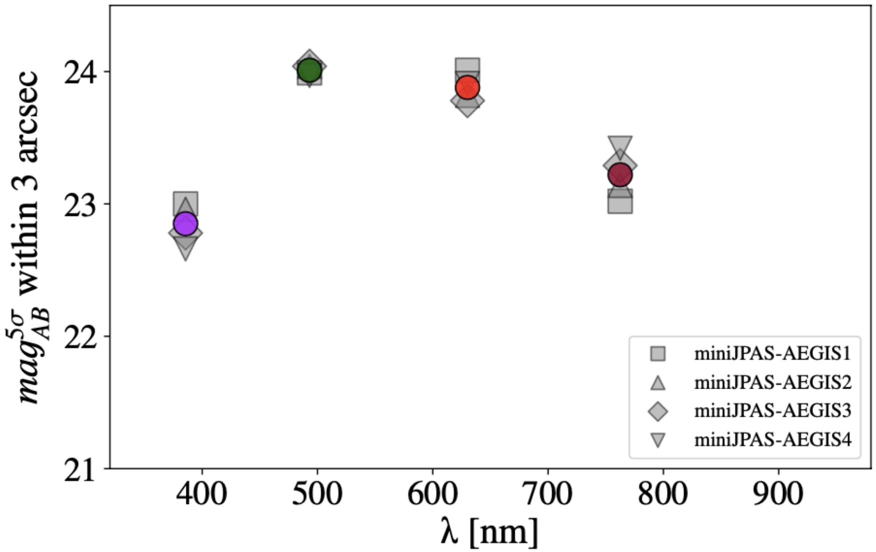
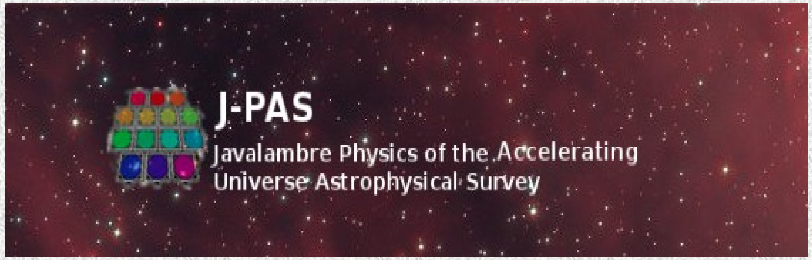
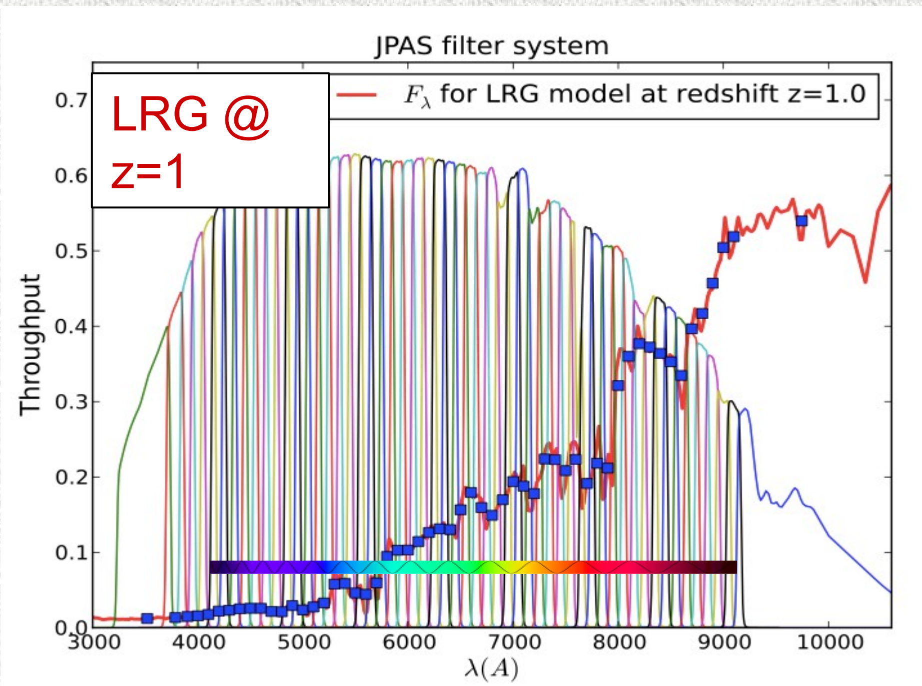


Fig. 4: Estimated depths (5σ at 3 arcsec aperture), computed from the noise in each tile, for the narrow bands (left) and broad bands (right). The coloured symbols show the average values for each filter, while the gray ones are the values for the co-added images of each pointing. For the narrow bands, the dashed gray line indicates the approximate targeted minimum depth, as defined in Benítez et al. (2014).

The filter system





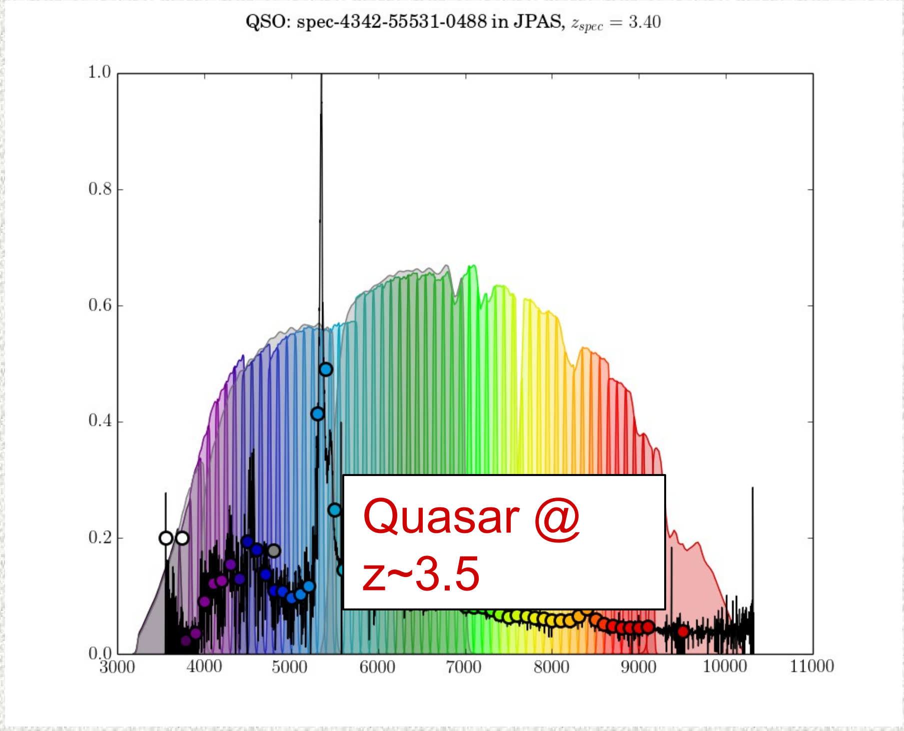
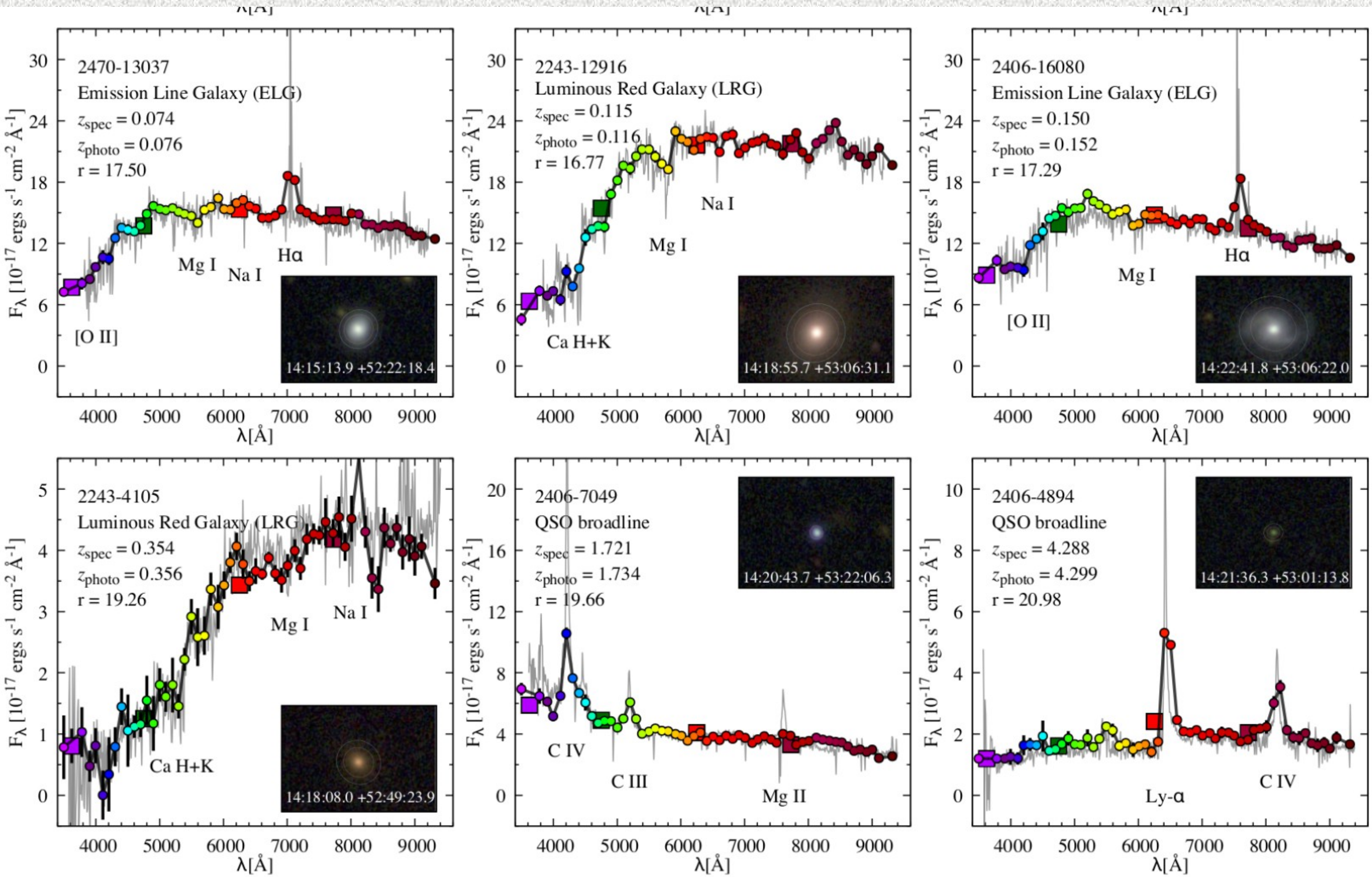
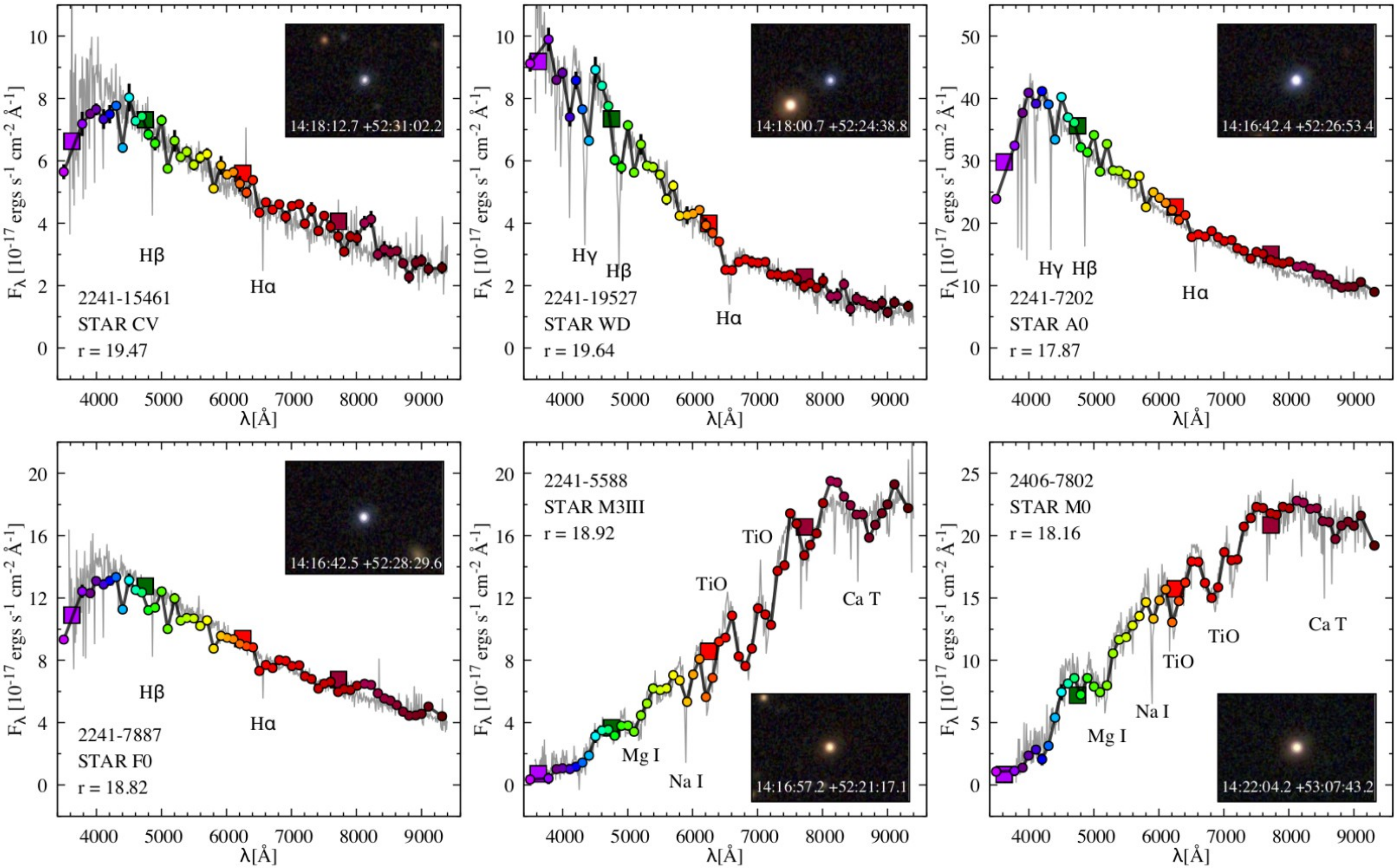


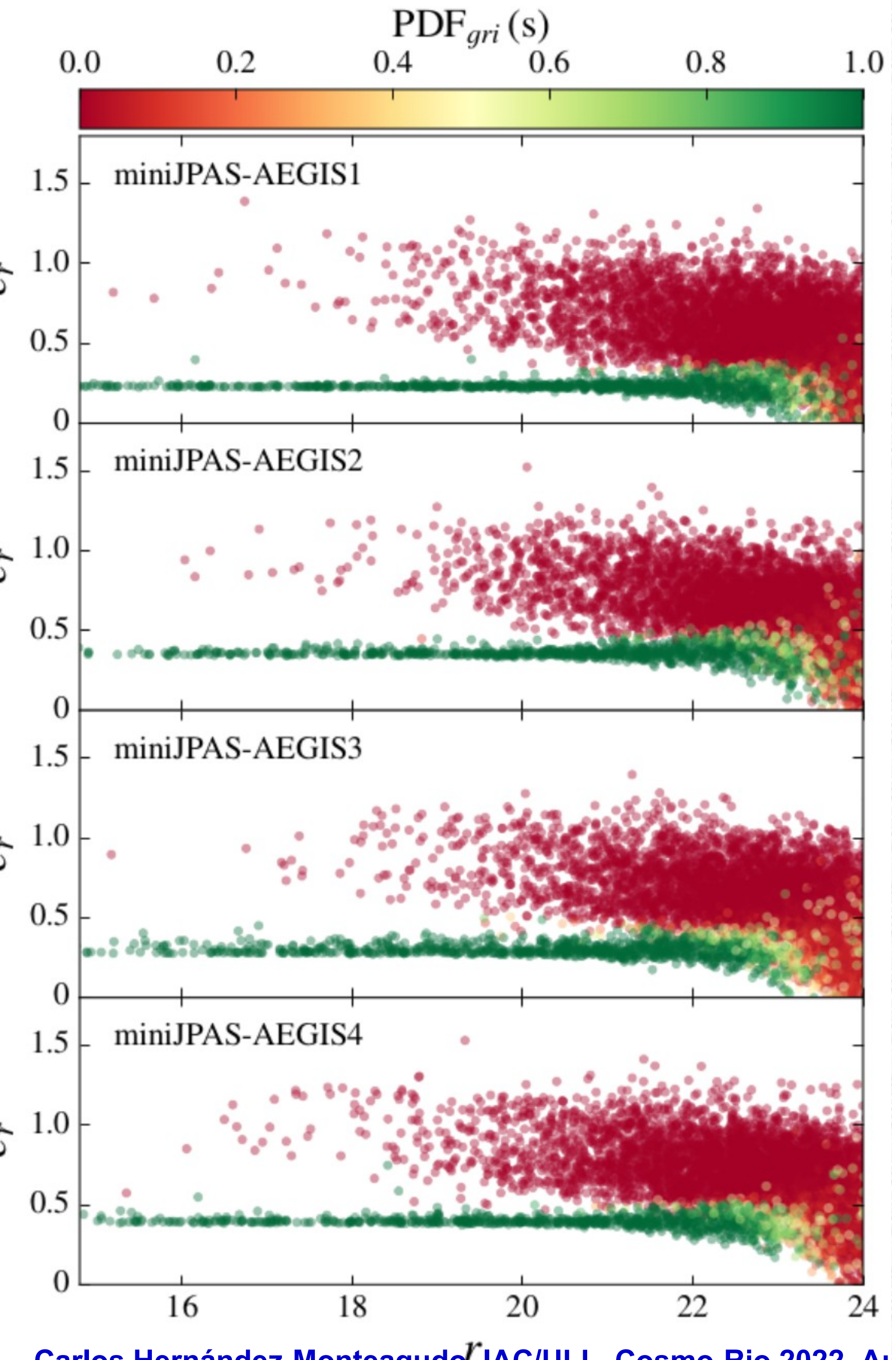
Photo-z precision as good as 0.003(1+z)

The miniJPAS galaxy and QSO examples



The miniJPAS star examples





Star-galaxy separation

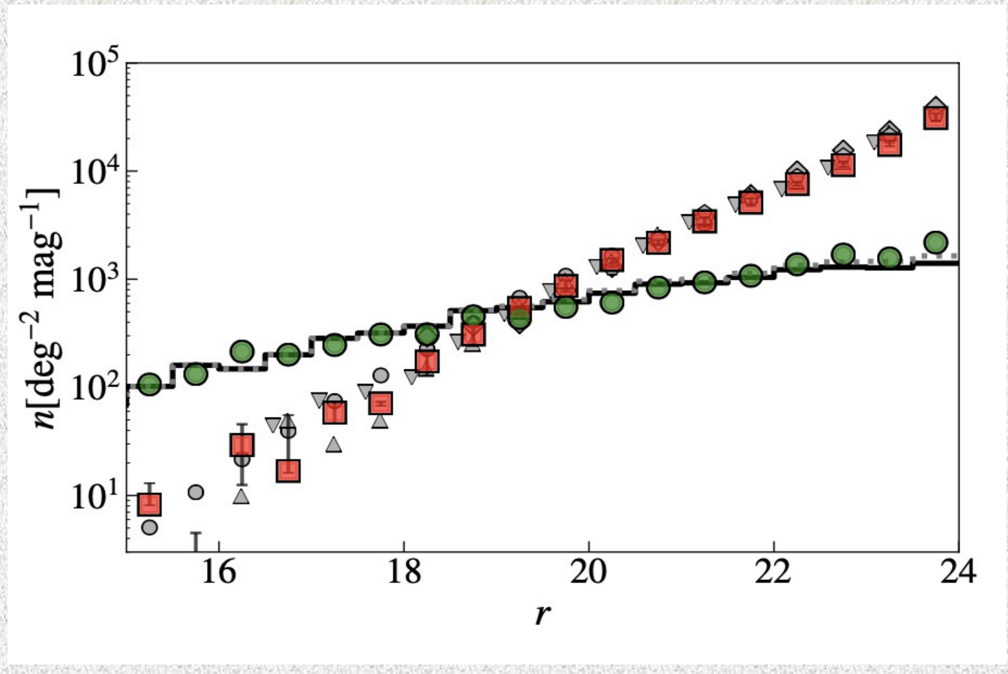


Photo-*zs* from miniJPAS

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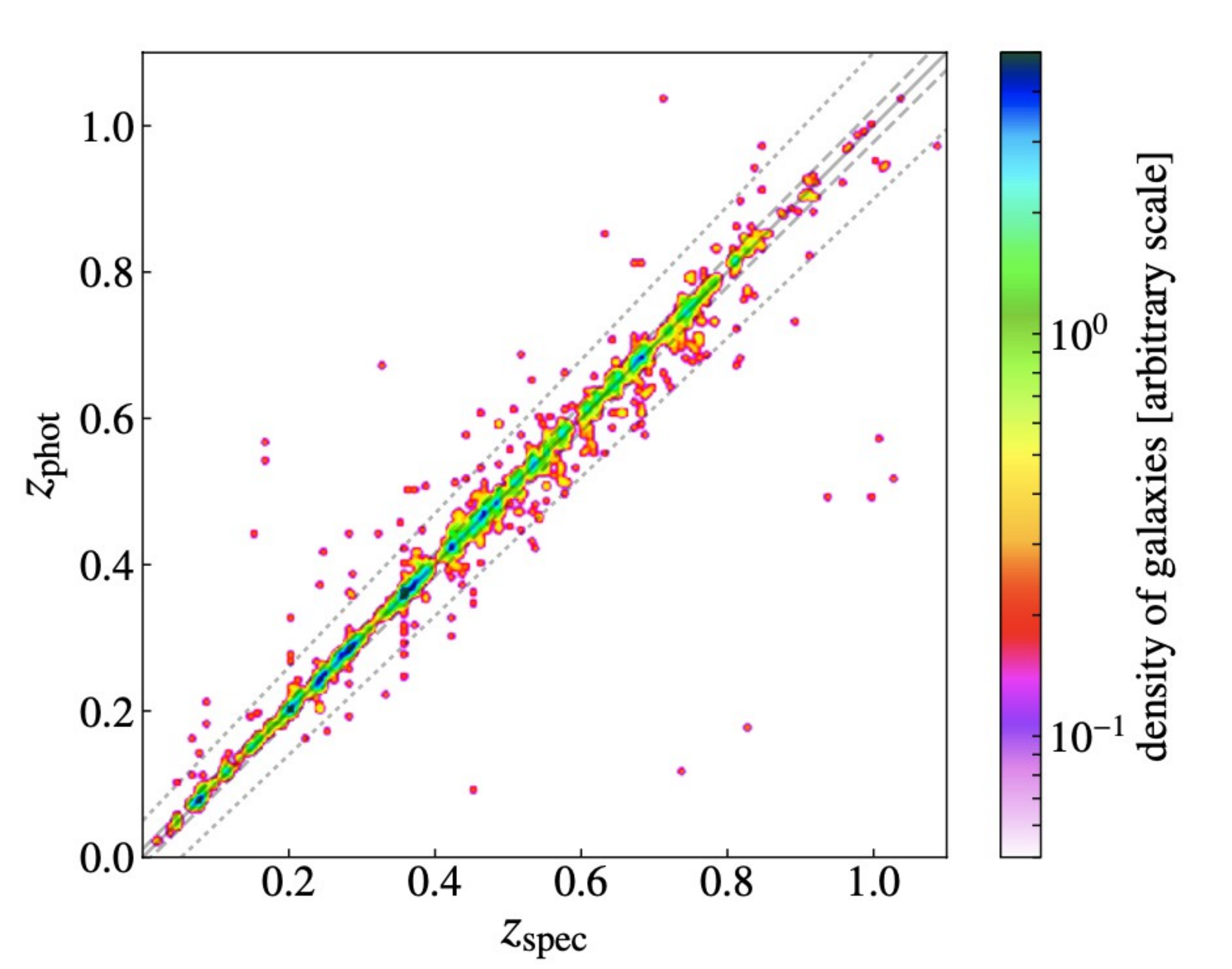
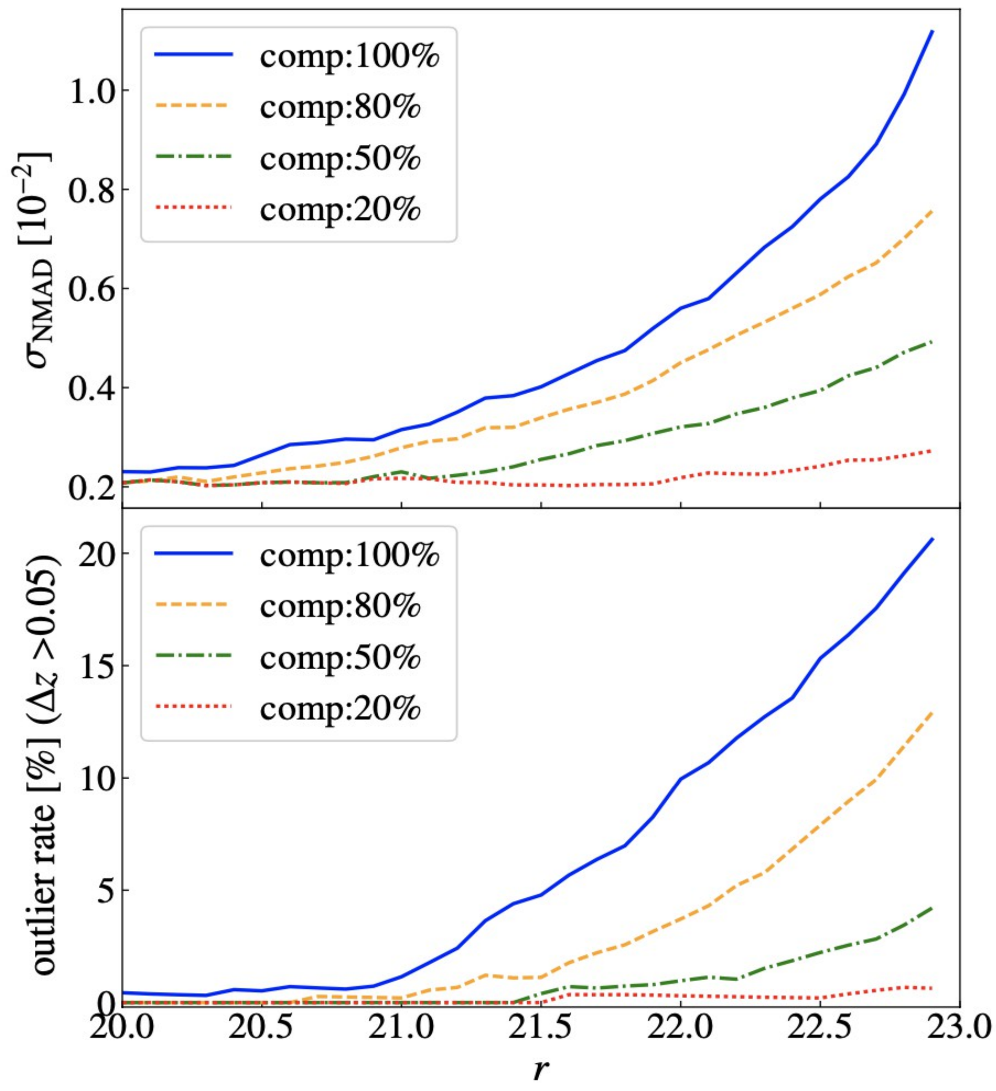
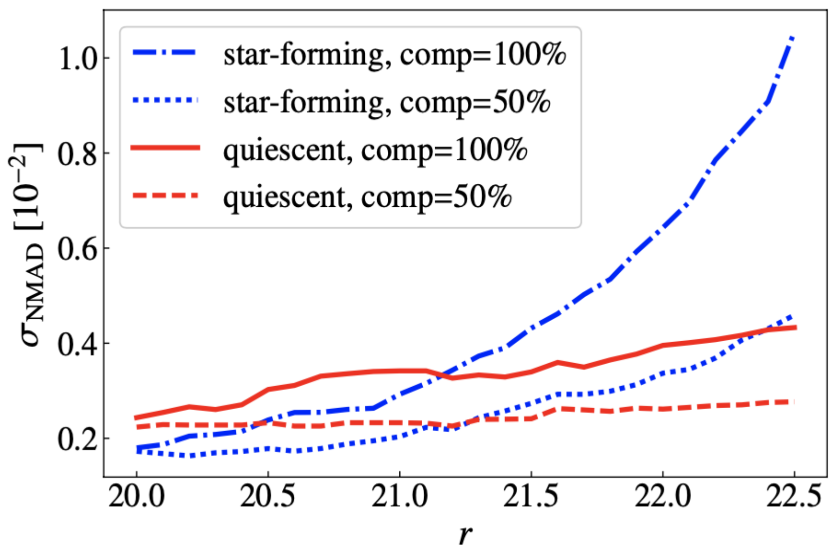


Photo-*zs* from miniJPAS





… for galaxies ...

Hernán-Caballero et al. 2021.

In miniJPAS, the template set used in the estimation of photo-*z*s was however inspired by the same spectroscopic sample (DEEP2-DEEP3 in the AEGIS field) used to measure photo-*z* precision and accuracy → too optimistic results?

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We test our photo-z pipeline with a different data set: J-PAS observations of the J-NEP, which amounts to 1/8th of the area, but under deeper photometry

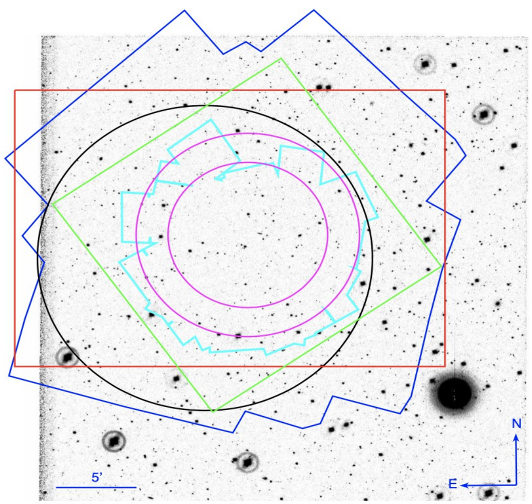
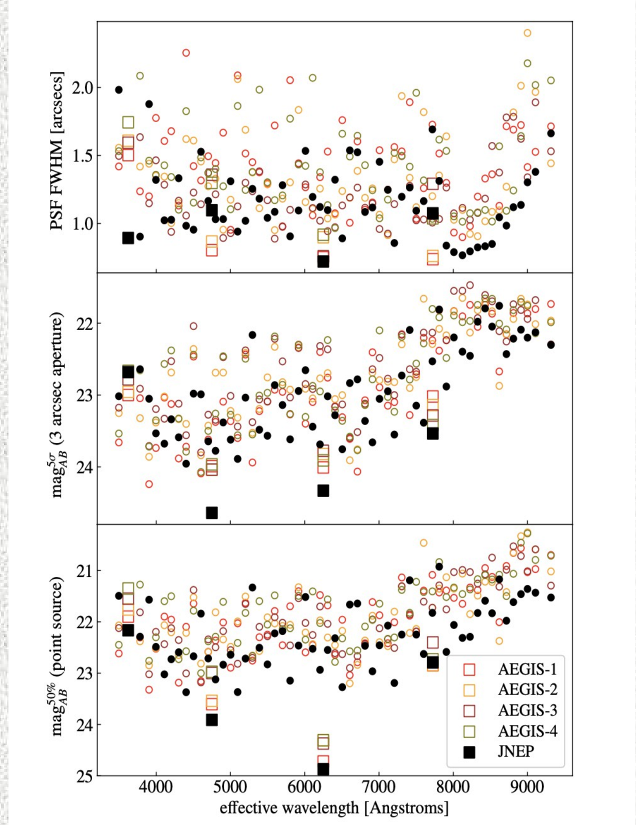
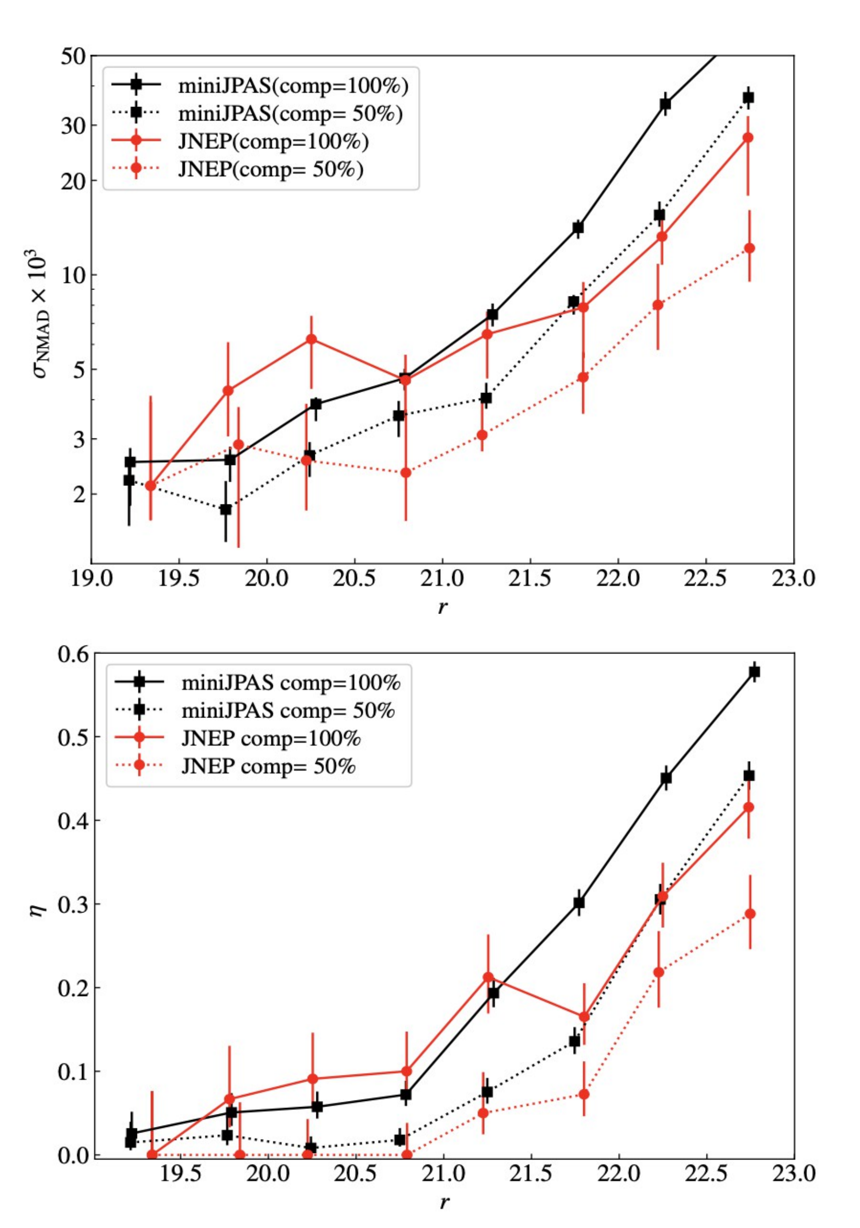


Fig. 1. Co-added *r*-band image from J-NEP. The magenta circles circumscribe the regions with NIRCam+NIRISS (inner circle) and NIRCam-only (outer circle) coverage from the JWST-GTO-1176 program. The actual footprint is a 4-spoke pattern whose orientation depends on the date of the initial observation (see Jansen & Windhorst 2018, for details). The solid lines show the footprint of ancillary surveys with HST/ACS+WFC3 (cyan polygon), NuSTAR (dark blue polygon), Chandra (green square), VLA (black circle), and the area covered by spectroscopic observations with MMT/Binospec (red rectangle).



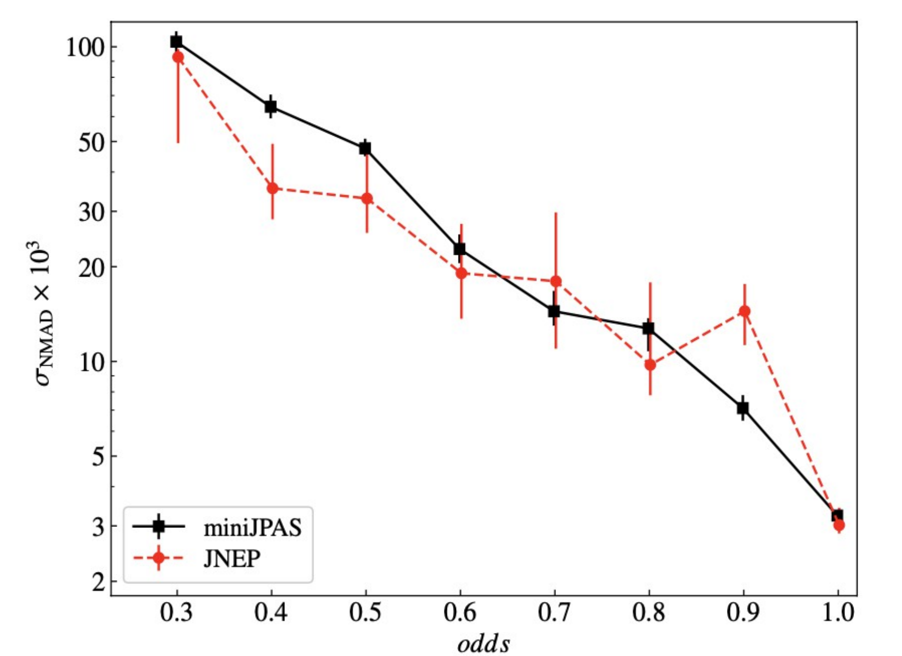
Hernán-Caballero et al., submitted



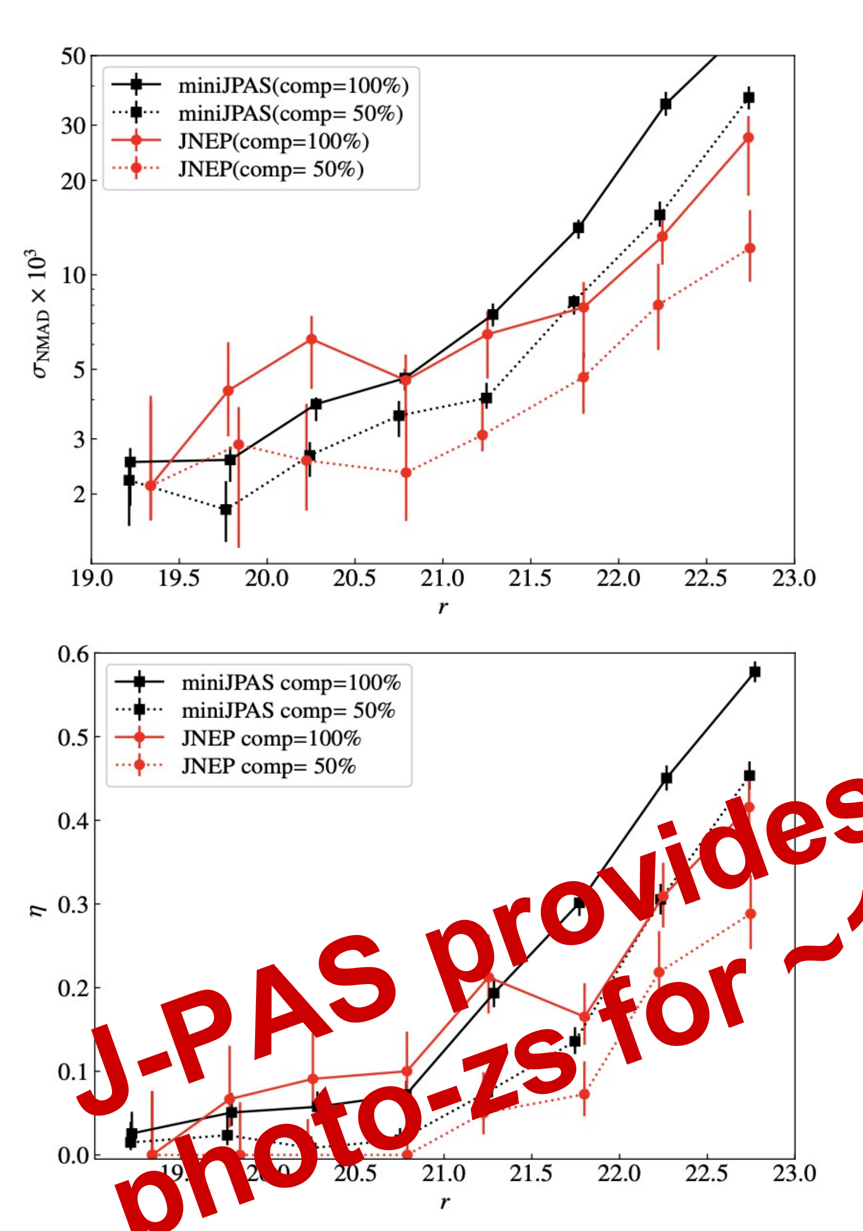
(1) Photo-*z* estimations from AEGIS field (miniJPAS) and JNEP ***coincide*** for r<21.5

(2) The ***odds*** parameter ***captures*** the precision of the photo-*z* *independently* of galaxy's magnitude or type: selections must be done in ***odds***

$$odds = \int_{z_{phot}-d}^{z_{phot}+d} P(z)dz, \qquad d = 0.03(1 + z_{phot})$$



Hernán-Caballero et al., submitted



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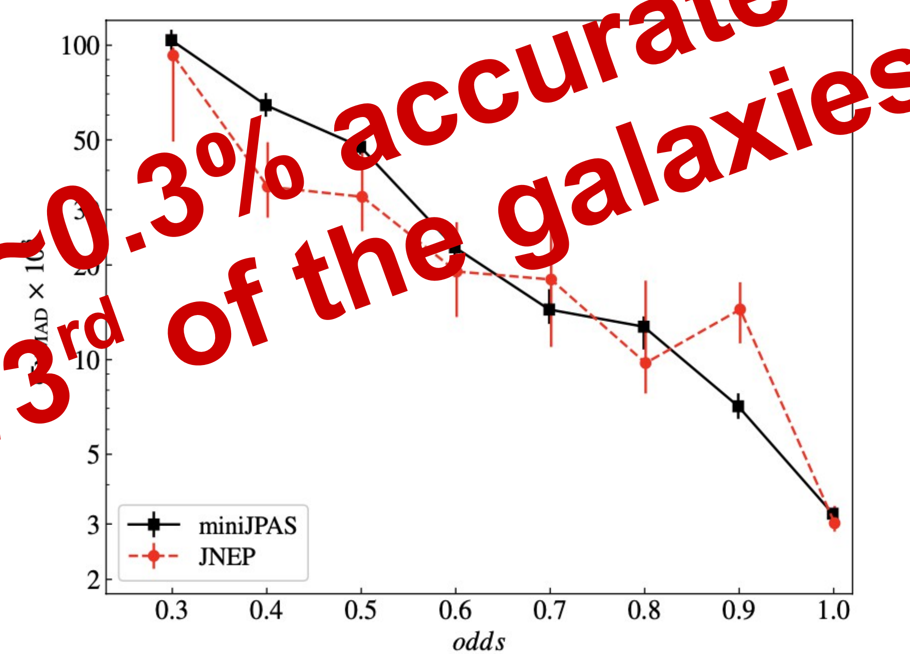
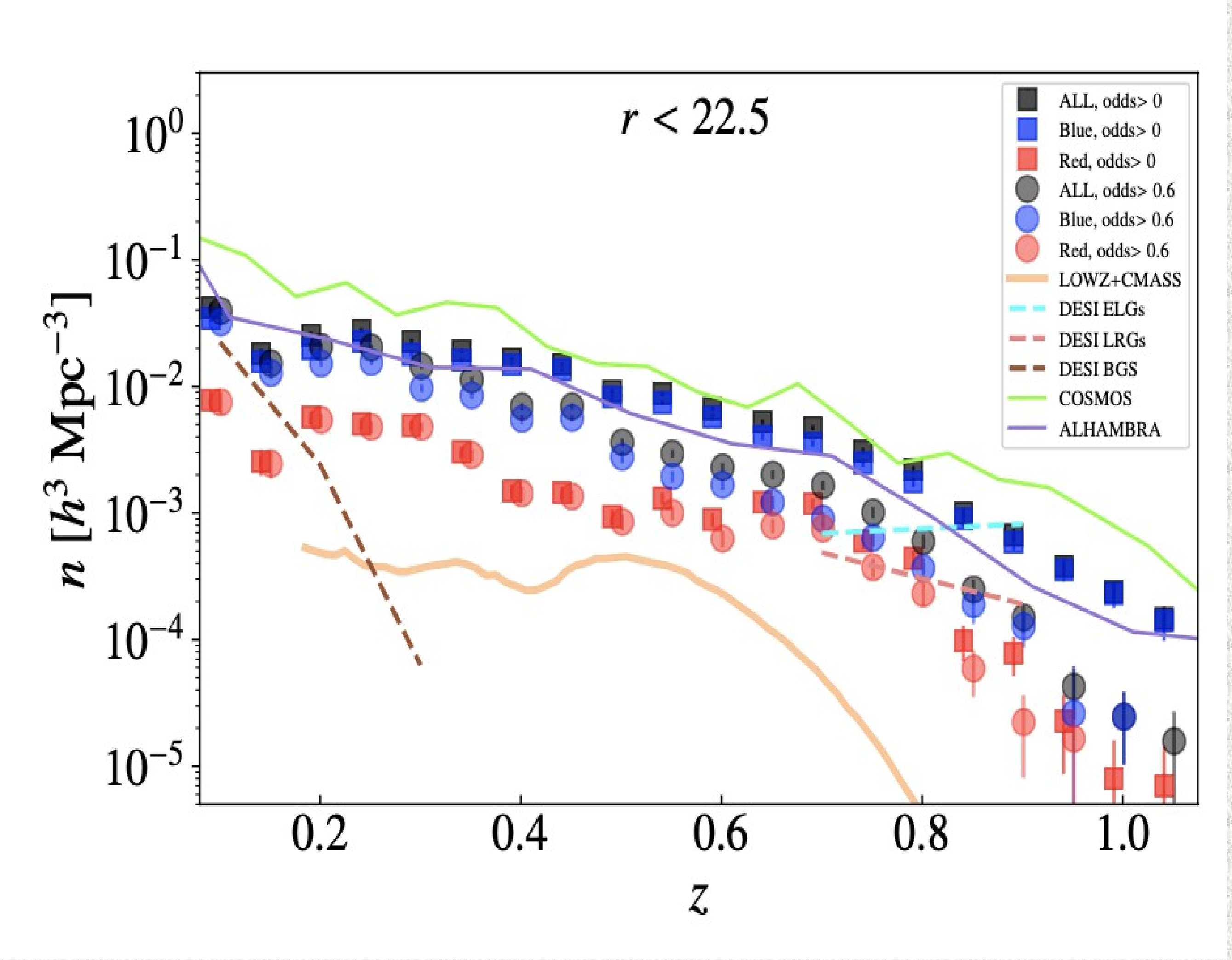


J-PAS provides ~0.3% accurate photo-zs for ~1/3rd of the galaxies

Hernán-Caballero et al., submitted

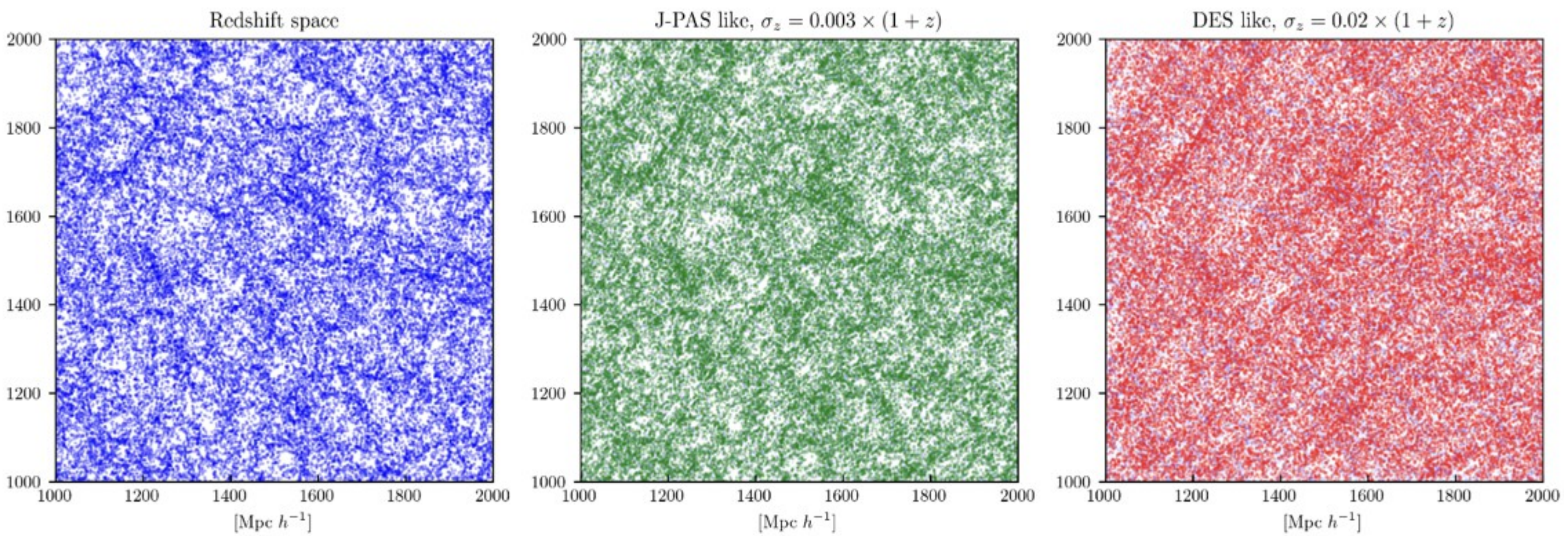
LSS in JPAS

LSS in miniJPAS

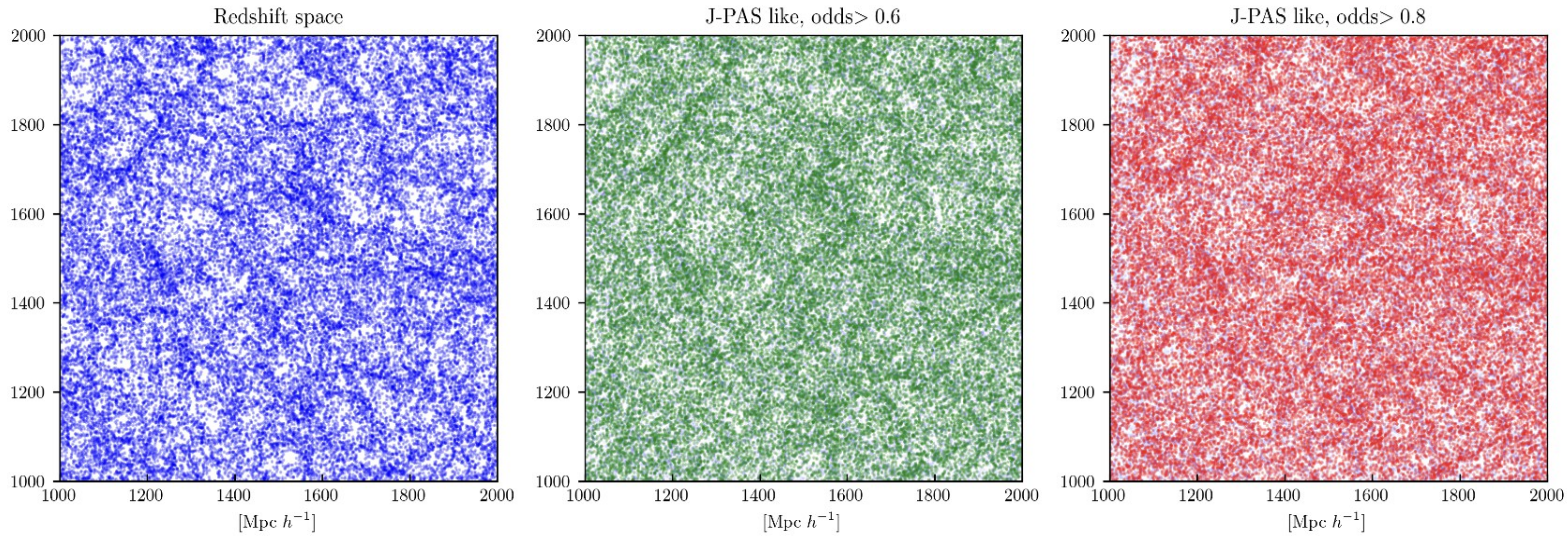


- **High quality** photo-zs for **all red galaxies up to z~0.9**
- **High quality** photo-zs for a **large fraction of blue galaxies up to z~0.9**
- **Multi-tracer** science enabled in a very wide redshift range z ~ [0,1]
- Clustering science cases augmented after the inclusion of the **J-PAS QSO** population sampling the redshift interval z ~[1,3.5]
- Further science cases after obtaining spectra with **WEAVE-QSO**

Ideal vs real life
(Ideal)



Ideal vs real life (Real[istic])



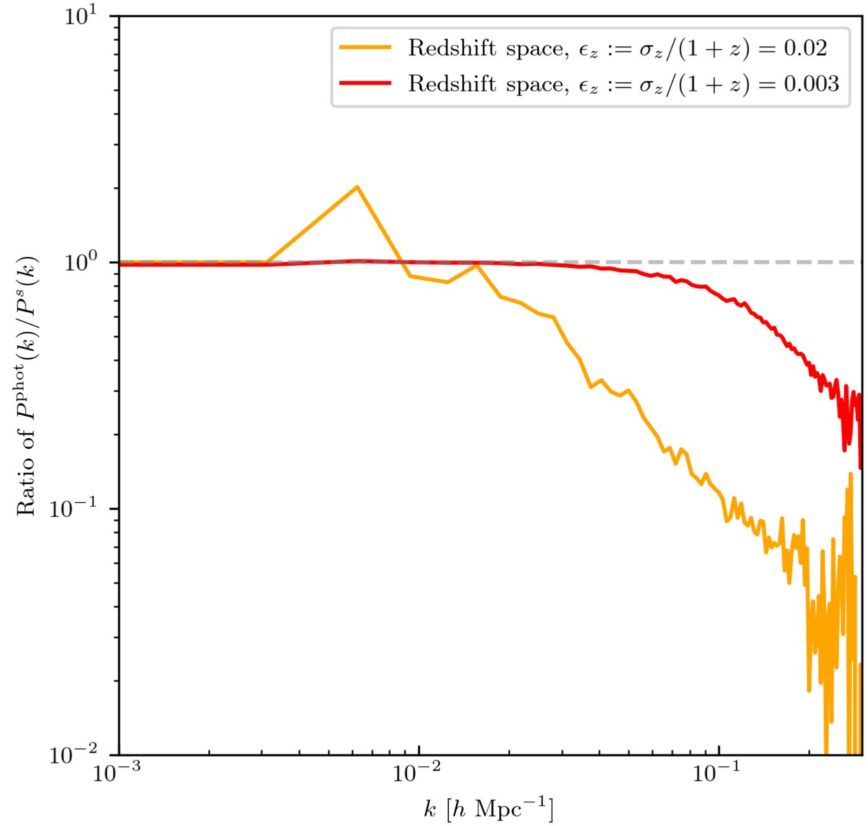
Projections of miniJPAS on LSS clustering

Ratio of $P_0(k)$s:

$$P_{0,photo}(k) / P_{0,spec}(k)$$

Obtained from **ideal**, **Gaussian Photo-z errors** at the targetted level of J-PAS

Forecasts on sensitivity of J-PAS to the **dark sector** (interacting dark matter and dark energy, exotic dark energy models) and **modified gravity** can be found in Salzano et al., 2021, Figueruelo et al. 2021, Aparicio-Resco et al. 2020, Costa et al. 2019.



Projections of miniJPAS on LSS clustering

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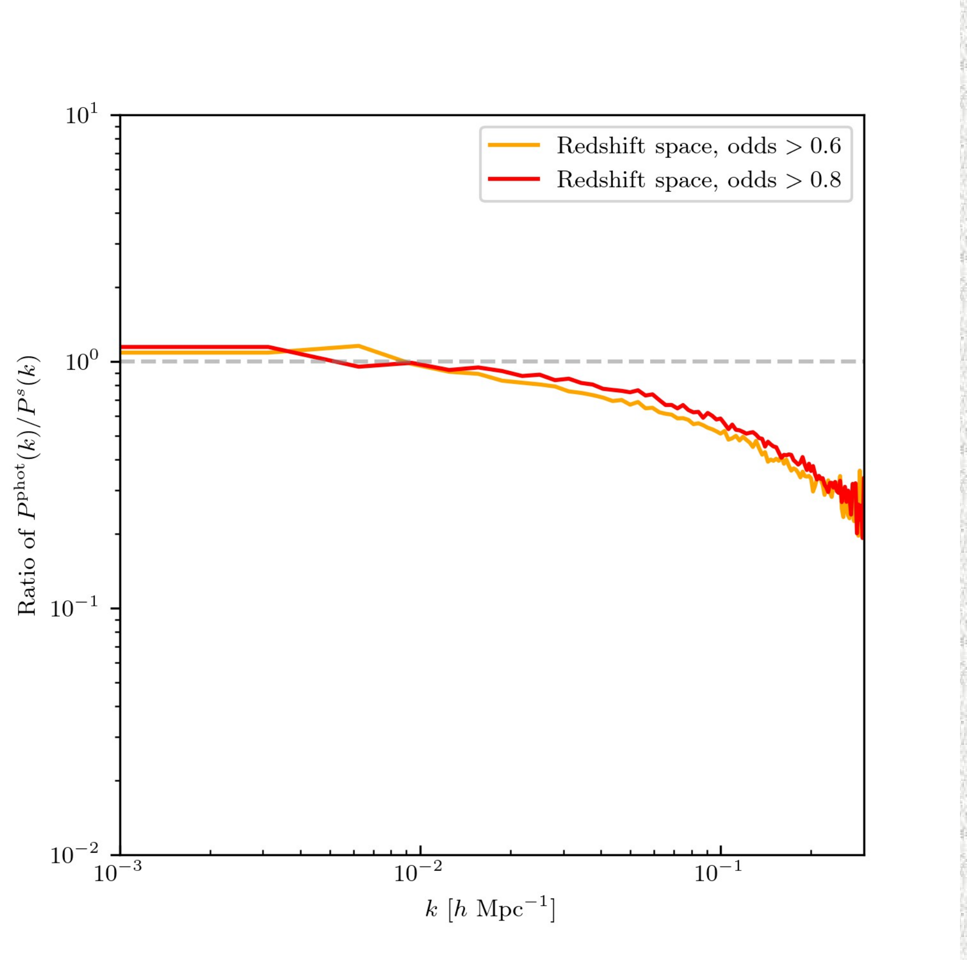
Obtained from **real photo-z PDFs** obtained from **miniJPAS** data



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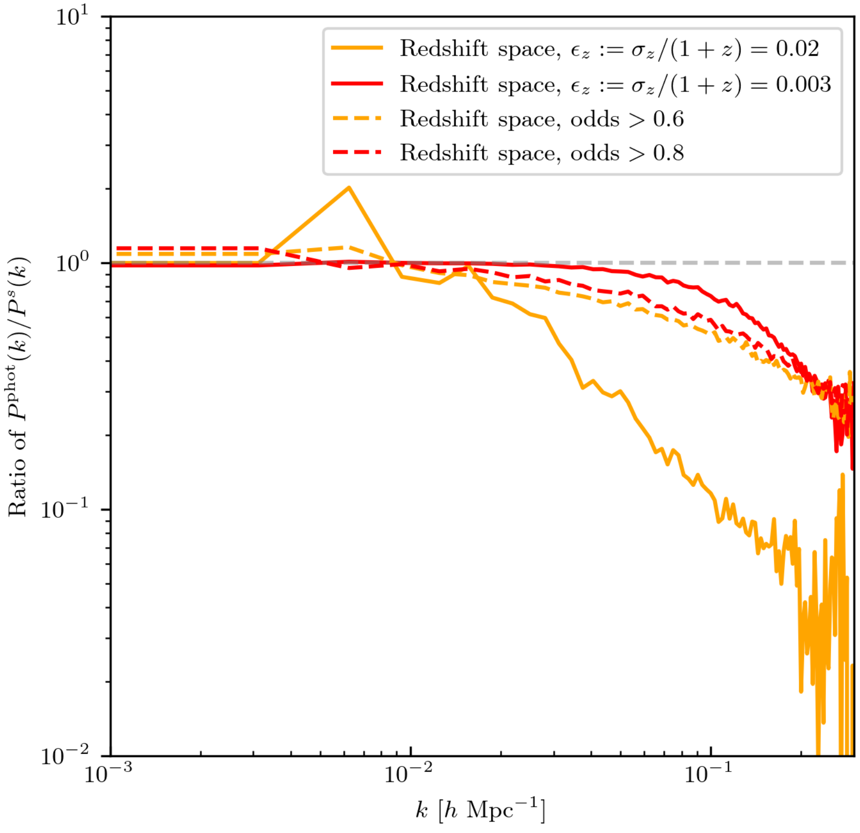

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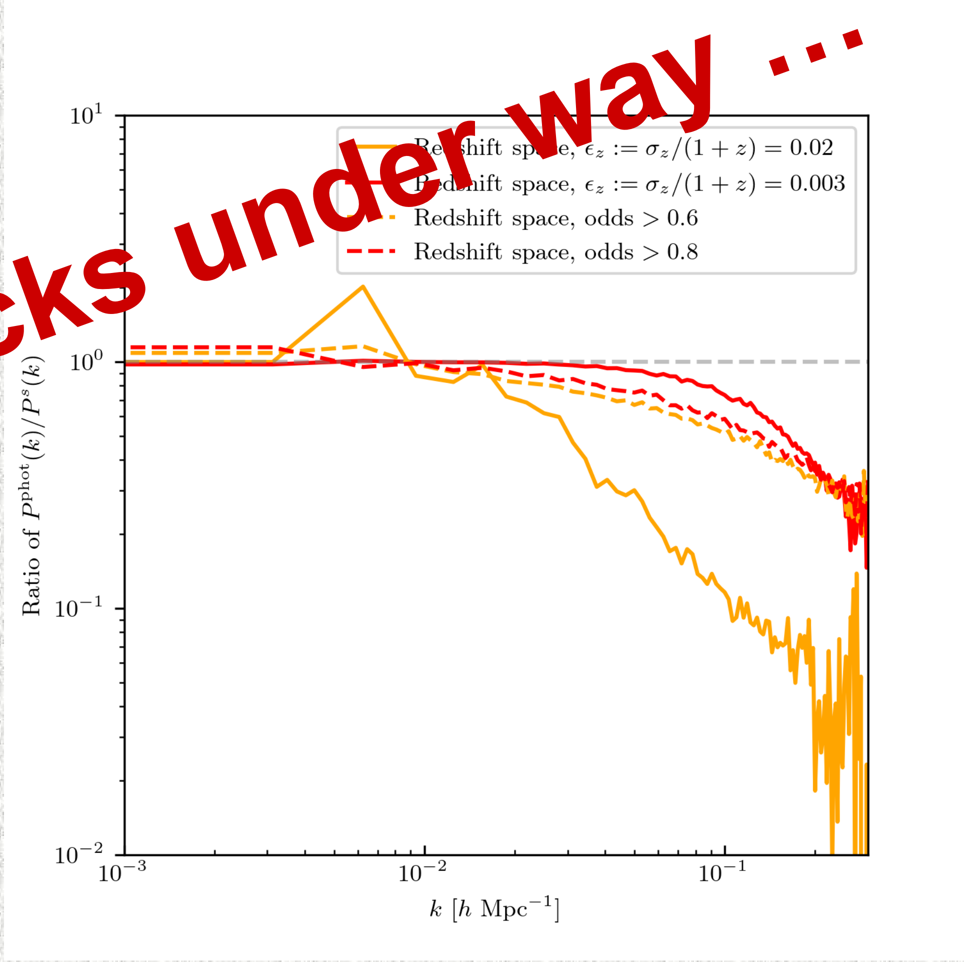
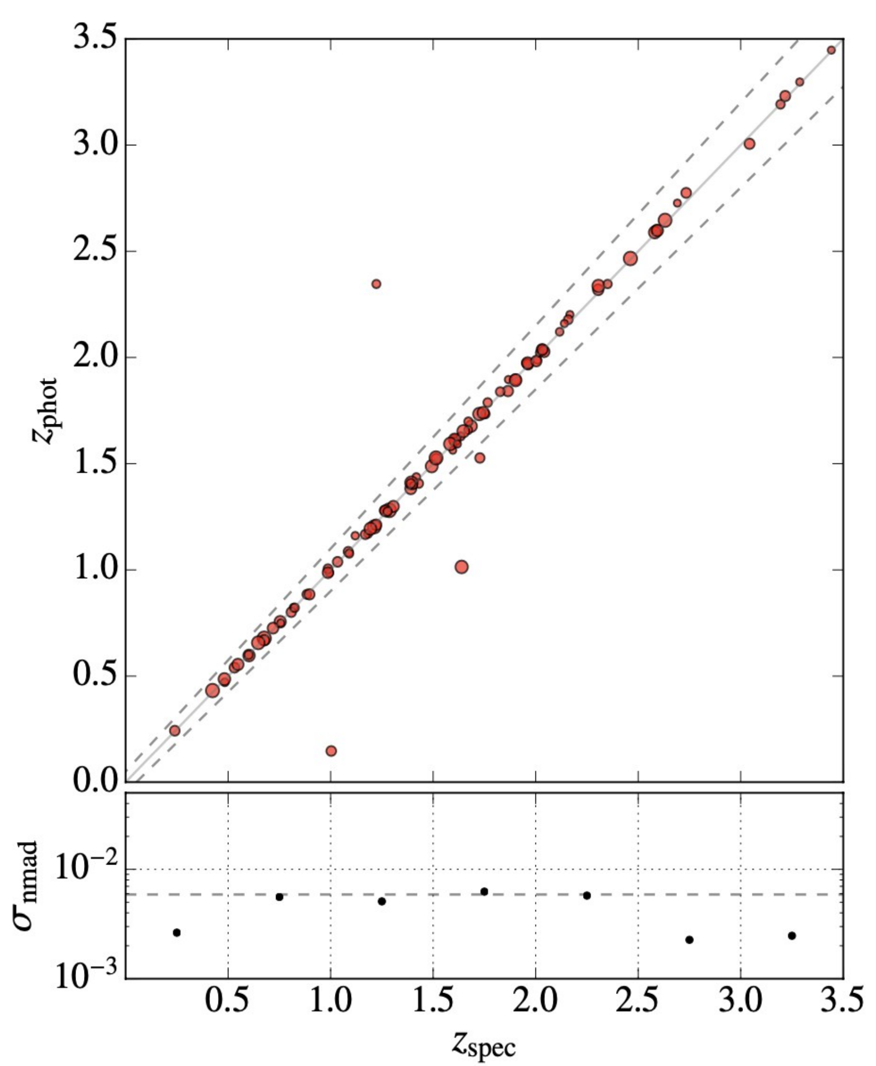
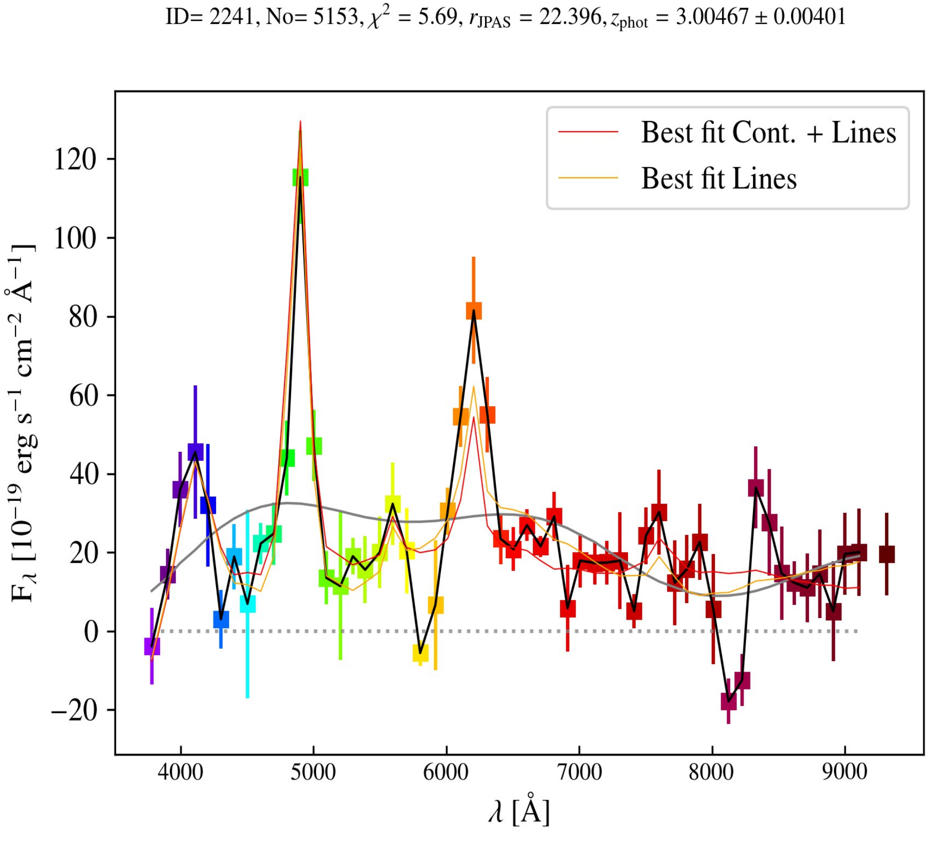


Full, realistic mocks under way …

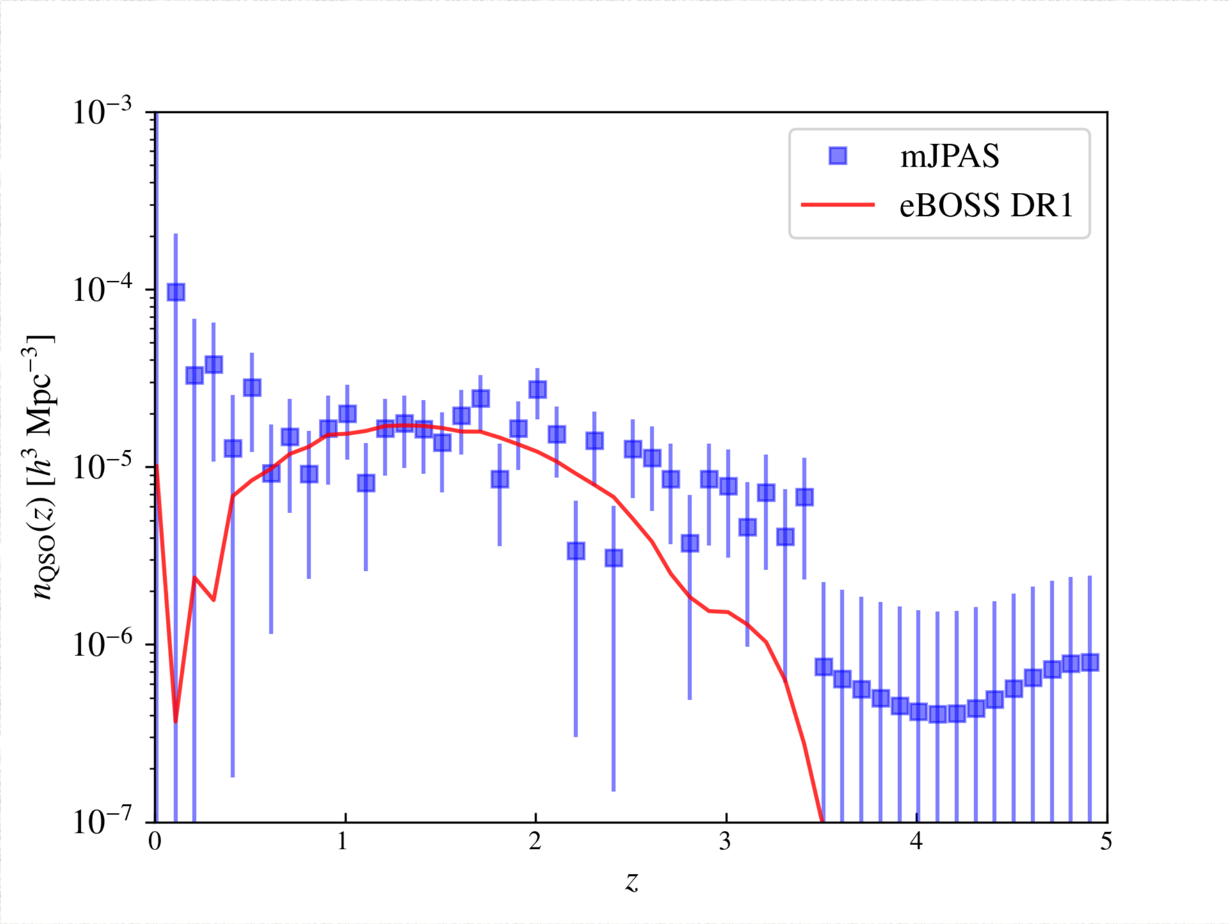
LSS from QSOs in miniJPAS

For **QSOs** we can recover very accurate and precise photo-z as well !!





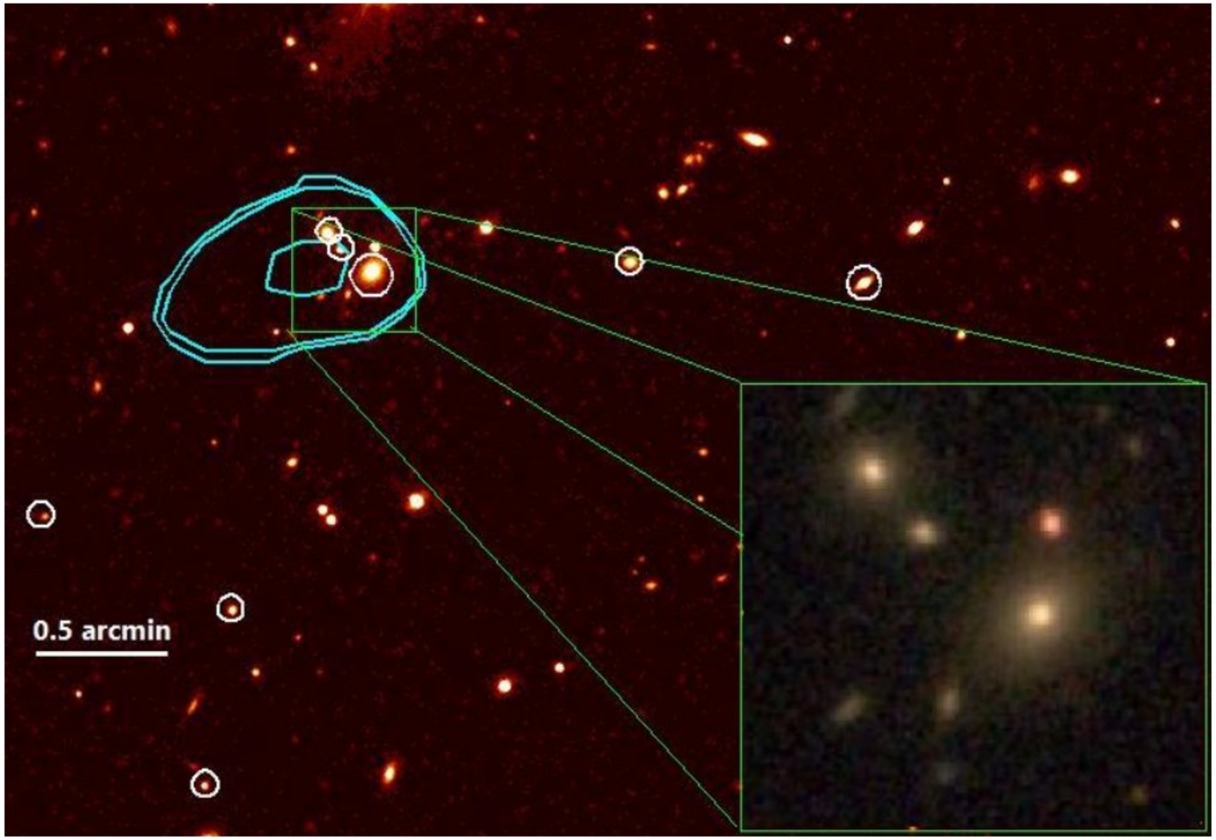
NUMBER DENSITY OF **VERY PRELIMINARY QSO** CANDIDATES FROM **miniJPAS**



Ongoing program with **WEAVE QSO**: about **~700 sq.deg** per year of our **QSO candidates** will be covered with their fibers, enabling **Lyman-alpha science**

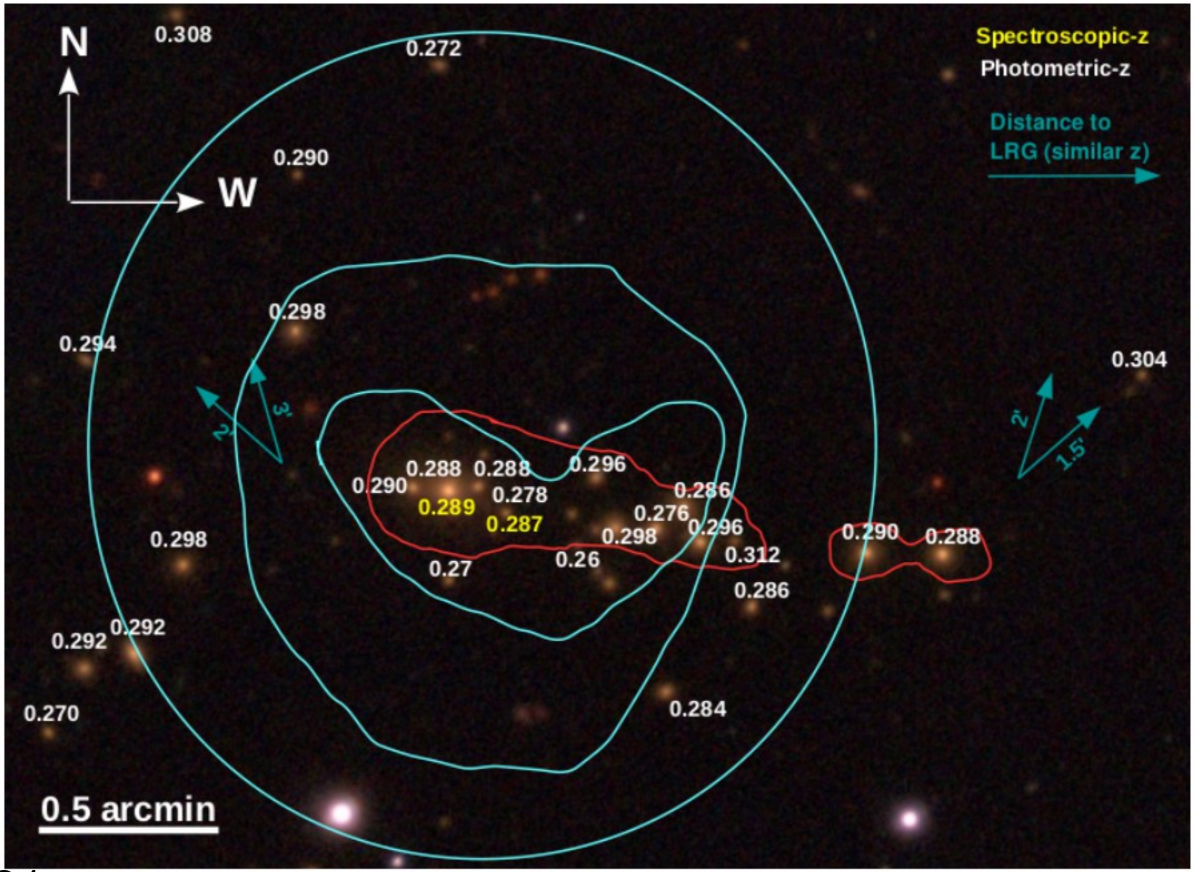
Clusters in miniJPAS

Clusters in miniJPAS



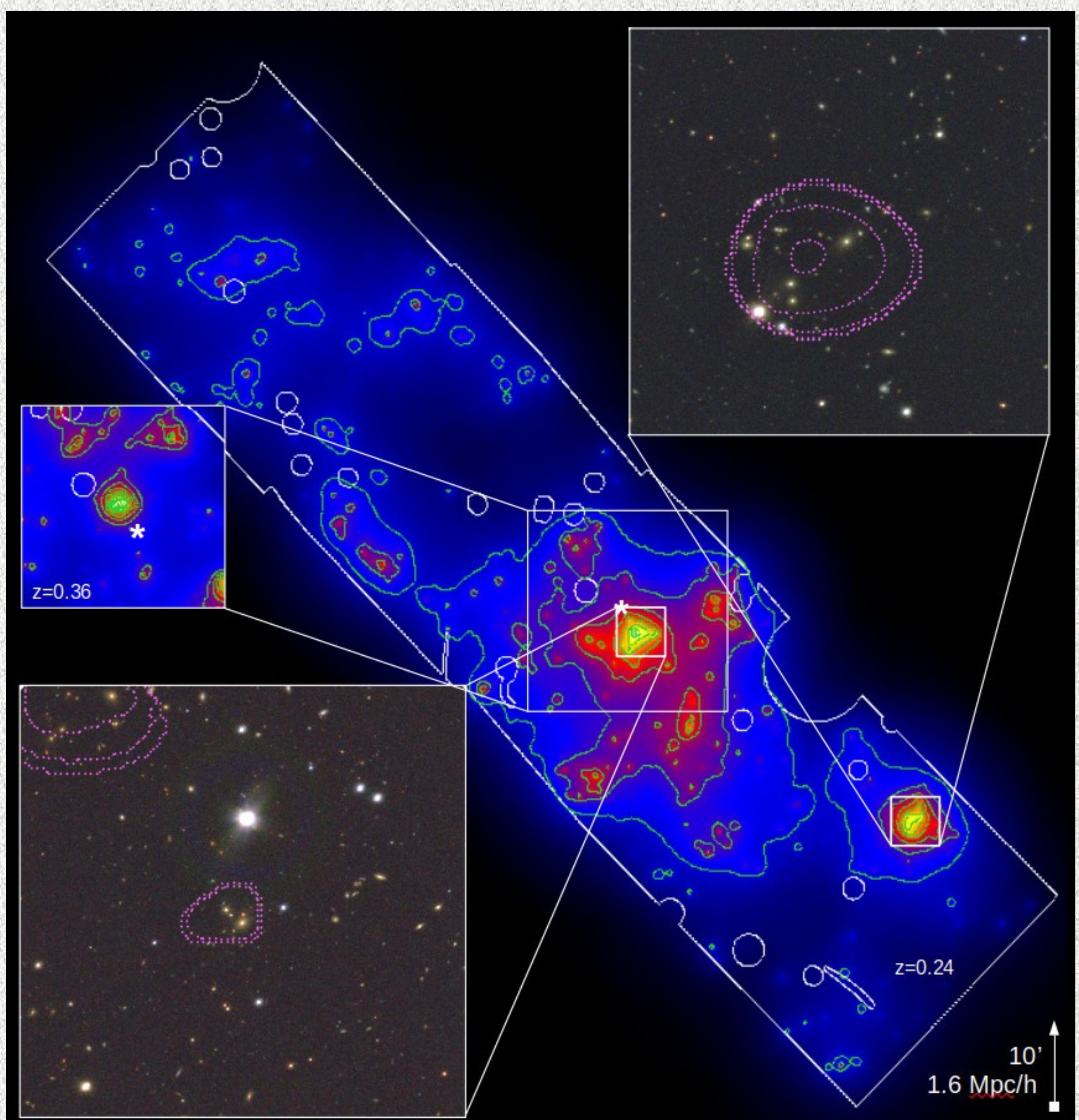
Currently two cluster finders in place: **AMICO** and **PzWav**

Clusters in miniJPAS



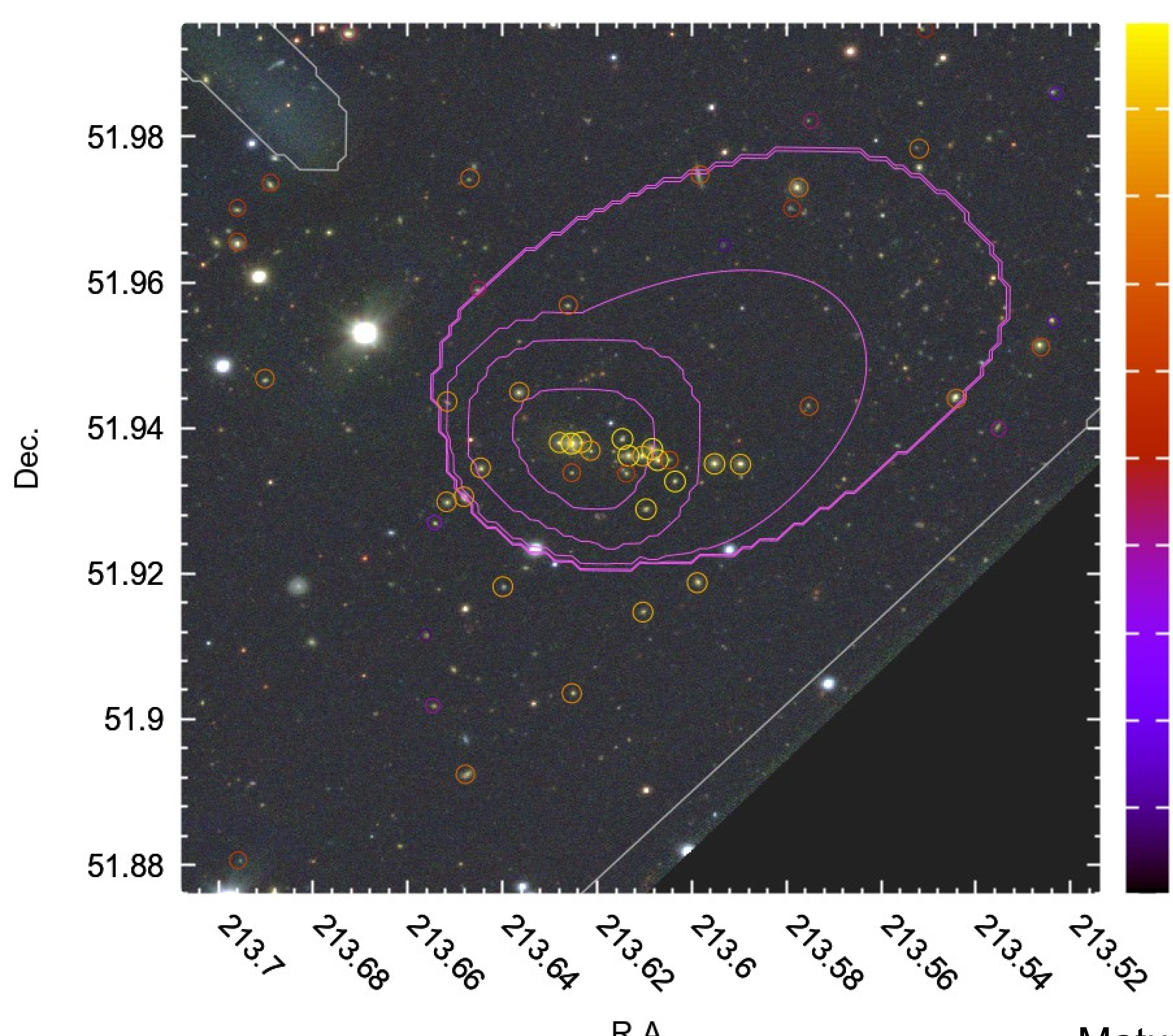
Bonoli et al., 2021.

Fig. 27: The most massive cluster found in the miniJPAS footprint, centred at RA=213.6254, DEC=51.9379. This cluster is also part of the redMaPPer catalogue where it is listed as a cluster with richness λ = 33. The brightest galaxy has a spectro-



AMICO response to a redshift slice on ***z~0.24,*** dashed iso-contours correspond to **X-ray data**

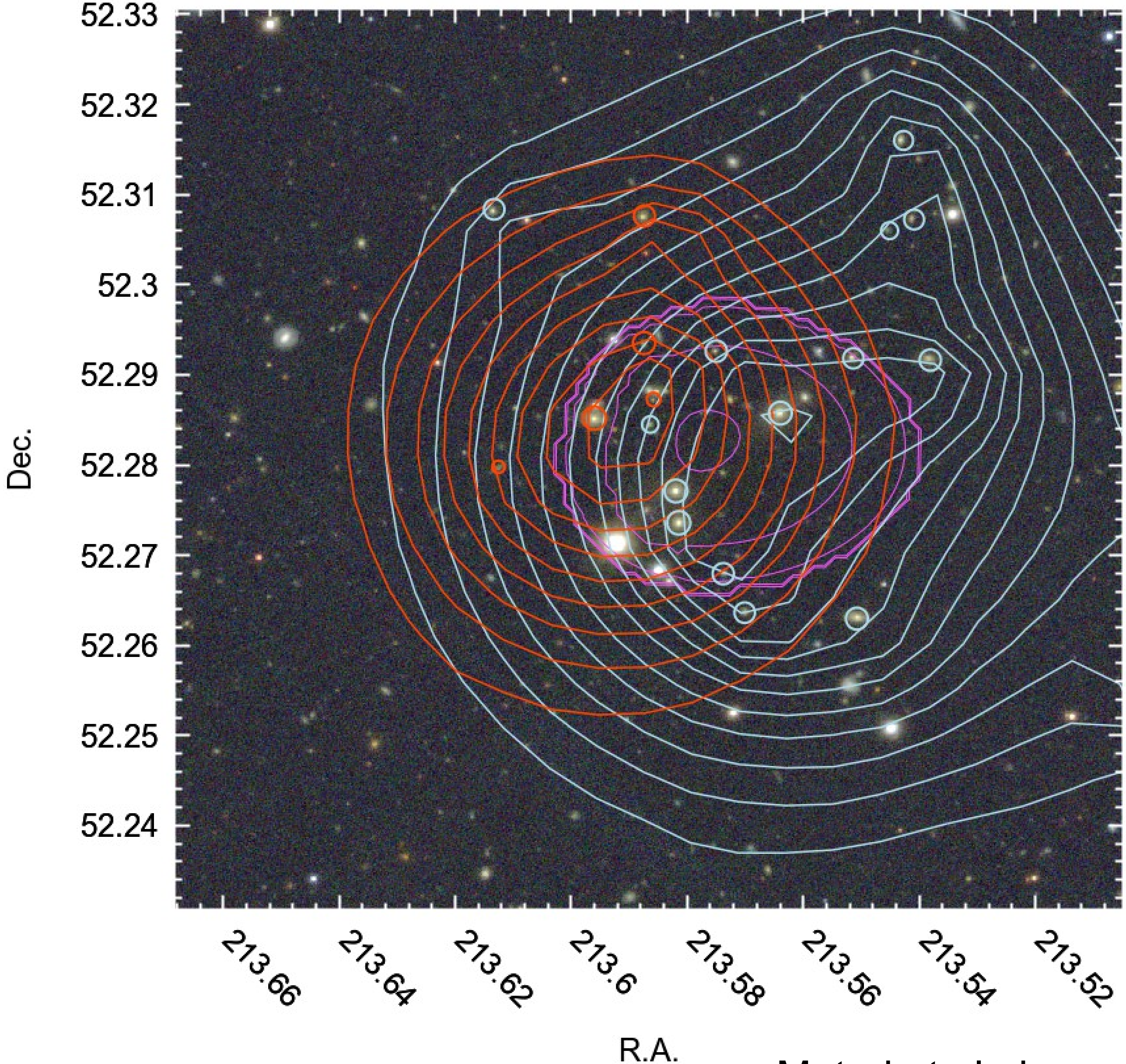
Maturi et al., in prep.



Contours are provided by **X-ray** data, color bar renders **membership probability** for each galaxy assigned by **AMICO**

Maturi et al., in prep.

Maturi et al., in prep.

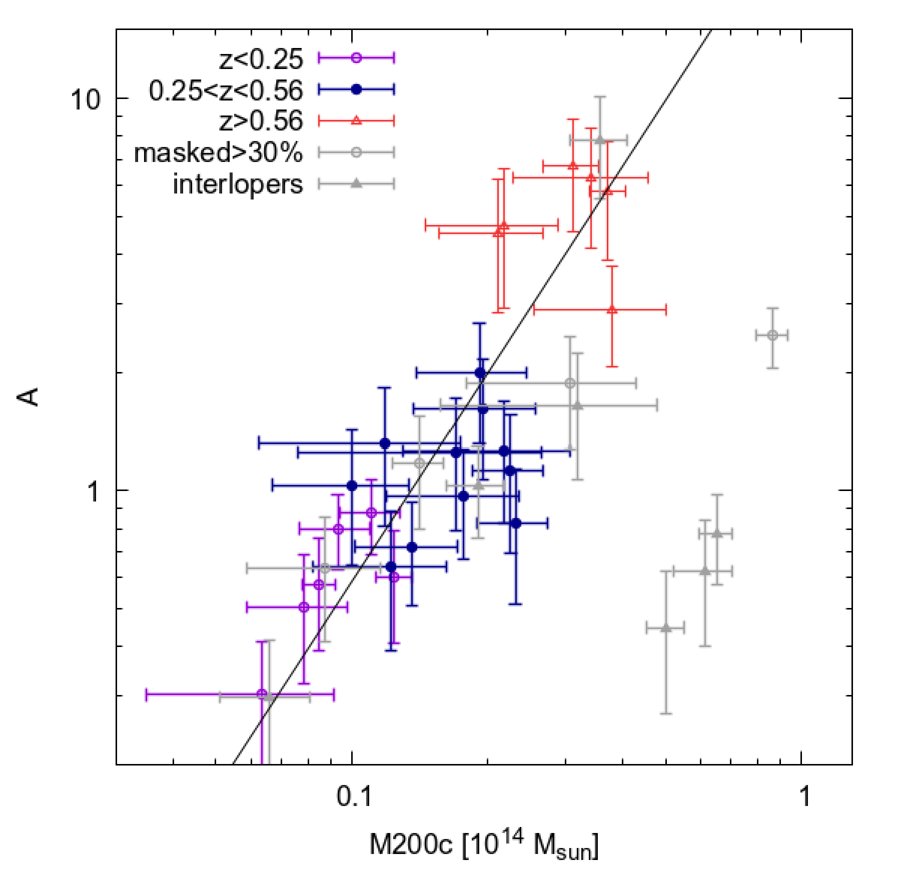


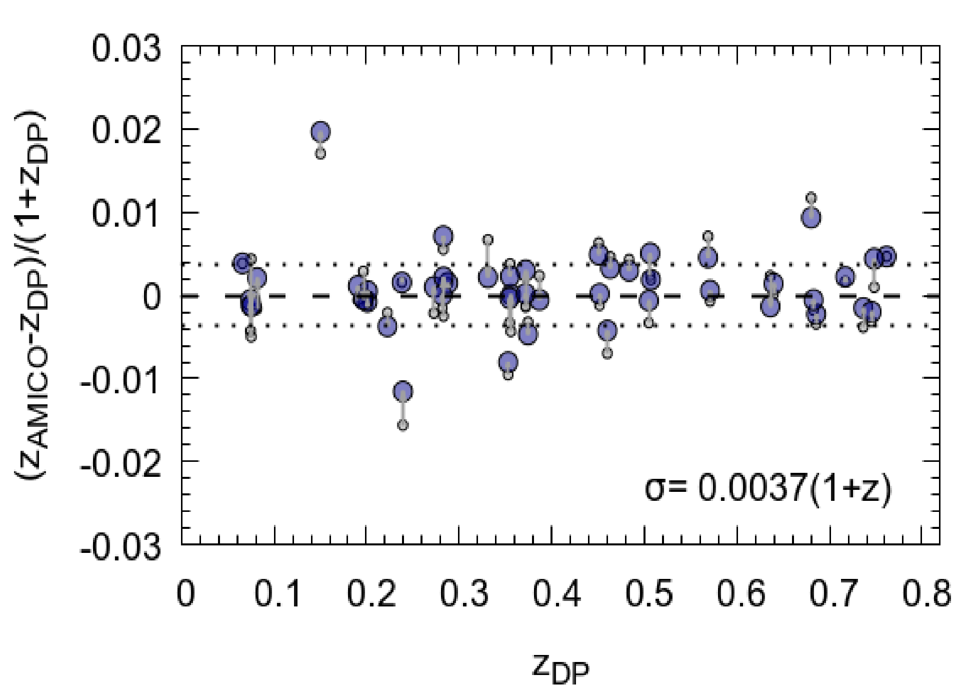
Maturi et al., in prep.

We can **distinguish interloping** clusters/groups along **very similar** lines of sight...

Maturi et al., in prep.

Maturi et al., in prep.



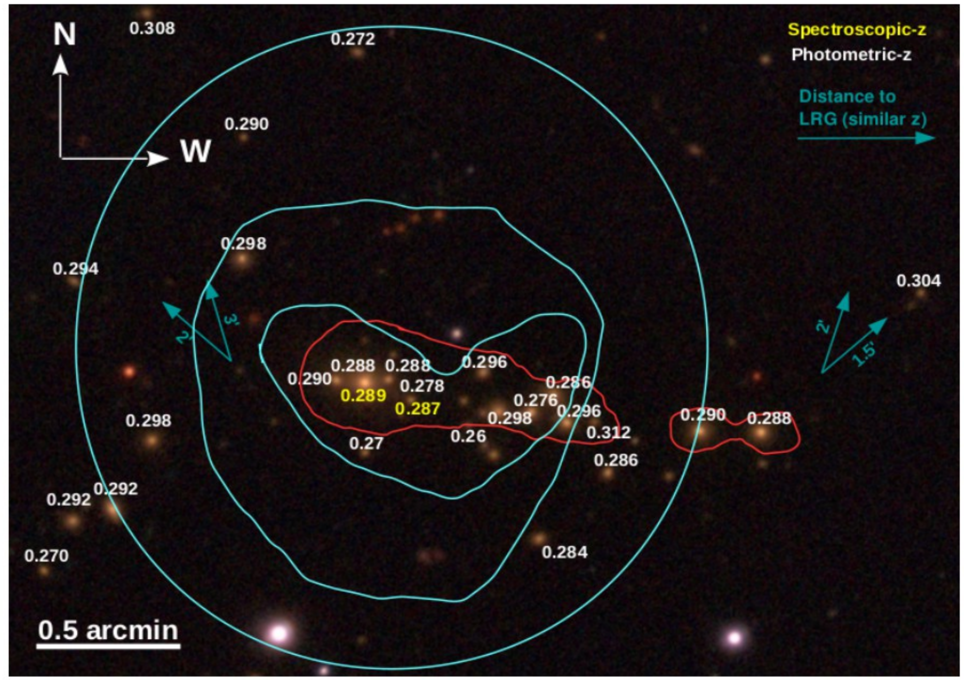


Low scatter in mass proxy – mass relation for Individual clusters (no binning/stacking)

Very **accurate & precise** redshift determination for clusters:
We shall be able to conduct **galaxy cluster clustering**

Clusters in miniJPAS

- **~100 groups** with **M_200>5e13 M_sun** in **~1 sq.deg** with high levels of purity and completeness up to z~0.4
- Internal weak lensing cluster mass estimates expected to give **ΔlnM~3%** or **Δσ8 ~1.5%**
- Current work towards establishing **density-based membership assignments** as a proxy for **optical mass**



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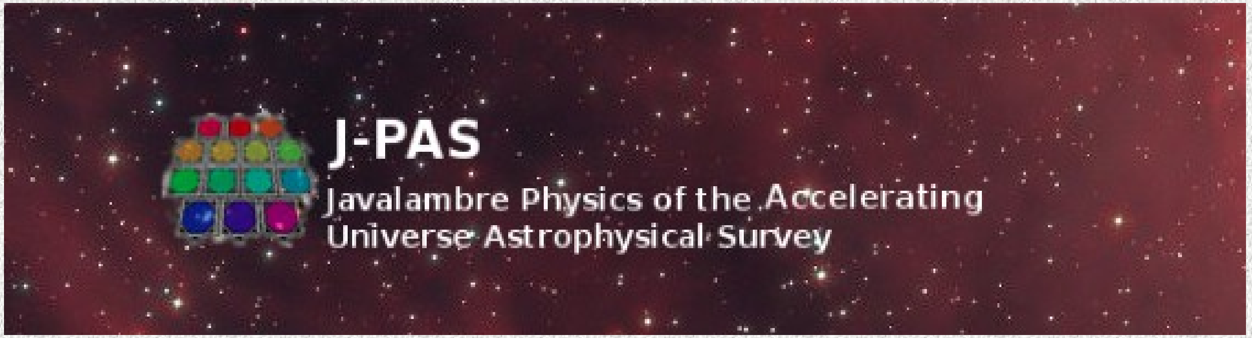
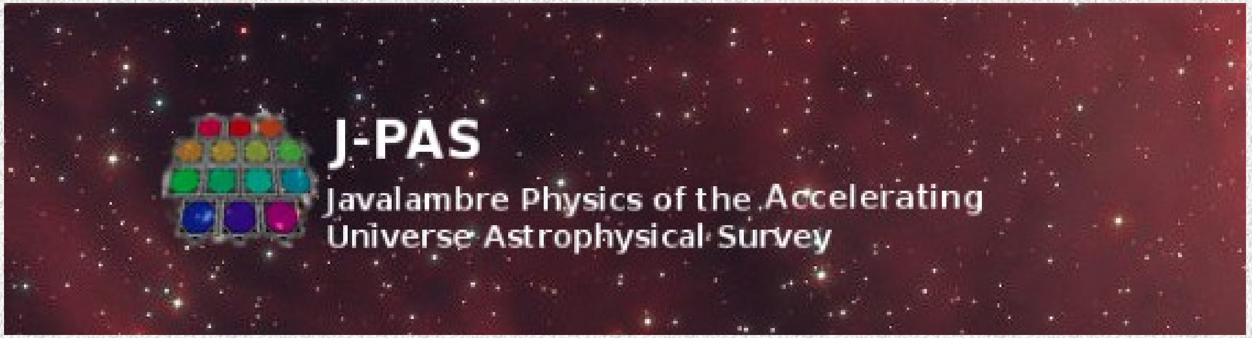
Bonoli et al. 2021



- **54** NB + **5** MB/BB filters
- **4.5** deg^2 FoV
- Up to mag~ **24.5 in BB filters, ~ 22.5 in NB ones**
- 90M ELG and LRG
- Reaching **~0.3% photo-z precision for ~1/3rd of galaxies**
- Millions of QSOs
- 200M of galaxies
- 4000 SNIa
- ~700K of groups and clusters with accurate photo-*z* and memberships

- http://www.j-pas.org



JPCam under comissioning as we speak, survey start expected before the end of this year …

Stay tuned!

J-PLUS DR3 (preliminary LSS analyses)

57 vs 12 filters …

J-PAS

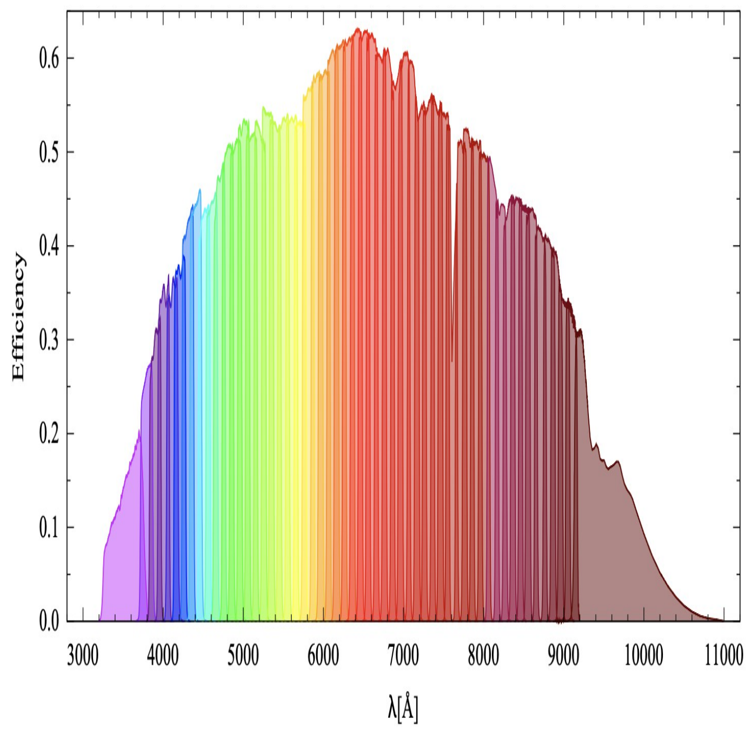
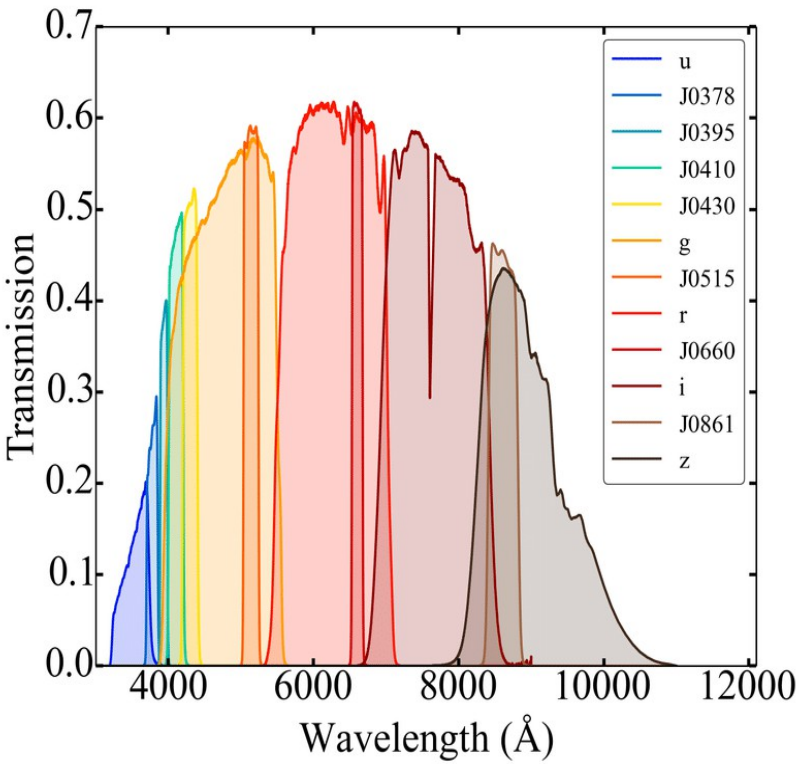
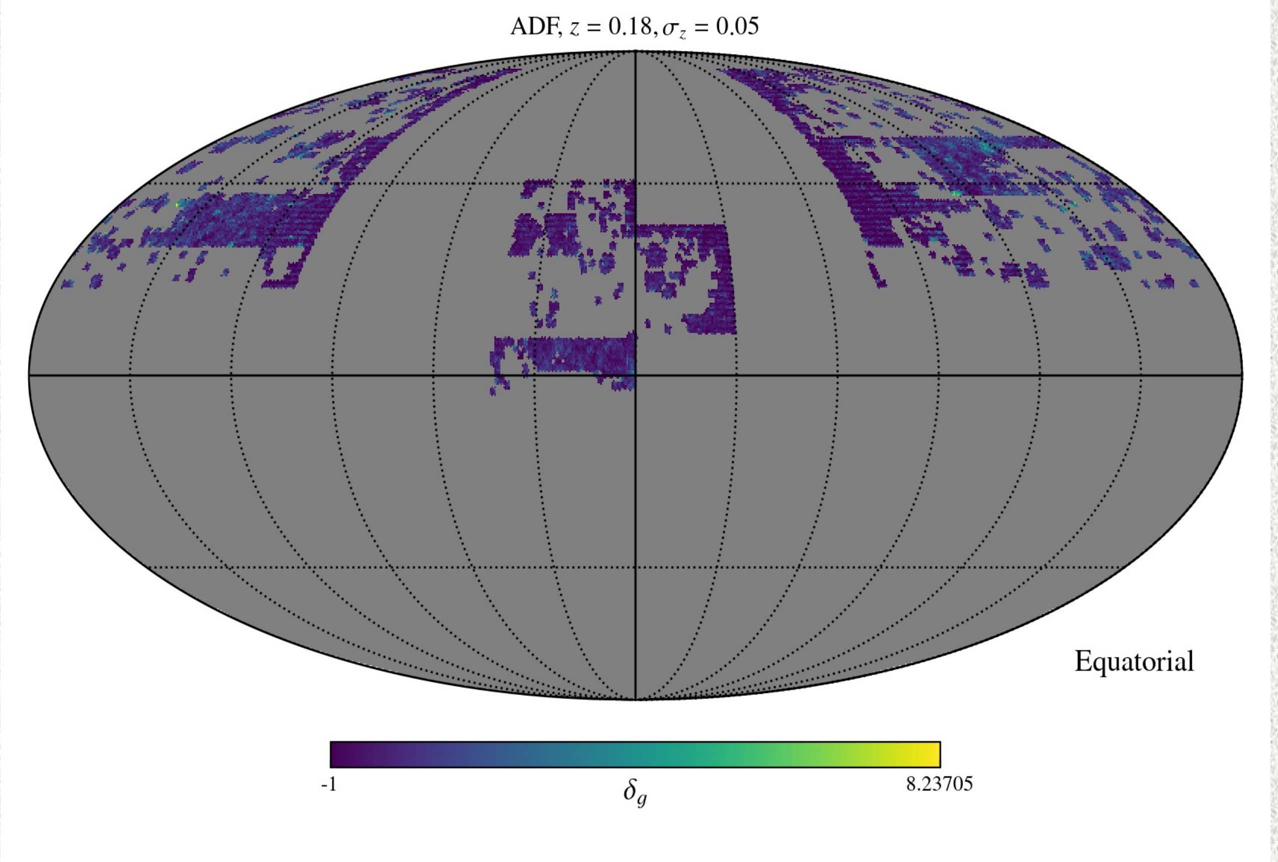


Fig. 2: The measured transmission curves of the J-PAS filters. Effects of the CCD quantum efficiency, the entire optical system of the JST/T250 telescope and sky absorption are included. The HTML color representation of each filter is provided in the miniJPAS database in the table `minijpas.Filter`.

J-PLUS/S-PLUS



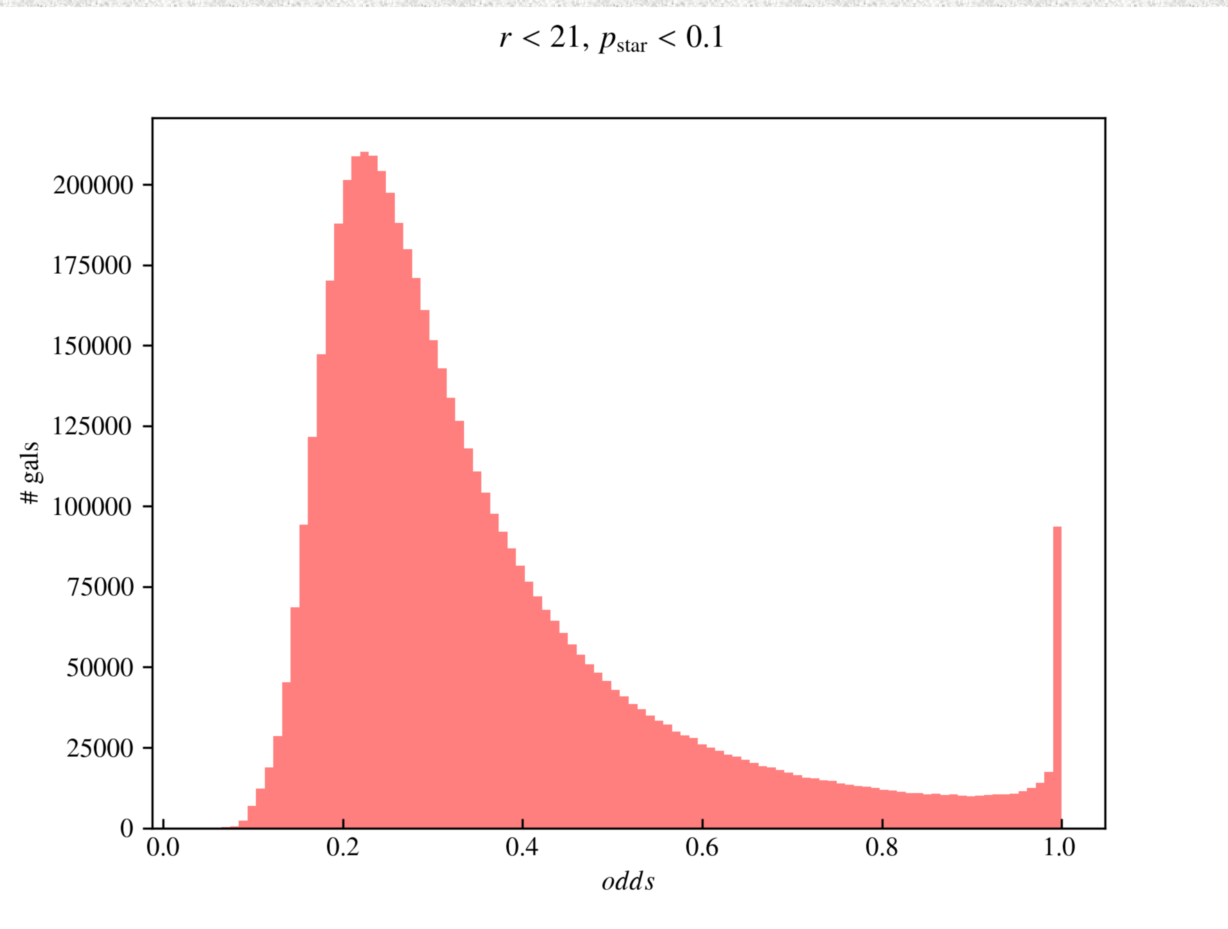
J-PLUS DR3 (preliminary LSS analyses)



Data Release 3 (DR3)

- 1642 pointints: **3192 sq.deg**. (**2881 sq.deg**. after masking)
- **Mean PSF 1.23 arcsec** in rSDSS
- **48,892,195 sources** in the **dual** mode catalog **348,538,554 sources** in the **single** mode catalog

J-PLUS DR3 (preliminary LSS analyses)



$$odds = \int_{z_{\rm phot}-d}^{z_{\rm phot}+d} P(z)dz, \qquad d = 0.03(1 + z_{\rm phot})$$

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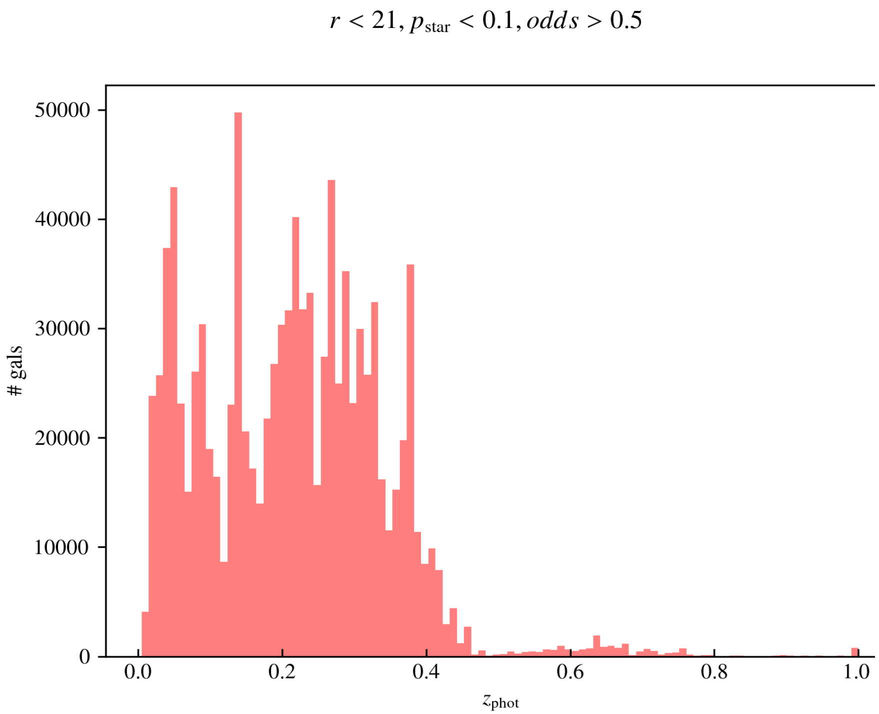
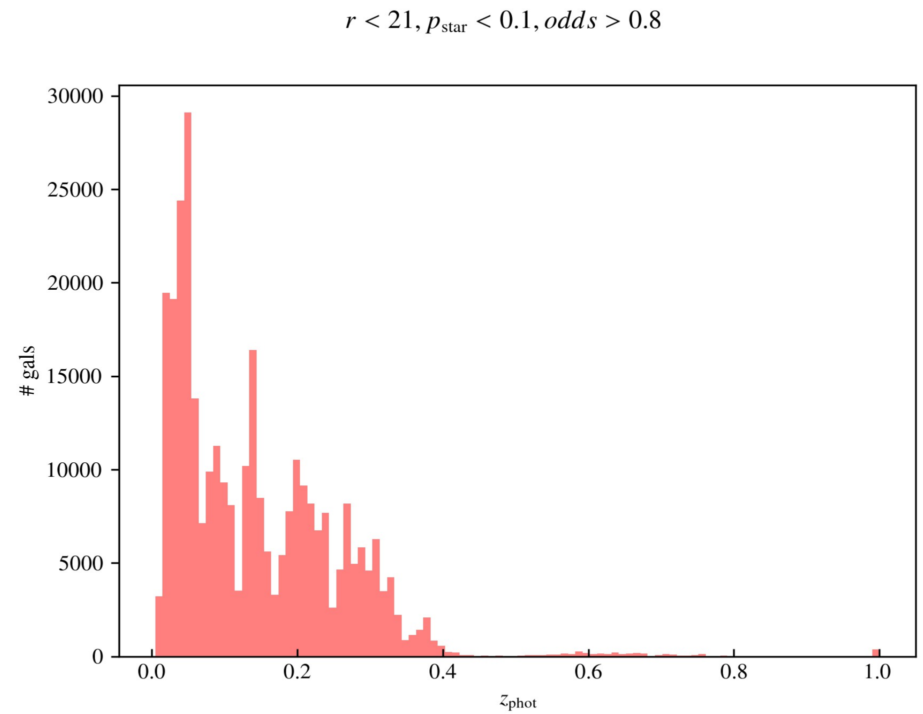
J-PLUS DR3 (preliminary LSS analyses)

Complex selection function when using *odds* ...





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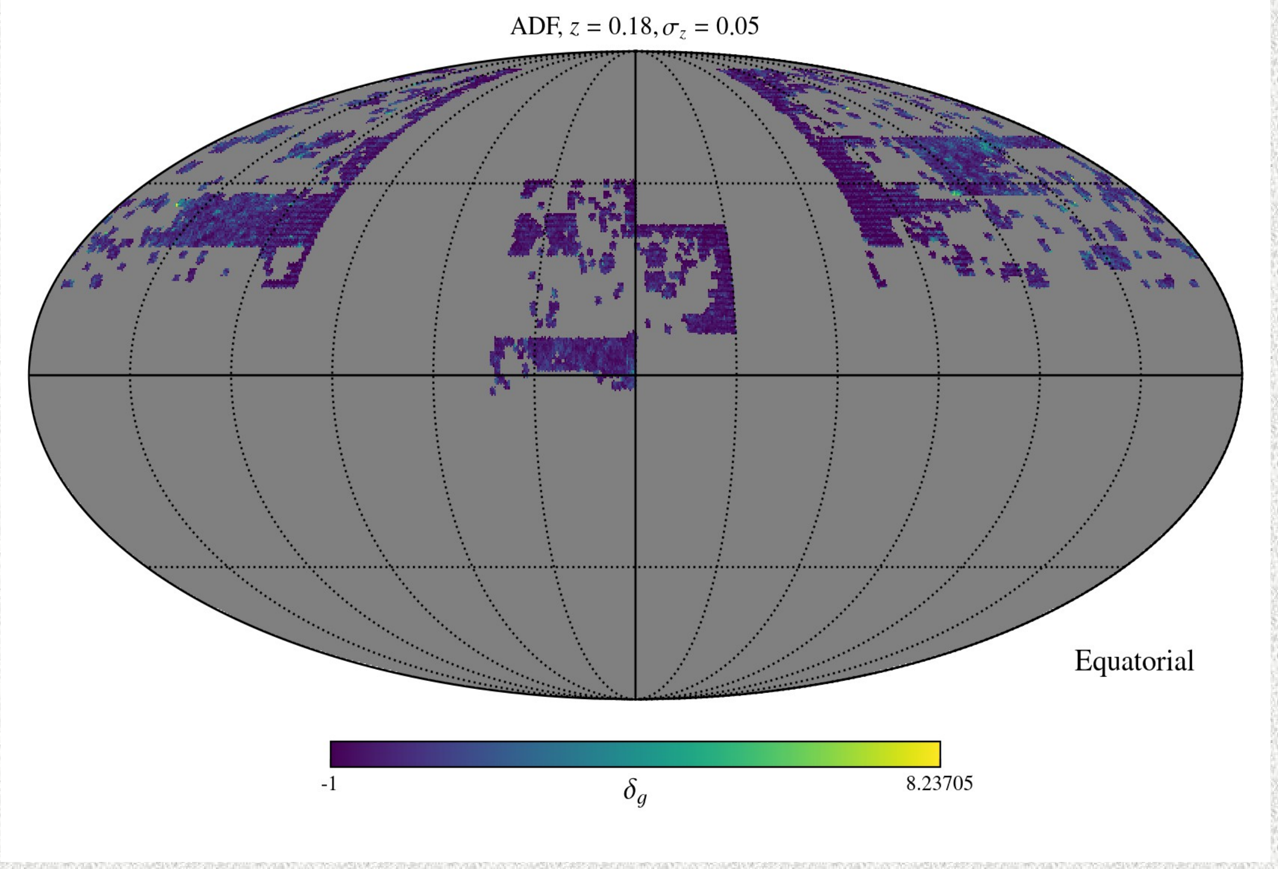
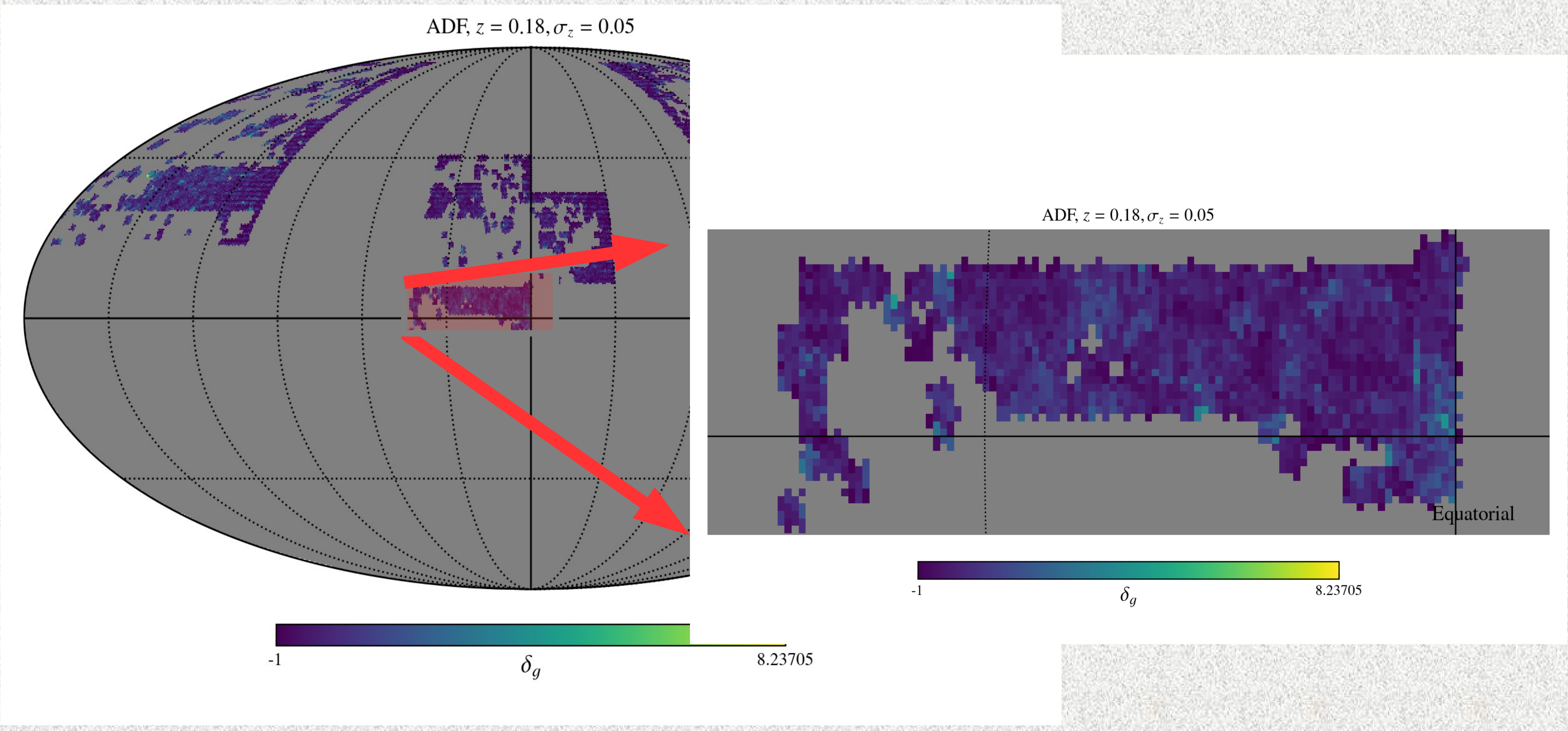
J-PLUS DR3 (preliminary LSS analyses)



Possibility of conducting **tomography ...**

J-PLUS DR3 (preliminary LSS analyses)



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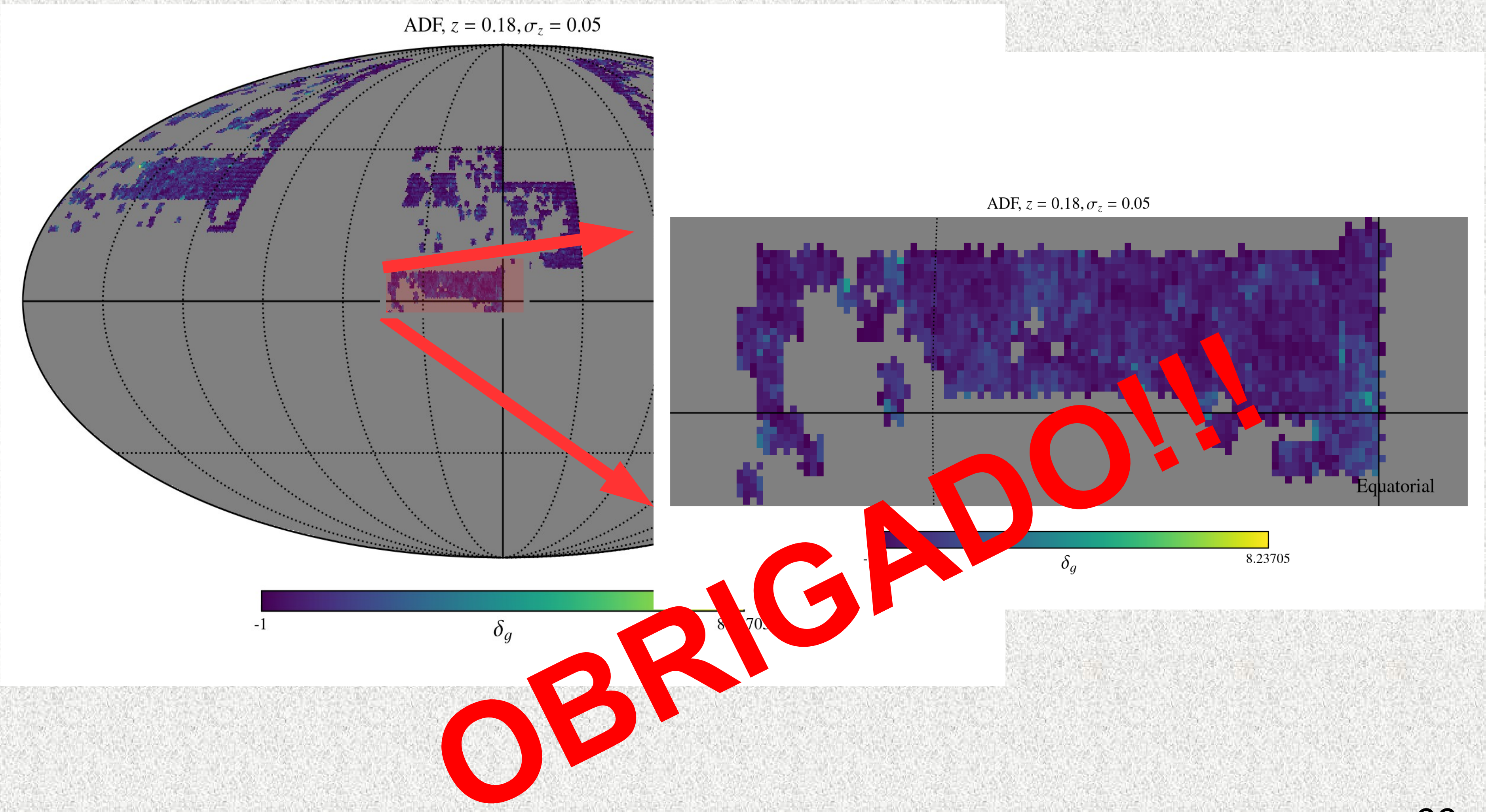


Cosmology experiments

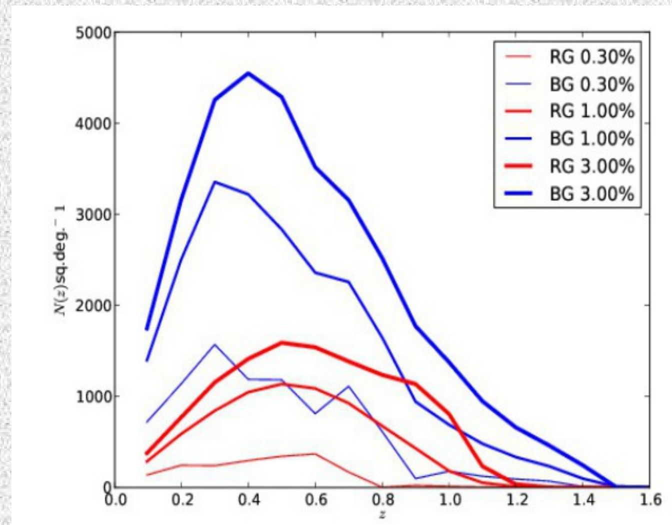


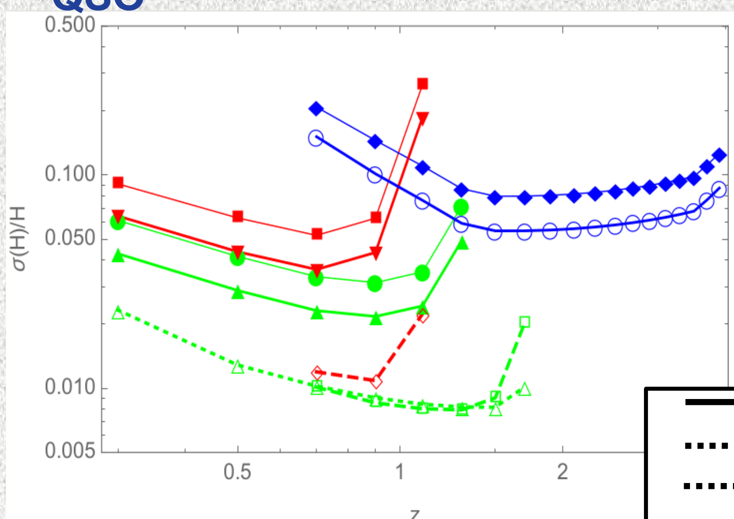
Photo-z error
Red
Blue
0.3%
17M
73M
1%
64M
200M

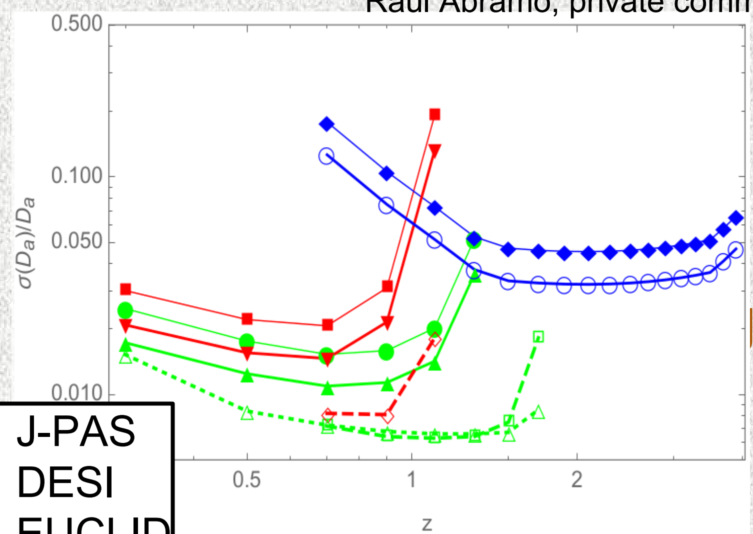
3% LRG ELG QSO 100 M 285M

Clustering

- 90M galaxies (LRG, ELG) with photo-z precision of 0.3%
- 2M QSOs
- ks LAE

Raul Abramo, private communication





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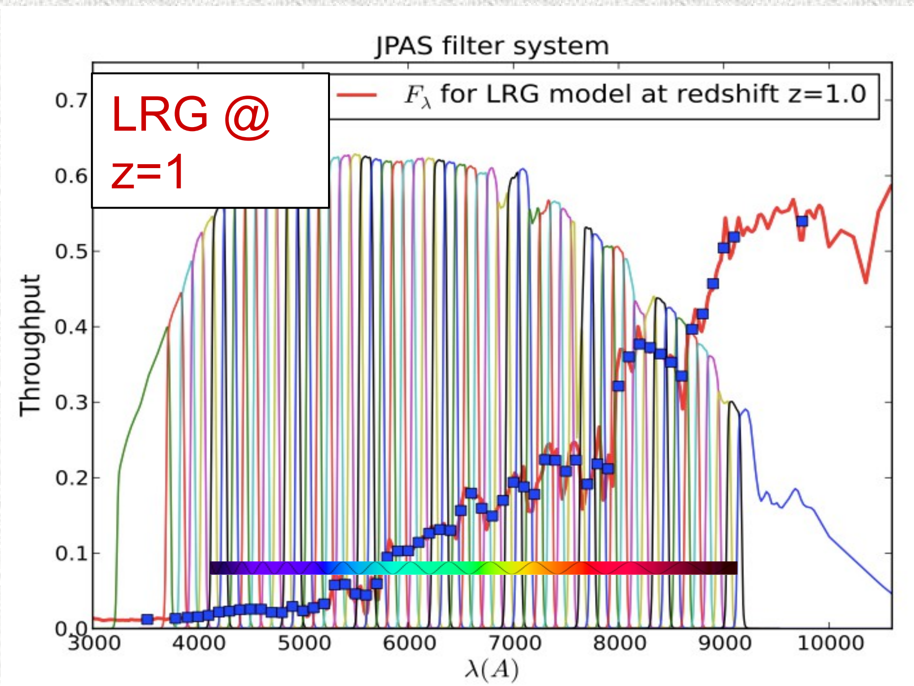
The filter system



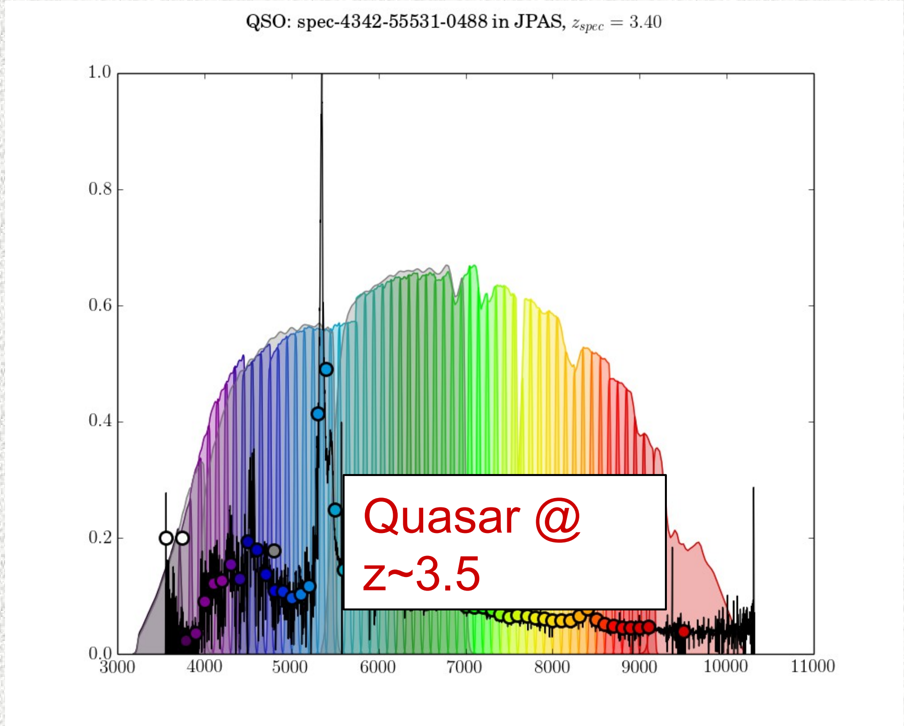
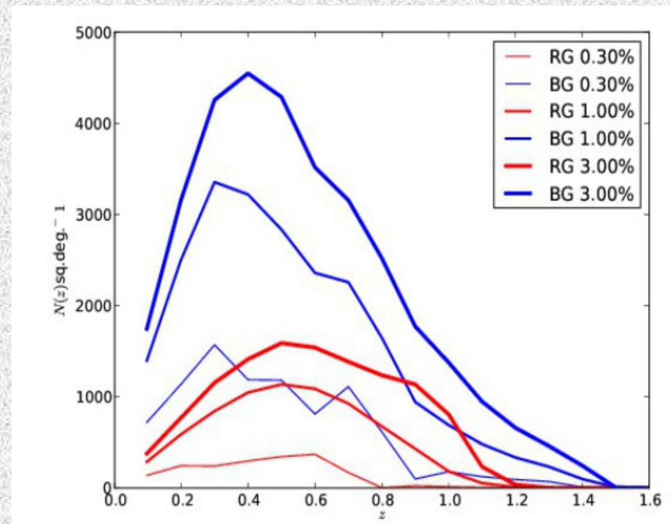


Photo-z precision as good as 0.003(1+z)

Cosmology experiments

Photo-z error
Red
Blue
0.3%
17M
73M
1%
64M
200M

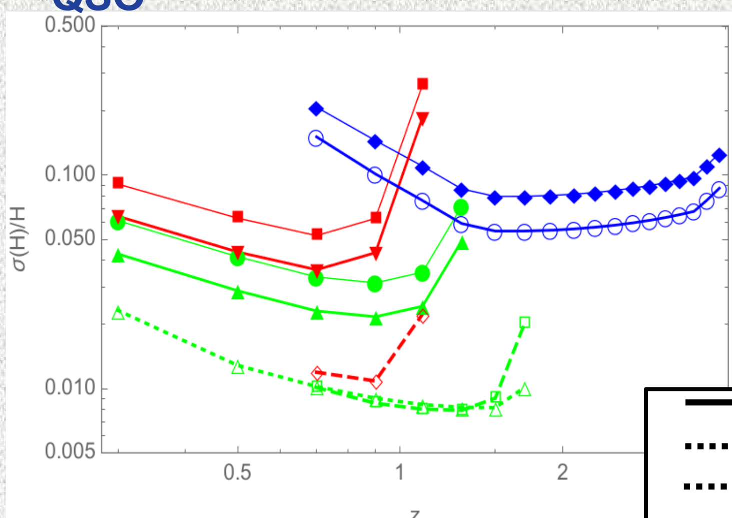


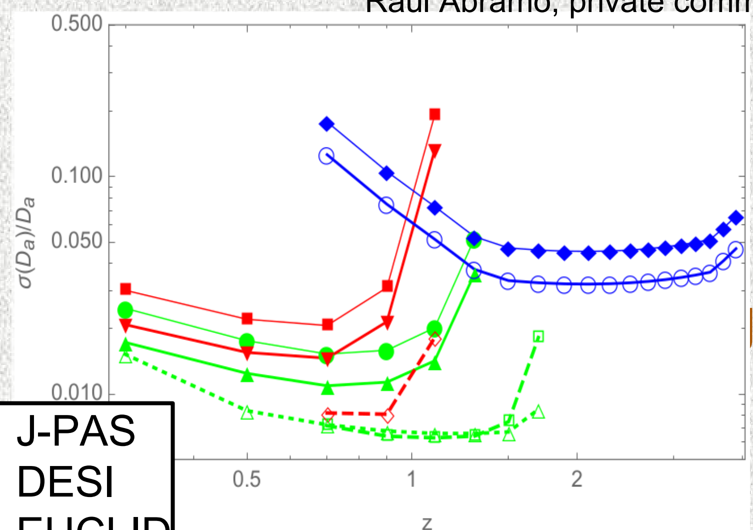
3%	LRG ELG QSO	100 M	285M

Clustering

- 90M galaxies (LRG, ELG) with photo-z precision of 0.3%
- 2M QSOs
- ks LAE

Raul Abramo, private communication





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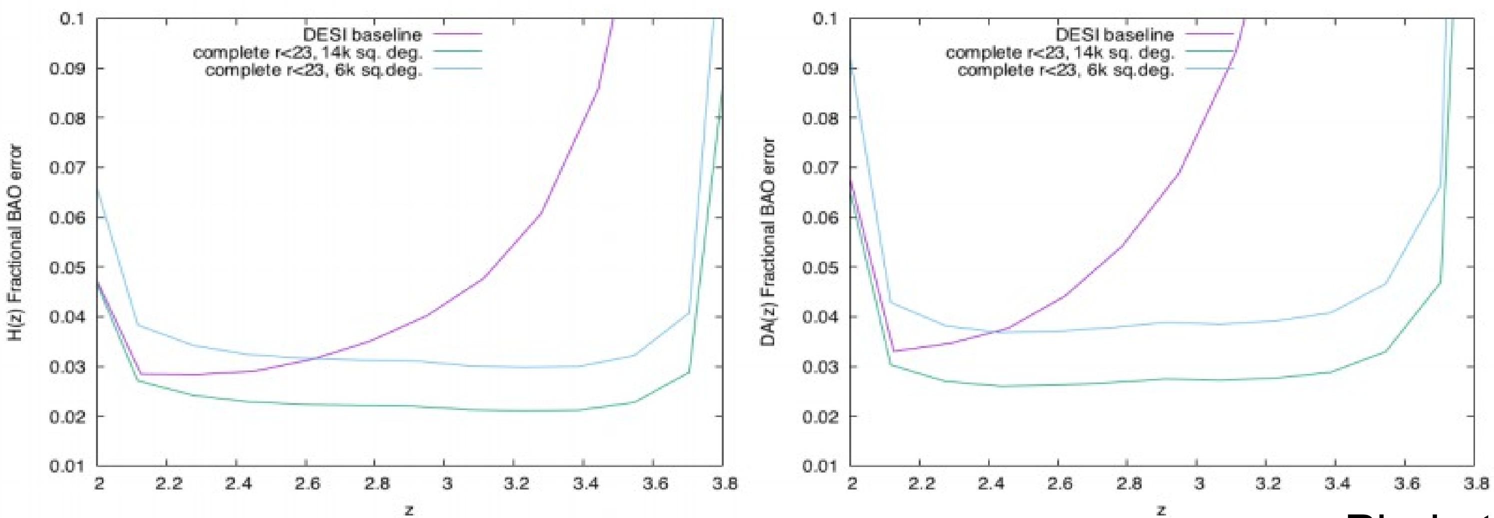
J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

Clustering

- 90M galaxies (LRG, ELG) with photo-z precision of 0.3%
- 2M QSOs
- ks LAE

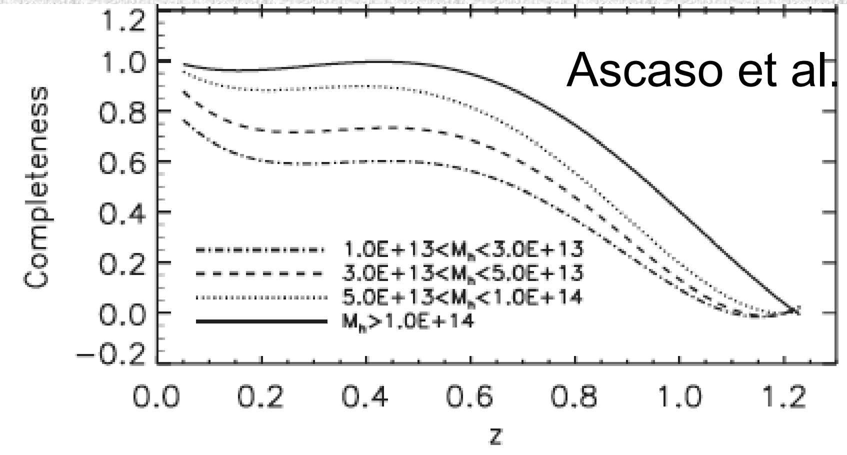
WEAVE-QSO survey: Follow-up of 0.5M QSOs at z>2.2



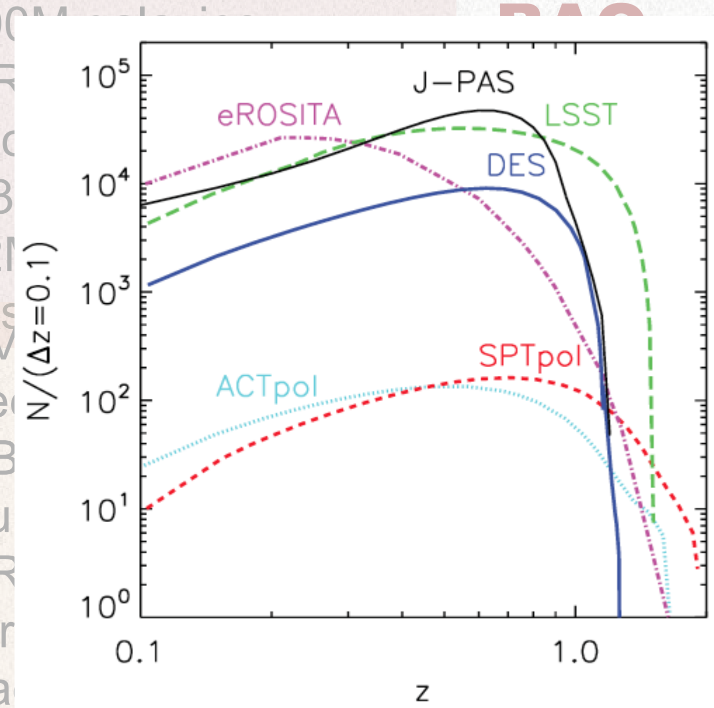
Pieri et al., 2016

Cosmology experiments

J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey



environment



Clusters

- 700k clusters with more than 10 members – down to ~few 10^{13} M_{sun}
- Combine lensing and optical richness for mass calibration

Synergy with eRosita (DE)

eROSITA

Time-line for J-PAS

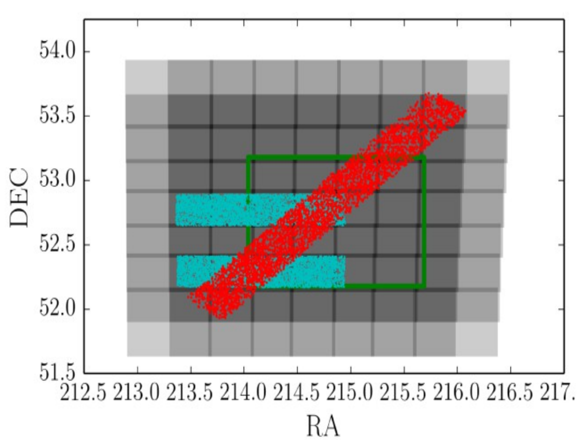
J-PAS
Javalambre Physics of the Accelerating Universe Astrophysical Survey

Current time-line:

- Early/Mid 2018: Running of **mini-JPAS** - Final assembly and fine-tuning of JPCam

- Mid/End 2018: Coating of the T250 mirror

- Beginning 2019: Installation of JPCam and **Start of J-PAS**



mini-JPAS (~1 deg2 at full-depth with all the filters on the AEGIS field)

Goals:
- telescope final testing (e.g., actuator system)
- data-reduction pipeline testing
- scientific-analysis pipelines testing
- first scientific results

Alternative strategies for J-PAS

We may consider redefinitions of the initial strategy, depending on whether our final science driver is **high redshift BAO measurement**, **cluster cosmology**, and/or **gravitational lensing**. Our leverage is given by:

1) Covering initially the sky with a subset of red/blue trays
2) Adopting first a shallow but faster survey
3) Once most urgent scientific goals have been addressed, complete the survey with further exposures and remaining trays .