More on catalog cross-matches

O. Perdereau

IJCLab, CNRS/IN2P3, Université Paris-Saclay, Orsay, France

Tianlai zoom
February 14th, 2023

Reminder of catalogs I used

I used two galaxy catalogs

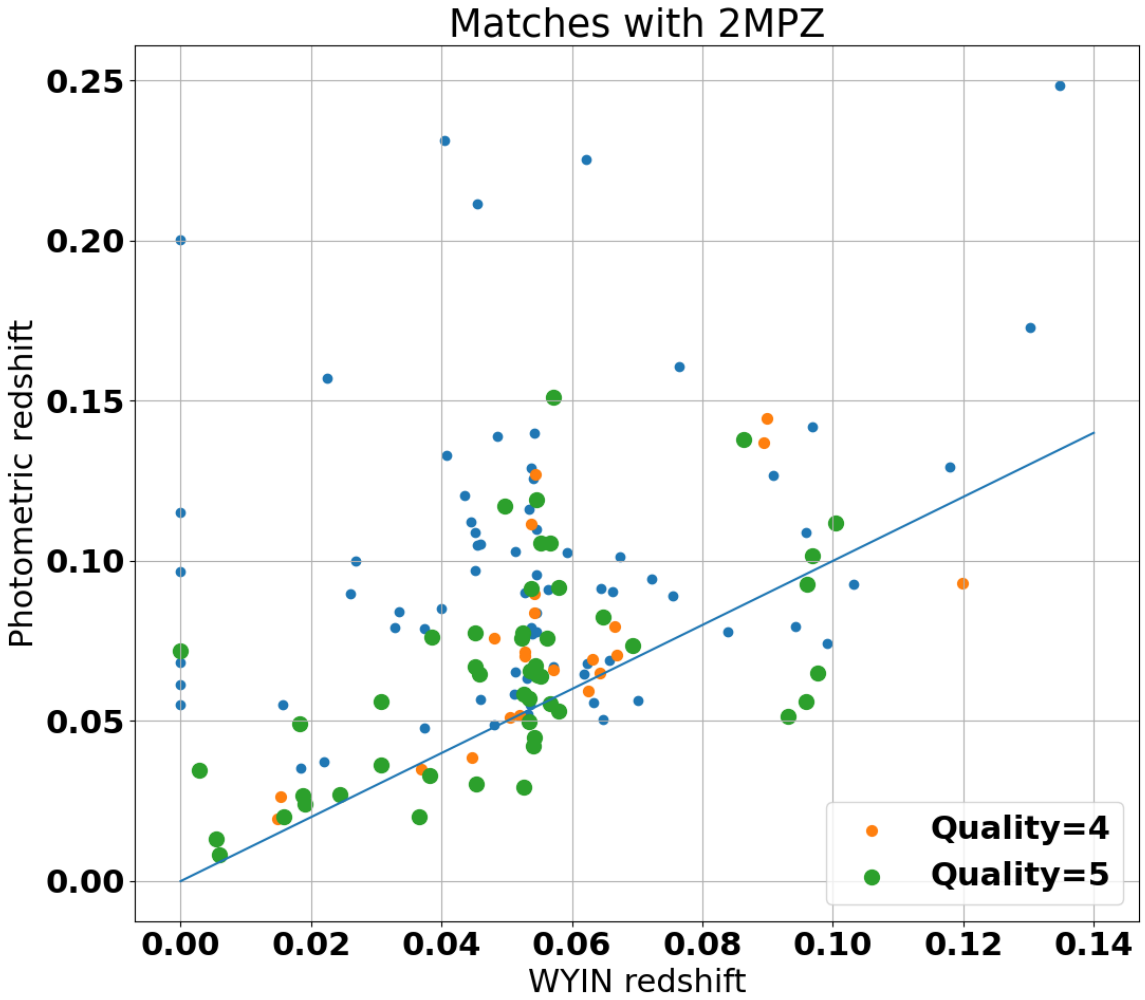
- 2mass photometric redshift (aka 2MPZ) catalog
- "super-cosmos X wise" (with $z_{photo} < 0.15$) (aka SCOS)

And

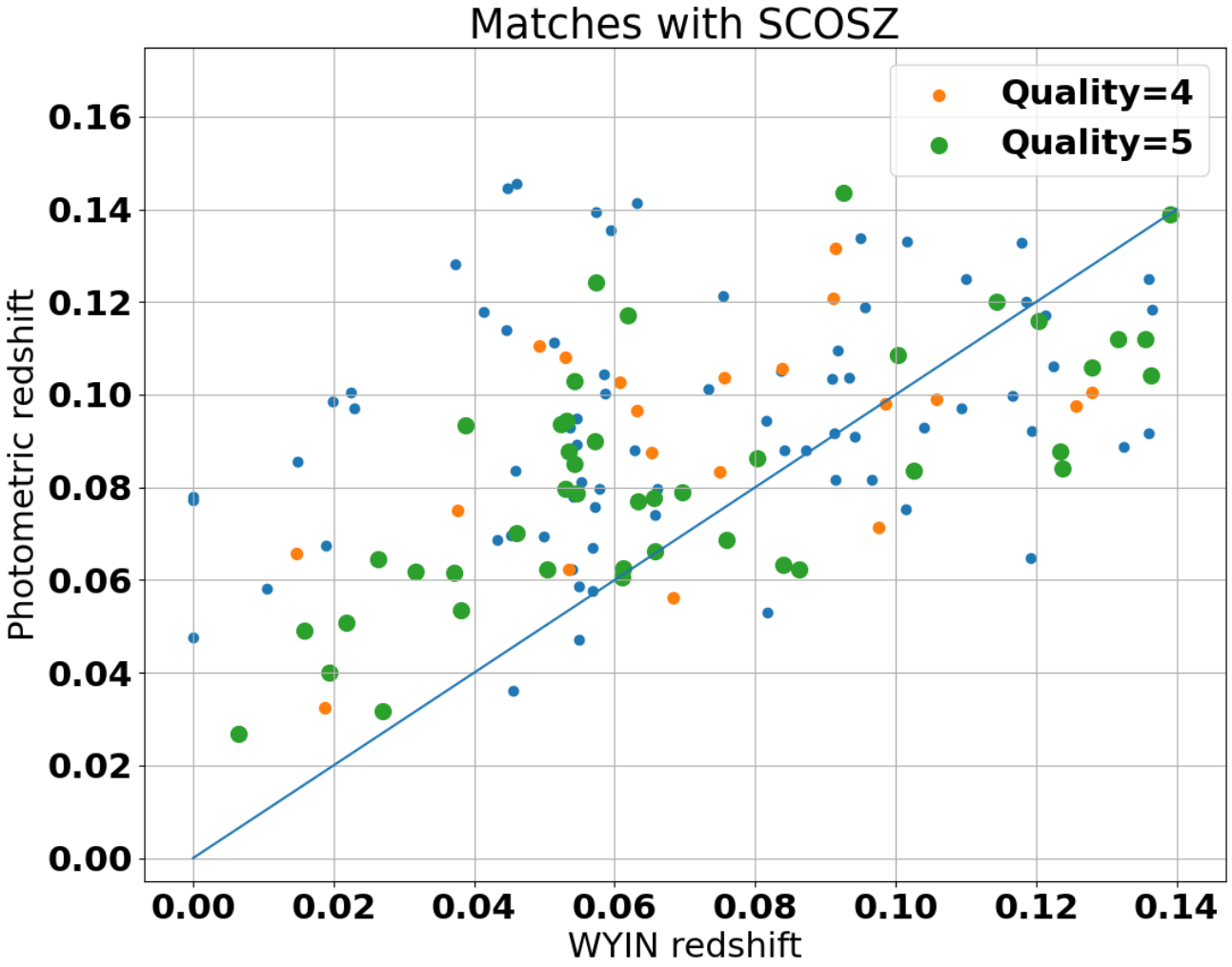
- the last version (v4) of our redshift catalog (used last time)
  reminder from John : z=0 means stars, use Quality flag
- the NCCS (cleaned) catalog (V<= 18.5)
- A GAIA-based catalog (DR3)

"good" matches : distance < 1 arcsec

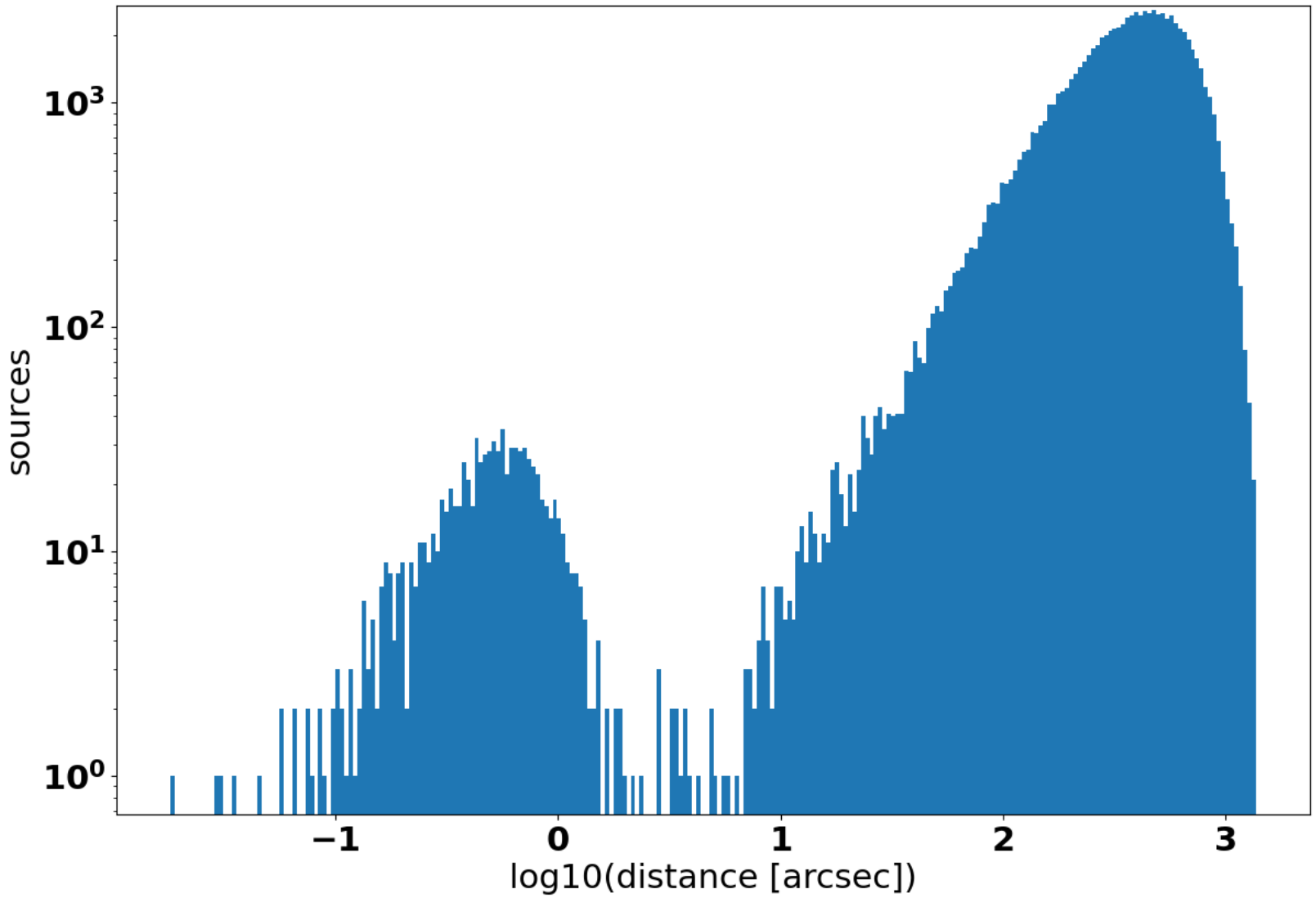
More redshifts comparision



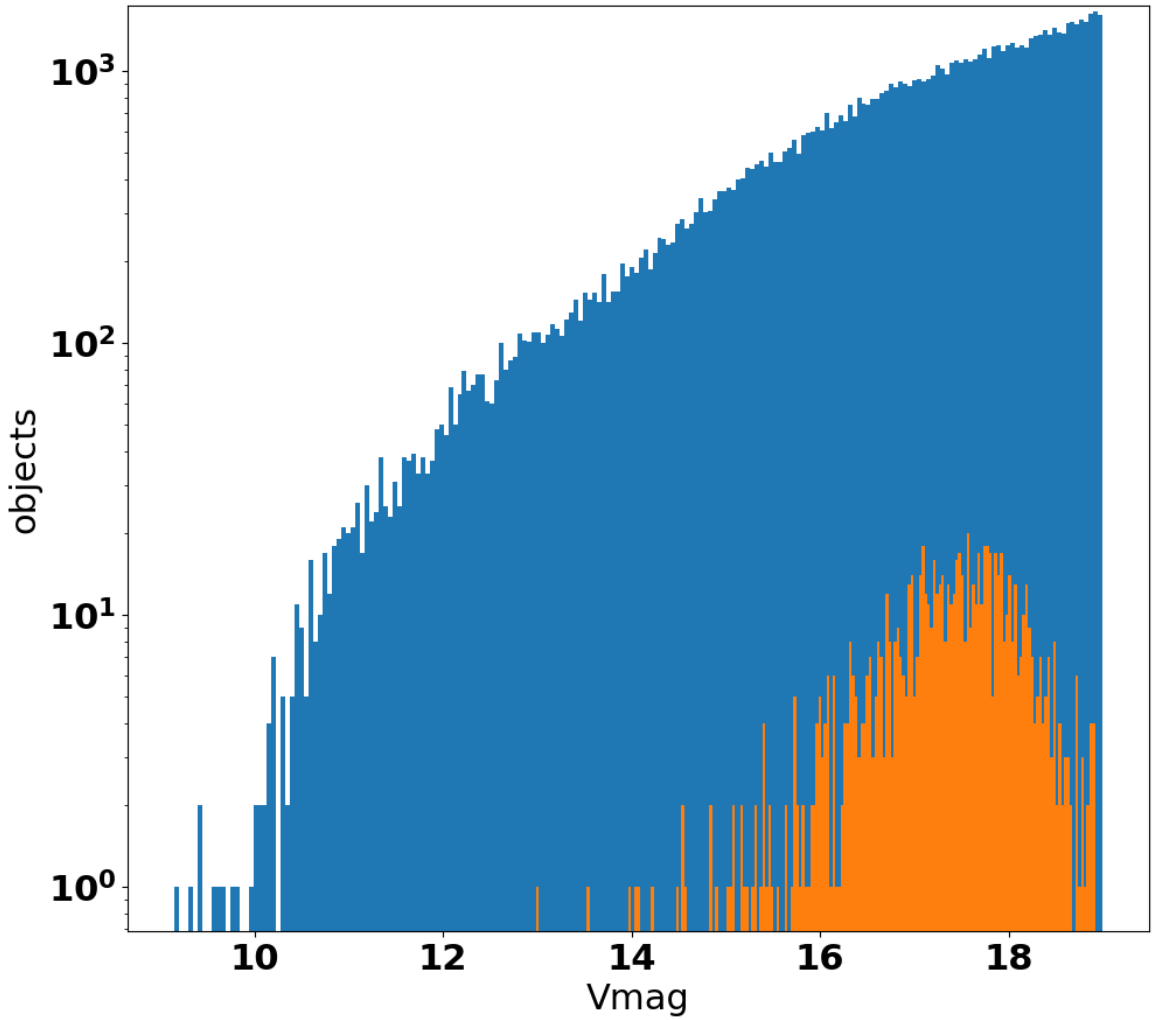
More redshifts comparision



NCCS x 2MPZ match : distances

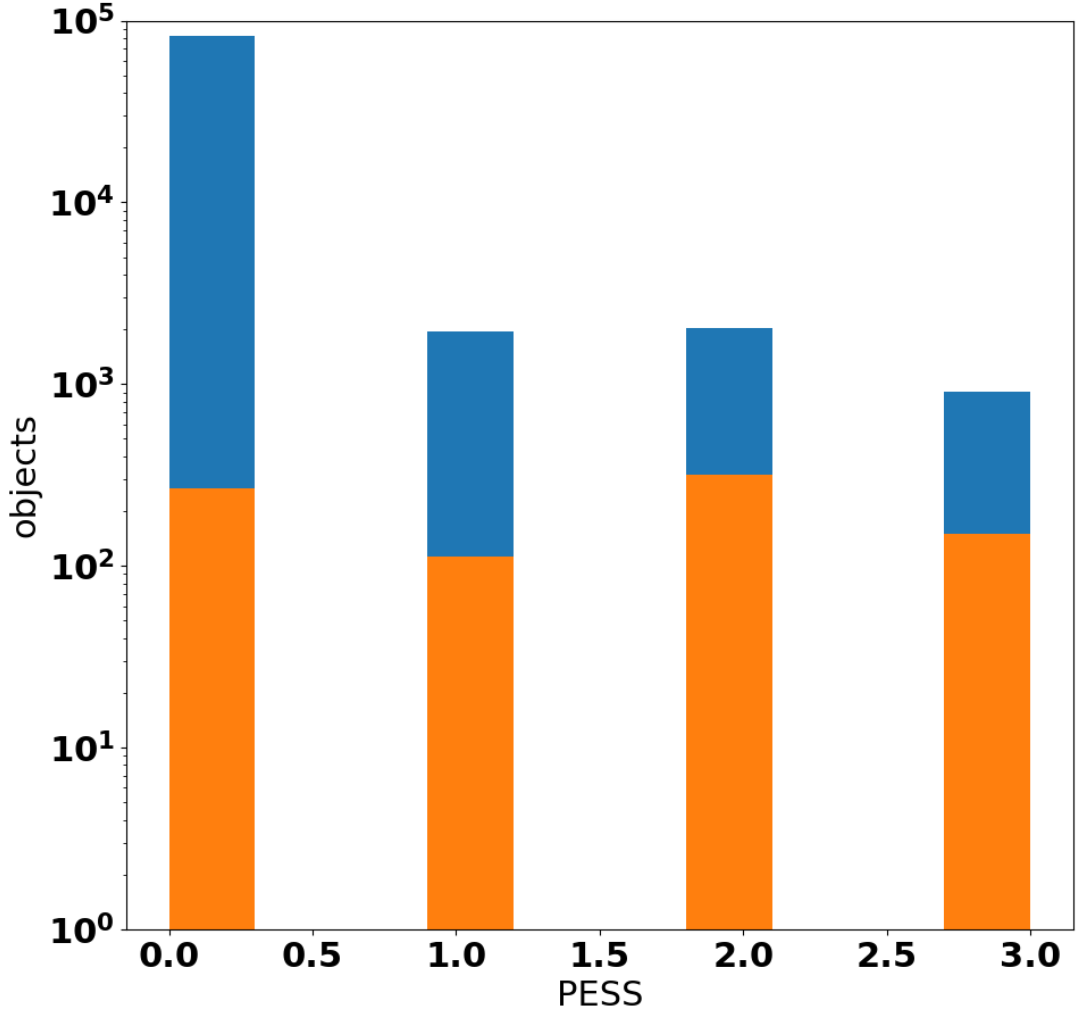


NCCS x 2MPZ matches : V magnitudes



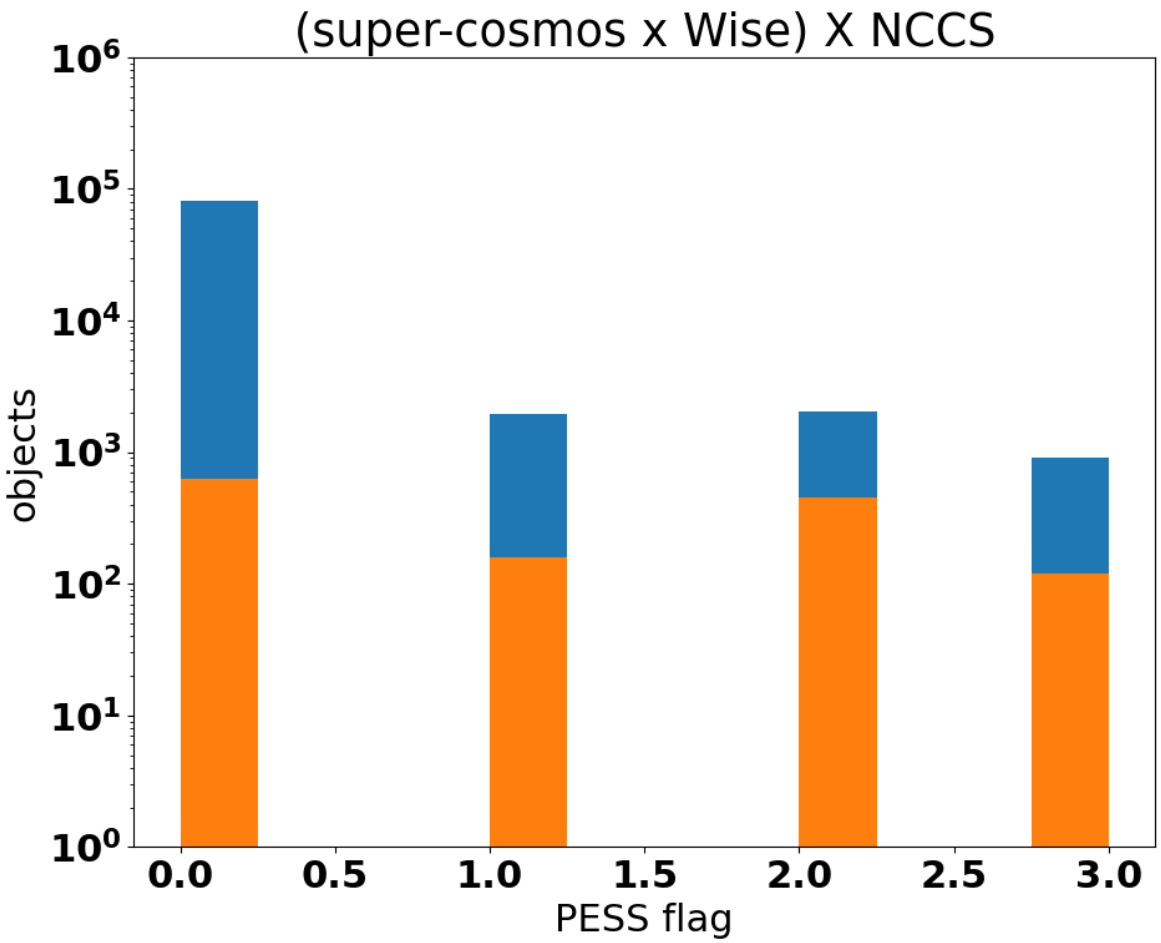
(blue = all, orange = matches)

NCCS x 2MPZ matches : PESS scores



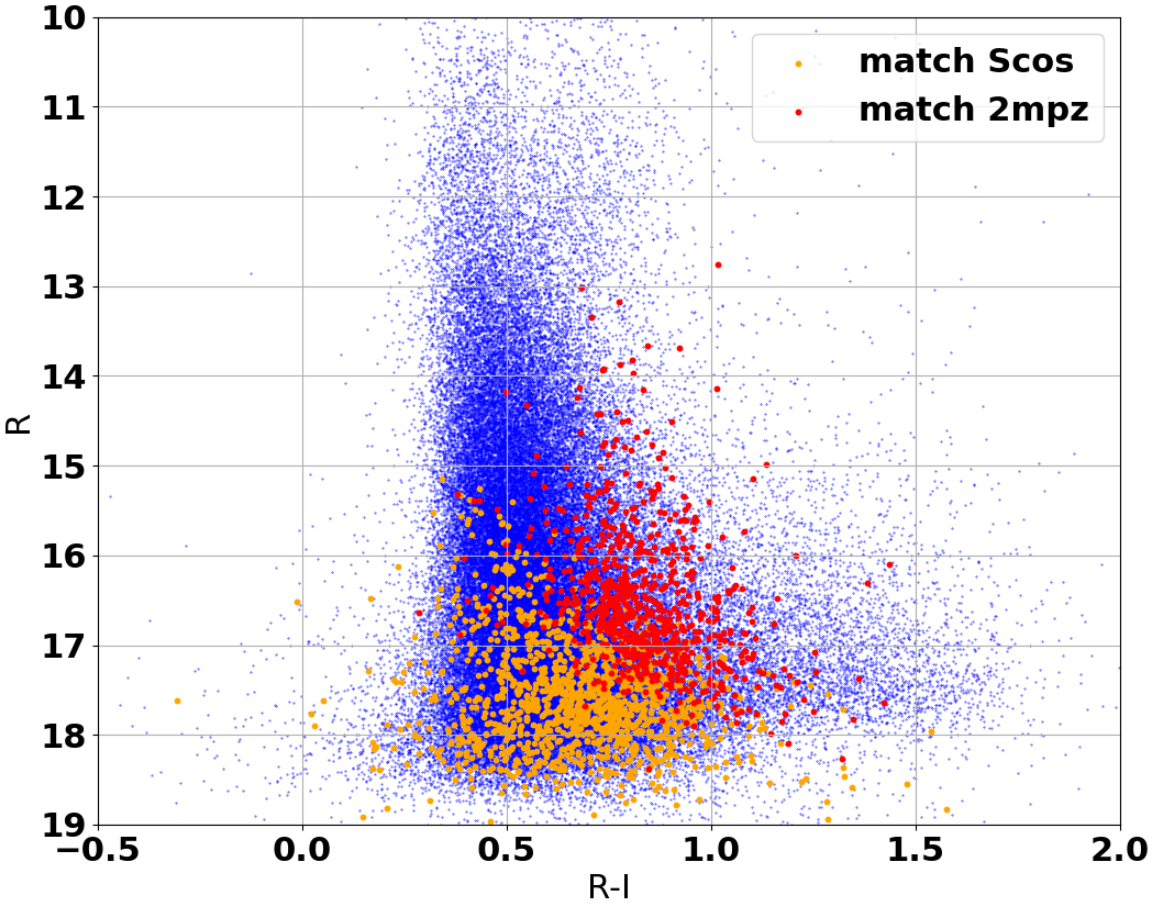
(blue = all, orange = matches)

NCCS x SCOS matches : PESS scores



(blue = all, orange = matches)

NCCS matches : CM diagram



GAIA object catalog

sub-set of GAIA catalog selected using SQL-like selection in GAIA DR3 archive

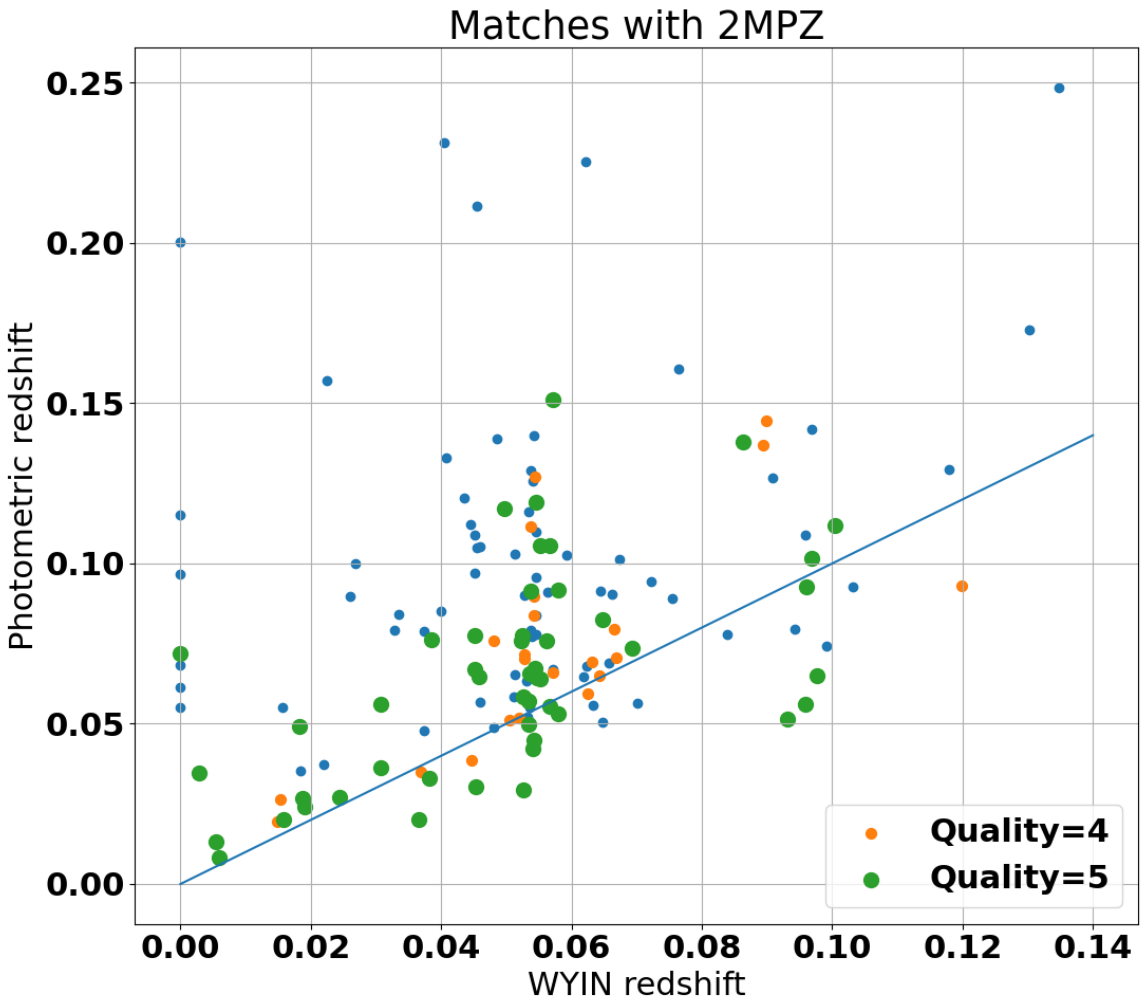
- gives some photometric info and parallax and proper motion
- I assume that if parallax present object should be a star

Results

- 2MPZ :
  - 6461 objects in polar cap i.e. $\delta > 80\,\mathrm{deg}$
  - 5745 have a GAIA object closer than 1 arcsec (matched)
  - 5061 matched in GAIA (dist < 1") and no parallax (11%)
- SCOS :
  - 3085 objects in polar cap i.e. $\delta > 80\,\mathrm{deg}$
  - 1160 have a GAIA object closer than 1 arcsec
  - 673 matched in GAIA (dist < 1") and no parallax (22%)
- NCCS ($\delta \geq 86\,\mathrm{deg}$ and V<18.5)
  - 2206 objects with have PESS =3
  - 687 objects with PESS=3 matched in GAIA
  - 466 objects with PESS=3 matched in GAIA with no parallax (21%)

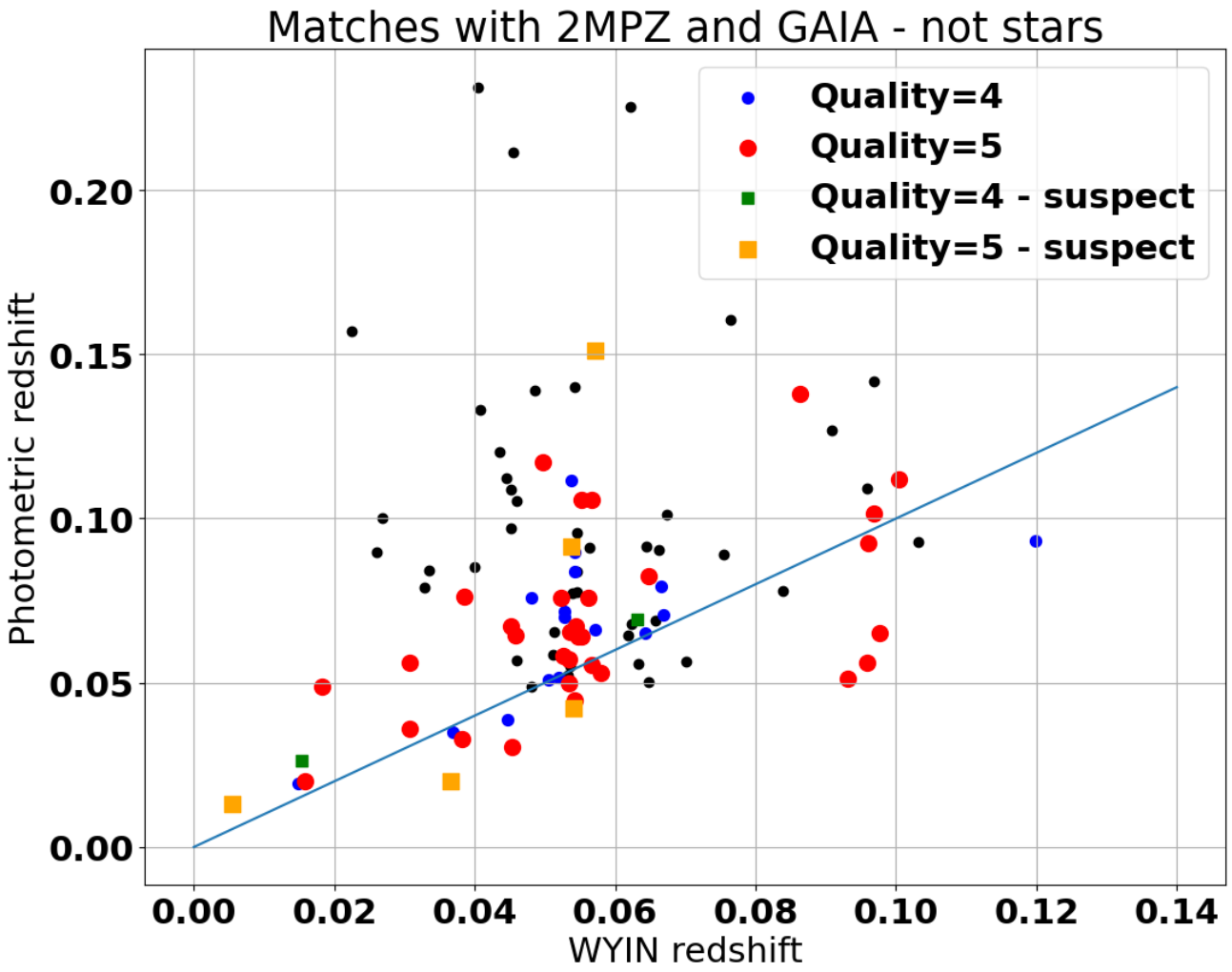
Redshifts comparision for non star objects

Non star : $z_{WYIN} > 0$ and matched with gaia object w/o parallax
Suspect : $z_{WYIN} > 0$ and matched with gaia object with parallax



Redshifts comparision for non star objects

Non star : $z_{WYIN} > 0$ and matched with gaia object w/o parallax
Suspect : $z_{WYIN} > 0$ and matched with gaia object with parallax



Current summary stats

In our 2801 objects 589 have a redshift (i.e. 21%).
In those :

Category	All	Quality ≥ 3	$dist_{GAIA} \leq 1''$	$dist_{GAIA} \leq 1''$ with parallax
star ($z_{WYIN} = 0$)	70	51	30	26
galaxy ($z_{WYIN} > 0$)	519	362	132	15
star/gal.	13%	14%	23%	173 %

Some conclusions

- 2MPZ or SCOSZ objects (galaxies ?) matched in NCCS :
  - red and faint (R>16.5) (but maybe not too faint for WIYN ?)
  - SCOSZ objects are fainter
  - @MPZ or SCOSZ galaxies no well identified by PESS ?
- using GAIA :
  - in NCCS PESS =3 objects : 31% matched in GAIA , 21% matched in GAIA w/o parallax
  - 2MPZ objects : ∼ 89% are matched in GAIA, 78% are matched w/o parallax
  - SCOSZ : less matches with GAIA :31%, 21% matches w/o parallax
- using 2MPZ sources + matching with GAIA could improve spectroscopy efficiency

Some data (csv files)

2MPZ selection :
https://box.in2p3.fr/index.php/s/x3Dxgwz3C5MY8yb
SCOS selection :
https://box.in2p3.fr/index.php/s/iqMnceqeHLmcmaD
GAIA selection :
https://box.in2p3.fr/index.php/s/CXanpcmmCLDr5iF
enlarged WIYN summary
https://box.in2p3.fr/index.php/s/f2mQqM6bp58YpPM

New fields in summary

name	meaning
twomassID_mpz	nearest 2MPZ ID in twomass
wiseID_mpz	nearest 2MPZ ID in wise
scosID_mpz	nearest 2MPZ ID in SCOS
dist_mpz	distance (degrees) to the nearest 2MPZ object
zSpec_2mpz	spectroscopic *z* in 2MPZ (-999 if not)
zPhoto_mpz	photometric *z* in 2MPZ
wiseID_scz	nearest SCOSZ ID in Wise
scosID_scz	nearest SCOSZ ID in SCOS
dist_scz	distance (degrees) to nearest in SCOSZ
zPhoto_scz	photometric *z* in SCOSZ
gaia_sep	distance to nearest GAIA obj (arcsec)
gaia_pm	GAIA proper motion (milliarcsec)
gaia_para	GAIA parallax (milliarcsec)
gaia_id	GAIA ID

For details :
http://ssa.roe.ac.uk/www/TWOMPZ_TABLE_twompzPhotozSchema.html#twompzPhotoz
http://ssa.roe.ac.uk/www/WISExSCOSPZ_TABLE_wiseScosPhotozSchema.html#wiseScosPhotoz