The COSMOS2015 catalogue

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1 Abstract

This document describes the COSMOS2015 catalogue which contains precise photometric redshifts and stellar masses for more than half a million objects over the 2 deg^2 COSMOS field. Including $YJHK_s$ images from the UltraVISTA-DR2 survey, Y-band from Subaru/Hyper-Suprime-Cam and infrared data from SPLASH Spitzer legacy program, this near-infrared selected catalogue is highly optimised for the study of galaxy evolution and environments in the early Universe.

1.1 Acknowledging this catalogue

If you use this catalog, please cite the following paper: "The COSMOS2015 catalog: exploring the $1 < z < 6$ universe with half a million galaxies" (Laigle et al. 2016, ApJS, 224, 24)

You must also include the following standard acknowledgement:

"Based on data products from observations made with ESO Telescopes at the La Silla Paranal Observatory under ESO programme ID 179.A-2005 and on data products produced by TERAPIX and the Cambridge Astronomy Survey Unit on behalf of the UltraVISTA consortium."

You are additionally encouraged to cite the papers representing the data included in the catalogue (such as McCracken et al. 2012 for UltraVISTA); see Laigle et al. (2016).

2 Context and changes with respect to the published catalogue

As stated in Laigle et al. (2016), the catalogue was initially made available via anonymous ftp[1], with the aim of adding additional distribution channels, such as ESO's Phase 3, which is what this document concerns. Since the catalogue includes photometry in $YJHK_s$ from the UltraVISTA DR2 images, ESO has given this catalogue release a release number of 2.1 (i.e. DR2.1) in the UltraVISTA Phase 3 collection. This DR2.1 catalogue release supplements rather than supersedes the DR2 image release.

With respect to the catalogue made available via anonymous ftp, some noteworthy changes are:

- Some column names were changed: the dot in `FLUX_XMM_0.5_2`, `FLUX_CHANDRA_0.5_2` and `FLUX_CHANDRA_0.5_10` was removed, `OFFSET` was changed to `OFFSET_MAG`, and an underscore was inserted in the 11 absolute magnitude columns, now called `M_NUV`, `M_U`, ..., `M_K`.
- The original catalogue used different real numbers to indicate bad or missing data; e.g. -99.9 for fluxes, magnitudes and their errors, 99 additionally for the ISO and AUTO magnitudes and their errors, -99.9, -99 or 9.99 for `PHOTOZ`, and -999 for e.g. `SFR_BEST` and `MASS_BEST`. To follow the Phase 3 standard all these real-valued "NULL values" were changed to the correct NULL value of NaN (not a number).
- It was discovered that a small fraction of the absolute magnitudes were wrong (in the interval $\sim [-105, -90]$), and these were set to NaN. This concerns about 2% of the `M_NUV` values and 0.1% of the values in the 10 other absolute magnitude columns (`M_U`, ..., `M_K`). The 3 log luminosity columns (`L_NU`, `L_R`, `L_K`) do not have this problem.
- Negative (i.e. unphysical) values of the 50% flux radius column (`FLUX_RADIUS`) were set to NaN.
- 17 likely fake objects with `ALPHA_J2000` > 150.887 (all having no data in the 5 bands used to construct the detection image) were "removed" by seetting `ALPHA_J2000` and `DELTA_J2000` to NaN (thus keeping the number of rows and their order unchanged).
- UCDs (unified content descriptors) were added to the header for all columns. The UCDs describe the columns using a standardised vocabulary[2]. The UCDs can be seen in the header doing e.g. `dfits -x 1 ADP*.fits` or viewed online in the ESO catalogue facility at `http://www.eso.org/qi/`
- Units were already present for most columns, but units for a few extra columns were added. The units can be viewed in the same way as the UCDs.
- Descriptions (comments) were added in the header for all columns; these can also be seen in Sect. 3.2.
- The primary header was updated to comply with the Phase 3 standard.

The number of rows (1,182,108) and the number of columns (536) was not changed.

[1] `ftp://ftp.iap.fr/pub/from_users/hjmcc/COSMOS2015/`

[2] e.g. `http://www.ivoa.net/documents/REC/UCD/UCDlist-20070402.html`

3 Release Content

We present a catalogue containing photometry and physical parameters for more than half a million objects over the $2\,\mathrm{deg}^2$ COSMOS field. This catalogue is largely identical to the one which has already been presented in Laigle et al. (2016). It has been reformatted by the UltraVISTA consortium to comply with ESO's Phase 3 requirements (cf. Sect. 2). The catalogue contains in total 536 columns together with 1,182,108 rows. The number "half a million" is mentioned since the number of objects with the "best" data is 536,077; these objects are selected using these flags:

```
(FLAG_HJMCC==0) & (FLAG_COSMOS==1) & (FLAG_PETER==0)
```

(see also Sect. 3.1).

The photometry has been extracted from PSF-homogenised COSMOS optical near-infrared data and infrared data. Each near-infrared and optical band has been convolved so the final seeing (measured using a fit to a Moffat profile) corresponds to $0.8''$. Sources are selected from a chi-squared sum of the optical $z{+}{+}$ (zpp) band (SuprimeCam) and the 4 NIR $YJHK$s bands (UltraVISTA-DR2). This ensures that the catalogue contains both redder and bluer objects. It contains the NIR photometric data obtained at the ESO-VISTA telescope by the UltraVista collaboration, as processed at IAP-TERAPIX and made publicly available, the imaging data publicly available from the COSMOS collaboration including Subaru and CFHT, Y band taken with HSC Subaru, and the IR data taken with Spitzer as a part the SPLASH Spitzer legacy program. It contains also a match with the MIPS 24 um catalog. Physical parameters have been computed with Le Phare at Laboratoire d'Astrophysique de Marseille and have been calibrated using spectroscopic data. In order to compute photometric redshifts with this catalogue, some additional corrections have to be applied to the magnitudes provided here. They are fully described in Laigle et al. (2016).

We provide also the matches with ACS, X-Ray, UV, IR, FIR, Radio catalogs and previous versions of the multi-band catalogue on COSMOS field. When the photometry is not described in Laigle et al. (2016), the corresponding references are mentioned below. What follows in Sect. 3.1 is a description of each column taken from the README file distributed with the original catalogue. Additionaly, in Sect. 3.2 we provide a list of all the 536 columns (number, name, description).

3.1 Description of catalogue columns (from the README file)

```
#####################################################
0) object identification
#####################################################

#    name = 'NUMBER'

Right Ascension and Declination
#   name = 'ALPHA_J2000' ; unit = 'deg'
```

```
#   name = 'DELTA_J2000'; unit = 'deg'

Positions in pixels
#   name = 'X_IMAGE';
#   name = 'Y_IMAGE';
#   name = 'ERRX2_IMAGE'; variance on X_IMAGE
#   name = 'ERRY2_IMAGE'; variance on Y_IMAGE
#   name = 'ERRXY_IMAGE'; covariance of X_iMAGE,Y_IMAGE

######################################################
2) Regions Flags. see the Readme file COSMOS2015_Flags.pdf
for a full description of the regions.
######################################################

UltraVISTA area
#   name = 'FLAG_HJMCC'; 0: UltraVISTA area, >=1 out of UltraVISTA

UltraVISTA Ultra-deep stripes
#   name = 'FLAG_DEEP'; 1: Ultra-deep stripes, 0: deep stripes

COSMOS 2deg^2 area
#   name = 'FLAG_COSMOS'; 1: 2deg2 COSMOS area

Saturated objects and bad areas
#   name = 'FLAG_PETER'; 0: good area, >=1 masked in optical broad-bands (P. Capak)

######################################################
3) Galactic extinction (Schlegel et al. 1998) at the object position
######################################################

#   name = 'EBV';


######################################################
4) Photometry.
######################################################

Non-detection convention (unless otherwise specified) Flux, Fluxerr,
mag, magerr = NaN in a particular band: there is no data (or pixels are
flagged as saturated) in this band at this position.  Flux + Fluxerr
>0 and mag, magerr = NaN: flux is negative at this position,but flux
error is consistent.



#   name = 'FLUX_RADIUS'; radius enclosing 0.5 of the total flux (FLUX_AUTO)
```

```
#########################
A) Optical and NIR photometry
[# is the filter name. Below is the filter list:
CFHT: u
SuprimeCam: B V r ip zpp IB427 IB464 IA484 IB505 IA527 IB574
IA624 IA679 IA738 IA767 IB709 IB827 NB711 NB816
Hyper Suprime-Cam: yHSC (Y band)
UltraVISTA-DR2: Y,J,H,Ks
WIRCam: Hw (H),Ksw (Ks)]



Fluxes and Fluxes errors:
2 diameter apertures fluxes
#   name = #_FLUX_APER2';  unit = 'uJy'
#   name = #_FLUXERR_APER2'; unit = 'uJy'

3 diameter apertures fluxes
#   name = #_FLUX_APER3'; unit = 'uJy'
#   name = #_FLUXERR_APER3'; unit = 'uJy'

AB Magnitudes and Magnitudes errors:
2 diameter apertures magnitudes
#   name = #_MAG_APER2';  unit = 'mag'
#   name = #_MAGERR_APER2'; unit = 'mag'

3 diameter apertures magnitudes
#   name = #_MAG_APER3'; unit = 'mag'
#   name = #_MAGERR_APER3'; unit = 'mag'

automatic apertures magnitudes
#   name = #_MAG_AUTO';  unit = 'mag'
#   name = #_MAGERR_AUTO'; unit = 'mag'

Isophotal magnitudes
#   name = #_MAG_ISO';  unit = 'mag'
#   name = #_MAGERR_ISO';  unit = 'mag'

Flags from SExtractor
#   name = #_FLAGS';
 1  The object has neighbours, bright and close enough to
 significantly bias the MAG AUTO photometry,
 or bad pixels (more than 10% of the integrated area affected),
 2  The object was originally blended with another one,
 4 At least one pixel of the object is saturated (or very close to),
```

```
 8 The object is truncated (too close to an image boundary),
 16 Objects aperture data are incomplete or corrupted,
 32 Objects isophotal data are incomplete or corrupted,
 64 A memory overflow occurred during deblending,
 128 A memory overflow occurred during extraction.
#   name = #_IMAFLAGS_ISO'; Object flags indicating saturation


##########################
B) IRAC filters (# is the filter name: SPLASH_1 (ch1, 3.6um),
SPLASH_2 (ch2, 4.5um), SPLASH_3 (ch3, 5.8um), SPLASH_4 (ch4, 8.0um)):


fluxes and fluxes errors in a 3 aperture:
#   name = #_FLUX;  unit = 'uJy'
#   name = #_FLUX_ERR'; unit = 'uJy'

Magnitudes and Magnitudes errors in a 3 aperture:
#   name = #_MAG';  unit = 'mag'
#   name = #_MAGERR'; unit = 'mag'



##########################
C) MIPS 24 micrometer photometry (Match with the 24um catalog by 1")
(based on Le Floc'h 2009)

fluxes and fluxes errors:
#   name = FLUX_24;  unit = 'uJy'
#   name = FLUXERR_24'; unit = 'uJy'

Magnitudes and Magnitudes errors:
#   name = MAG_24';  unit = 'mag'
#   name = MAGERR_24'; unit = 'mag'

ID in the 24um catalog:
#   name = ID_A24';


##########################
D) PACS/PEP photometry (Lutz et al. 2011)
fluxes and fluxes errors 100um:
#   name = FLUX_100;  unit = 'mJy'
#   name = FLUXERR_100'; unit = 'mJy'

fluxes and fluxes errors 160um:
```

```
#   name = FLUX_160;  unit = 'mJy'
#   name = FLUXERR_160'; unit = 'mJy'


##########################
E) SPIRE/HERMES photometry (Oliver et al. 2012)
fluxes and fluxes errors 250um:
#   name = FLUX_250;  unit = 'mJy'
#   name = FLUXERR_250'; unit = 'mJy' (instrumental noise)
#   name = FLUXERRTOT_250'; unit = 'mJy' (total (inst+conf) noise)

fluxes and fluxes errors 350um:
#   name = FLUX_350;  unit = 'mJy'
#   name = FLUXERR_350'; unit = 'mJy' (instrumental noise)
#   name = FLUXERRTOT_350'; unit = 'mJy' (total (inst+conf) noise)

fluxes and fluxes errors 500um:
#   name = FLUX_500;  unit = 'mJy'
#   name = FLUXERR_500'; unit = 'mJy' (instrumental noise)
#   name = FLUXERRTOT_500'; unit = 'mJy' (total (inst+conf) noise)



##########################
F) GALEX photometry (Zamojski et al. 2007, Capak et al. 2007)

fluxes and fluxes errors FUV:
#   name = MAG_GALEX_FUV;  unit = 'mag
#   name = MAGERR_GALEX_FUV'; unit = 'mag
#   name = FLUX_GALEX_FUV;  unit = uJy'
#   name = FLUXERR_GALEX_FUV'; unit = uJy'

fluxes and fluxes errors NUV:
#   name = MAG_GALEX_NUV;  unit = 'mag
#   name = MAGERR_GALEX_NUV'; unit = 'mag
#   name = FLUX_GALEX_FUV;  unit = uJy'
#   name = FLUXERR_GALEX_FUV'; unit = uJy'


##########################
G) X-Ray photometry
nan value if there is no corresponding object in the matched catalog.

match from the new Chandra COSMOS catalog (Civano et al. 2016, Marchesi et al. 2016):
The match is described in Laigle et al. 2016.
#   name = 'ID_CHANDRA16'; format = '9A'
```

```
fluxes and fluxes errors from the previous Chandra COSMOS catalog (Elvis et al. 2009)
#   name = 'ID_CHANDRA09'; format = 'J'; null = -2147483648
#   name = 'FLUX_CHANDRA_05_2; format = 'D'; unit = 'erg/cm2/s' (0.5-2 keV band flux)
#   name = 'FLUX_CHANDRA_2_10'; format = 'D'; unit = 'erg/cm2/s' (2-10 keV band flux)
#   name = 'FLUX_CHANDRA_05_10'; format = 'D'; unit = 'erg/cm2/s'(0.5-10 keV band flux)

fluxes and fluxes errors from XMM/Newton (Cappelluti et al. 2009):
#   name = 'ID_XMM'; format = 'J'; null = -2147483648
#   name = 'FLUX_XMM_05_2; format = 'E' (0.2-2 keV band flux)
#   name = 'FLUX_XMM_2_10'; format = 'E' (2-10 keV band flux)
#   name = 'FLUX_XMM_5_10'; format = 'E' (5-10 keV band flux)
#   name = 'HARDNESS_XMM'; format = 'E' (hardness ratio)


fluxes and fluxes errors from Nustar (Civano et al. 2015):
#   name = 'ID_NUSTAR'; format = '20A'
#   name = 'FLUX_NUSTAR_3_24'; format = 'E' (3-24 keV band flux)
#   name = 'FLUXERR_NUSTAR_3_24; format = 'E' (3-24 keV band flux error)
#   name = 'FLUX_NUSTAR_3_8; format = 'E' (3-8 keV band flux)
#   name = 'FLUXERR_NUSTAR_3_8; format = 'E' (3-8 keV band flux error)
#   name = 'FLUX_NUSTAR_8_24'; format = 'E' (8-24 keV band flux)
#   name = 'FLUXERR_NUSTAR_8_24'; format = 'E' (8-24 keV band flux error)
#   name = 'HARDNESS_NUSTAR'; format = 'E' (hardness ratio)
#   name = 'HARDNESSLOW_NUSTAR'; format = 'E' (hardness ratio lower bound)
#   name = 'HARDNESSUP_NUSTAR'; format = 'E' (hardness ratio upper bound)
#   name = 'FLAG_XRAYBLEND'; format = 'I'; null = -32768 (flag for blended sources)


##########################
H) Match with the ACS catalog (Leauthaud et al. 2007)

fluxes and fluxes errors F814W:
#   name = FLUX_814W';  unit = 'mJy'
#   name = FLUXERR_814W'; unit = 'mJy'


##########################
I) Radio VLA photometry:
To do the match, 90cm catalog is merged with the 20cm catalog using a 6 radius.
The 20cm catalog to the optical catalog with a 2 radius.

fluxes and fluxes errors 20cm:

# name = FLUXPEAK_20CM'; unit = 'mJy' (peak flux of the radio source)
# name = FLUXPEAKERR_20CM'; unit = 'mJy' (rms uncertainty in the peak
```

```
    flux of the radio source)
# name = FLUXINT_20CM'; unit = 'mJy' (total integrated flux of the
    radio source)
# name = FLUXINTERR_20CM'; unit = 'mJy'(rms uncertainty total
    integrated flux of the radio source)
# name = RMSBKG_20CM'; unit = 'mJy' (measured local rms noise at the
    source position)



fluxes and fluxes errors 90cm:

# name = FLUXPEAK_90CM'; unit = 'mJy' (peak flux of the radio source)
# name = FLUXPEAKERR_90CM'; unit = 'mJy' (rms uncertainty in the peak
    flux of the radio source)
# name = FLUXINT_90CM'; unit = 'mJy' (total integrated flux of the
    radio source)
# name = FLUXINTERR_90CM'; unit = 'mJy' (rms uncertainty total
    integrated flux of the radio source)
# name = RMSBKG_90CM'; unit = 'mJy' (measured local rms noise at the
    source position)
name of the sources in VLA 90cm catalog
#   name = NAME_VLA90CM';
name of the sources in JVL Deep catalog
#   name = NAME_JVLDEEP';
name of the sources in JVL Large catalog
#   name = NAME_JVLLARGE';


#####################################################
5) Match with previous multi-band catalogs
#####################################################

1st version of the catalog from Capak et al. 2007
   name= 'ID2006'
2ndversion of the catalog from Capak et al. 2007
   name= 'ID2008'
catalog from Ilbert et al. 2013
   name= 'ID2013'



#####################################################
6) Main parameters computed with LePhare
derived using a method similar to Ilbert et al. (2009, 2013)
#####################################################
```

```
# name= 'OFFSET_MAG' (offset applied to the aperture magnitudes to obtain
  total quantities)
# name= 'PHOTOZ' (z= zPDF if galaxy [median of the likelihood
  distribution], z= 0 if star, z= NaN if Xray source based on Chandra
  (Civano program), z= NaN if masked area in flag_Capak)

# name= 'TYPE' (Given even in masked regions; type=0 if galaxy; type=1
   if star[mainly based on the chi2, only for objects detected in NIR
   or 3.6]; type=2 if Xray source; type=-9 if failure in the fit [most
   of these objects have less than 1 band])

##########################

Best fit obtained with the galaxy templates warning: every source has
a redshift, regardless of the type or if it is in a masked area or not

# name= 'ZPDF' (photo-z measured using the galaxy templates. Median of
   the likelihood distribution.)

# name= 'ZPDF_L68' (lower limit, 68% confidence level [a comparison
  photo-z/spec-z shows that these errors could be underestimated by a
  factor 0.1*I-0.8 at I>20 and 1.2 at I<20])

# name= 'ZPDF_U68' (upper limit, 68% confidence level [a comparison
 photo-z/spec-z shows that these errors could be underestimated by a
 factor 0.1*I-0.8 at I>20 and 1.2 at I<20]) name= 'ZMIN_CHI2' (photo-z
 measured using the galaxy templates.  Photo-z defines as the minimum
 of the chi2 distribution.)

#  name= 'CHI2_BEST' (reduced chi2 for zMinChi2)

# name= 'ZP_2' (second photo-z solution if a second peak is detected
  with P>5% in the PDF)

#  name= 'CHI2_2'    (reduced chi2 for the second photo-z solution)
#  name=  'NBFILT'   (Number of filters used in the fit)


##########################

Best fit obtained with the AGN templates, in LePhare standard
modality, but NOT optimised for Xray detected sources (no prior based
on morphology, no variability correction, etc.)  !!!! Warning: PLEASE
use photos from Marchesi et al 2016 for the Xray selected sources. This
mentioned paper revises also the counterparts, so it supersedes
```

```
Salvato+09, Salvato+11, Civano+11, and Brusa+10.

#  name= 'ZQ'          (photoz for the AGN library.)
#  name= 'CHIQ'        (reduced chi2 )
#  name=  'MODQ'       (best fit template)

##########################
Best fit obtained with the STAR templates

#  name= 'MODS'        (model for the star library)
#  name= 'CHIS'        (reduced chi2)


##########################
PHYSICAL PROPERTIES

derived from the BC03 best-fit templates at zPDF (Chabrier IMF;
cosmo:70,0.3,0.7; BC03 tau+delayed models described in Ilbert et
al. 2015).

##########################
Best fit BC03 model at zPDF
# name = 'MODEL'
# name = 'AGE'
# name = 'EXTINCTION'

##########################
Absolute magnitudes
# name = 'M_NUV'  NUV galex
# name = 'M_U'    u* CFHT
# name = 'M_B'    B  Subaru
# name = 'M_V'    V  Subaru
# name = 'M_R'    r+ Subaru
# name = 'M_I'    i+ Subaru
# name = 'M_Z'    z Subaru   (new filter)
# name = 'M_Y'    VISTA
# name = 'M_J'    VISTA
# name = 'M_H'    VISTA
# name = 'M_K'    VISTA

##########################
 Dust corrected color at zPDF
# name = 'MNUV_MR'   corrected from dust-extinction.

##########################
 Classification quiescent/star-forming
```

```
# name = 'CLASS'   0:quiescent/1:star-forming based on the NUV-R/R-J

#########################
 Mass
# name = 'MASS_MED'        log Stellar mass from BC03 best-fit template. median of the PDF
# name = 'MASS_MED_MIN68'  lower limit, 68% confidence level
# name = 'MASS_MED_MAX68'  upper limit, 68% confidence level
# name = 'MASS_BEST' log Stellar mass from BC03 best-fit
  template. Taken at the minimum chi2

#########################
SFR  !Warning: computed without IR, large uncertainties with such methods
# name = 'SFR_MED'         log SFR from BC03 best-fit template. median of the PDF
# name = 'SFR_MED_MIN68'   lower limit, 68% confidence level
# name = 'SFR_MED_MAX68'   upper limit, 68% confidence level
# name = 'SFR_BEST'        log SFR from BC03 best-fit template. Taken at the minimum chi2
# name = 'SSFR_MED'        log sSFR from BC03 best-fit template. median of the PDF
# name = 'SSFR_MED_MIN68'  lower limit, 68% confidence level
# name = 'SSFR_MED_MAX68'  upper limit, 68% confidence level
# name = 'SSFR_BEST'       log sSFR from BC03 best-fit template. Taken at the minimum chi2


#########################
 Luminosities
# name = 'L_NU'    log(dust corrected luminosity in erg/s/Hz) in NUV filter
# name = 'L_R'     log(dust corrected luminosity in erg/s/Hz) in r filter
# name = 'L_K'     log(dust corrected luminosity in erg/s/Hz) in K filter
```

3.2 Complete list of catalogue columns

The following is a list of column number, name and description. This information was derived from the original README file and from Laigle et al. (2016), with the small update that it has been noted that the 3 log luminosity columns (`L_NU`, `L_R`, `L_K`) are dust corrected (i.e. corrected for dust attenuation).

```
No. Name                Description
--------------------------------------------------------------------------------
  1 ALPHA_J2000         Right ascension of barycenter in decimal degrees (J2000)
  2 DELTA_J2000         Declination of barycenter in decimal degrees (J2000)
  3 NUMBER              Running object number
  4 X_IMAGE             Object position along x
  5 Y_IMAGE             Object position along y
  6 ERRX2_IMAGE         Variance of position along X
  7 ERRY2_IMAGE         Variance of position along Y
  8 ERRXY_IMAGE         Covariance of position X / Y
  9 FLAG_HJMCC          Bad region flag
```

```
10 FLUX_RADIUS         Radius of aperture containing half the flux of MAG_AUTO
11 KRON_RADIUS         Kron apertures in units of A or B
12 EBV                 Galactic reddening E(B-V) based on Schlegel et al (1998) dust maps
13 FLAG_PETER          Flag Saturated objects and bad areas
14 FLAG_COSMOS         1: 2deg2 COSMOS area
15 FLAG_DEEP           1: Ultra-deep stripes, 0: deep stripes
16 FLAG_SHALLOW        Shallow Flag
17 Ks_FLUX_APER2       Ks fixed aperture flux (2",AB) [detection image]
18 Ks_FLUXERR_APER2    Ks fixed aperture flux error (2",AB) [detection image]
19 Ks_FLUX_APER3       Ks fixed aperture flux (3",AB) [detection image]
20 Ks_FLUXERR_APER3    Ks fixed aperture flux error (3",AB) [detection image]
21 Ks_MAG_APER2        Ks fixed aperture magnitude (2",AB) [detection image]
22 Ks_MAGERR_APER2     Ks fixed aperture mag error (2",AB) [detection image]
23 Ks_MAG_APER3        Ks fixed aperture magnitude (3",AB) [detection image]
24 Ks_MAGERR_APER3     Ks fixed aperture mag error (3",AB) [detection image]
25 Ks_MAG_AUTO         Ks auto magnitude (AB) [detection image]
26 Ks_MAGERR_AUTO      Ks auto mag error (AB) [detection image]
27 Ks_MAG_ISO          Isophotal magnitude
28 Ks_MAGERR_ISO       rms uncertainty on magK
29 Ks_FLAGS            Internal Flag
30 Ks_IMAFLAGS_ISO     External Flag
31 Y_FLUX_APER2        Y fixed aperture flux (2",AB) [detection image]
32 Y_FLUXERR_APER2     Y fixed aperture flux error (2",AB) [detection image]
33 Y_FLUX_APER3        Y fixed aperture flux (3",AB) [detection image]
34 Y_FLUXERR_APER3     Y fixed aperture flux error (3",AB) [detection image]
35 Y_MAG_APER2         Y fixed aperture magnitude (2",AB)
36 Y_MAGERR_APER2      Y fixed aperture mag error (2",AB)
37 Y_MAG_APER3         Y fixed aperture magnitude (3",AB)
38 Y_MAGERR_APER3      Y fixed aperture mag error (3",AB)
39 Y_MAG_AUTO          Y auto magnitude (AB)
40 Y_MAGERR_AUTO       Y auto mag error (AB)
41 Y_MAG_ISO           Isophotal magnitude
42 Y_MAGERR_ISO        rms uncertainty on magY
43 Y_FLAGS             Internal Flag
44 Y_IMAFLAGS_ISO      External Flag
45 H_FLUX_APER2        H fixed aperture flux (2",AB) [detection image]
46 H_FLUXERR_APER2     H fixed aperture flux error (2",AB) [detection image]
47 H_FLUX_APER3        H fixed aperture flux (3",AB) [detection image]
48 H_FLUXERR_APER3     H fixed aperture flux error (3",AB) [detection image]
49 H_MAG_APER2         H fixed aperture magnitude (2",AB)
50 H_MAGERR_APER2      H fixed aperture mag error (2",AB)
51 H_MAG_APER3         H fixed aperture magnitude (3",AB)
52 H_MAGERR_APER3      H fixed aperture mag error (3",AB)
53 H_MAG_AUTO          H auto magnitude (AB)
54 H_MAGERR_AUTO       H auto mag error (AB)
55 H_MAG_ISO           Isophotal magnitude
```

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 56 H_MAGERR_ISO        rms uncertainty on magH
 57 H_FLAGS             Internal Flag
 58 H_IMAFLAGS_ISO      External Flag
 59 J_FLUX_APER2        J fixed aperture flux (2",AB) [detection image]
 60 J_FLUXERR_APER2     J fixed aperture flux error (2",AB) [detection image]
 61 J_FLUX_APER3        J fixed aperture flux (3",AB) [detection image]
 62 J_FLUXERR_APER3     J fixed aperture flux error (3",AB) [detection image]
 63 J_MAG_APER2         J fixed aperture magnitude (2",AB)
 64 J_MAGERR_APER2      J fixed aperture mag error (2",AB)
 65 J_MAG_APER3         J fixed aperture magnitude (3",AB)
 66 J_MAGERR_APER3      J fixed aperture mag error (3",AB)
 67 J_MAG_AUTO          J auto magnitude (AB)
 68 J_MAGERR_AUTO       J auto mag error (AB)
 69 J_MAG_ISO           Isophotal magnitude
 70 J_MAGERR_ISO        rms uncertainty on magJ
 71 J_FLAGS             Internal Flag
 72 J_IMAFLAGS_ISO      External Flag
 73 B_FLUX_APER2        B fixed aperture flux (2",AB) [detection image]
 74 B_FLUXERR_APER2     B fixed aperture flux error (2",AB) [detection image]
 75 B_FLUX_APER3        B fixed aperture flux (3",AB) [detection image]
 76 B_FLUXERR_APER3     B fixed aperture flux error (3",AB) [detection image]
 77 B_MAG_APER2         B fixed aperture magnitude (2",AB)
 78 B_MAGERR_APER2      B fixed aperture mag error (2",AB)
 79 B_MAG_APER3         B fixed aperture magnitude (3",AB)
 80 B_MAGERR_APER3      B fixed aperture mag error (3",AB)
 81 B_MAG_AUTO          B auto magnitude (AB)
 82 B_MAGERR_AUTO       B auto mag error (AB)
 83 B_MAG_ISO           Isophotal magnitude
 84 B_MAGERR_ISO        rms uncertainty on magB
 85 B_FLAGS             Internal Flag
 86 B_IMAFLAGS_ISO      External Flag
 87 V_FLUX_APER2        V fixed aperture flux (2",AB) [detection image]
 88 V_FLUXERR_APER2     V fixed aperture flux error (2",AB) [detection image]
 89 V_FLUX_APER3        V fixed aperture flux (3",AB) [detection image]
 90 V_FLUXERR_APER3     V fixed aperture flux error (3",AB) [detection image]
 91 V_MAG_APER2         V fixed aperture magnitude (2",AB)
 92 V_MAGERR_APER2      V fixed aperture mag error (2",AB)
 93 V_MAG_APER3         V fixed aperture magnitude (3",AB)
 94 V_MAGERR_APER3      V fixed aperture mag error (3",AB)
 95 V_MAG_AUTO          V auto magnitude (AB)
 96 V_MAGERR_AUTO       V auto mag error (AB)
 97 V_MAG_ISO           Isophotal magnitude
 98 V_MAGERR_ISO        rms uncertainty on magV
 99 V_FLAGS             Internal Flag
100 V_IMAFLAGS_ISO      External Flag
101 ip_FLUX_APER2       ip fixed aperture flux (2",AB) [detection image]
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102 ip_FLUXERR_APER2    ip fixed aperture flux error (2",AB) [detection image]
103 ip_FLUX_APER3       ip fixed aperture flux (3",AB) [detection image]
104 ip_FLUXERR_APER3    ip fixed aperture flux error (3",AB) [detection image]
105 ip_MAG_APER2        ip fixed aperture magnitude (2",AB)
106 ip_MAGERR_APER2     ip fixed aperture mag error (2",AB)
107 ip_MAG_APER3        ip fixed aperture magnitude (3",AB)
108 ip_MAGERR_APER3     ip fixed aperture mag error (3",AB)
109 ip_MAG_AUTO         ip auto magnitude (AB)
110 ip_MAGERR_AUTO      ip auto mag error (AB)
111 ip_MAG_ISO          Isophotal magnitude
112 ip_MAGERR_ISO       rms uncertainty on magIP
113 ip_FLAGS            Internal Flag
114 ip_IMAFLAGS_ISO     External Flag
115 r_FLUX_APER2        r fixed aperture flux (2",AB) [detection image]
116 r_FLUXERR_APER2     r fixed aperture flux error (2",AB) [detection image]
117 r_FLUX_APER3        r fixed aperture flux (3",AB) [detection image]
118 r_FLUXERR_APER3     r fixed aperture flux error (3",AB) [detection image]
119 r_MAG_APER2         r fixed aperture magnitude (2",AB)
120 r_MAGERR_APER2      r fixed aperture mag error (2",AB)
121 r_MAG_APER3         r fixed aperture magnitude (3",AB)
122 r_MAGERR_APER3      r fixed aperture mag error (3",AB)
123 r_MAG_AUTO          r auto magnitude (AB)
124 r_MAGERR_AUTO       r auto mag error (AB)
125 r_MAG_ISO           Isophotal magnitude
126 r_MAGERR_ISO        rms uncertainty on magr
127 r_FLAGS             Internal Flag
128 r_IMAFLAGS_ISO      External Flag
129 u_FLUX_APER2        u fixed aperture flux (2",AB) [detection image]
130 u_FLUXERR_APER2     u fixed aperture flux error (2",AB) [detection image]
131 u_FLUX_APER3        u fixed aperture flux (3",AB) [detection image]
132 u_FLUXERR_APER3     u fixed aperture flux error (3",AB) [detection image]
133 u_MAG_APER2         u fixed aperture magnitude (2",AB)
134 u_MAGERR_APER2      u fixed aperture mag error (2",AB)
135 u_MAG_APER3         u fixed aperture magnitude (3",AB)
136 u_MAGERR_APER3      u fixed aperture mag error (3",AB)
137 u_MAG_AUTO          u auto magnitude (AB)
138 u_MAGERR_AUTO       u auto mag error (AB)
139 u_MAG_ISO           Isophotal magnitude
140 u_MAGERR_ISO        rms uncertainty on magU
141 u_FLAGS             Internal Flag
142 u_IMAFLAGS_ISO      External Flag
143 zp_FLUX_APER2       zp fixed aperture flux (2",AB) [detection image]
144 zp_FLUXERR_APER2    zp fixed aperture flux error (2",AB) [detection image]
145 zp_FLUX_APER3       zp fixed aperture flux (3",AB) [detection image]
146 zp_FLUXERR_APER3    zp fixed aperture flux error (3",AB) [detection image]
147 zp_MAG_APER2        zp fixed aperture magnitude (2",AB)
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148 zp_MAGERR_APER2     zp fixed aperture mag error (2",AB)
149 zp_MAG_APER3        zp fixed aperture magnitude (3",AB)
150 zp_MAGERR_APER3     zp fixed aperture mag error (3",AB)
151 zp_MAG_AUTO         zp auto magnitude (AB)
152 zp_MAGERR_AUTO      zp auto mag error (AB)
153 zp_MAG_ISO          Isophotal magnitude
154 zp_MAGERR_ISO       rms uncertainty on magZP
155 zp_FLAGS            Internal Flag
156 zp_IMAFLAGS_ISO     External Flag
157 zpp_FLUX_APER2      zpp fixed aperture flux (2",AB) [detection image]
158 zpp_FLUXERR_APER2   zpp fixed aperture flux error (2",AB) [detection image]
159 zpp_FLUX_APER3      zpp fixed aperture flux (3",AB) [detection image]
160 zpp_FLUXERR_APER3   zpp fixed aperture flux error (3",AB) [detection image]
161 zpp_MAG_APER2       zpp fixed aperture magnitude (2",AB)
162 zpp_MAGERR_APER2    zpp fixed aperture mag error (2",AB)
163 zpp_MAG_APER3       zpp fixed aperture magnitude (3",AB)
164 zpp_MAGERR_APER3    zpp fixed aperture mag error (3",AB)
165 zpp_MAG_AUTO        zpp auto magnitude (AB)
166 zpp_MAGERR_AUTO     zpp auto mag error (AB)
167 zpp_MAG_ISO         Isophotal magnitude
168 zpp_MAGERR_ISO      rms uncertainty on magZPP
169 zpp_FLAGS           Internal Flag
170 zpp_IMAFLAGS_ISO    External Flag
171 IA484_FLUX_APER2    IA484 fixed aperture flux (2",AB) [detection image]
172 IA484_FLUXERR_APER2 IA484 fixed aperture flux error (2",AB) [detection image]
173 IA484_FLUX_APER3    IA484 fixed aperture flux (3",AB) [detection image]
174 IA484_FLUXERR_APER3 IA484 fixed aperture flux error (3",AB) [detection image]
175 IA484_MAG_APER2     IA484 fixed aperture magnitude (2",AB)
176 IA484_MAGERR_APER2  IA484 fixed aperture mag error (2",AB)
177 IA484_MAG_APER3     IA484 fixed aperture magnitude (3",AB)
178 IA484_MAGERR_APER3  IA484 fixed aperture mag error (3",AB)
179 IA484_MAG_AUTO      IA484 auto magnitude (AB)
180 IA484_MAGERR_AUTO   IA484 auto mag error (AB)
181 IA484_MAG_ISO       Isophotal magnitude
182 IA484_MAGERR_ISO    rms uncertainty on magIA484
183 IA484_FLAGS         Internal flag
184 IA484_IMAFLAGS_ISO  External Flag
185 IA527_FLUX_APER2    IA527 fixed aperture flux (2",AB) [detection image]
186 IA527_FLUXERR_APER2 IA527 fixed aperture flux error (2",AB) [detection image]
187 IA527_FLUX_APER3    IA527 fixed aperture flux (3",AB) [detection image]
188 IA527_FLUXERR_APER3 IA527 fixed aperture flux error (3",AB) [detection image]
189 IA527_MAG_APER2     IA527 fixed aperture magnitude (2",AB)
190 IA527_MAGERR_APER2  IA527 fixed aperture mag error (2",AB)
191 IA527_MAG_APER3     IA527 fixed aperture magnitude (3",AB)
192 IA527_MAGERR_APER3  IA527 fixed aperture mag error (3",AB)
193 IA527_MAG_AUTO      IA527 auto magnitude (AB)
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194 IA527_MAGERR_AUTO   IA527 auto mag error (AB)
195 IA527_MAG_ISO       Isophotal magnitude
196 IA527_MAGERR_ISO    rms uncertainty on magIA527
197 IA527_FLAGS         Internal Flag
198 IA527_IMAFLAGS_ISO  External Flag
199 IA624_FLUX_APER2    IA624 fixed aperture flux (2",AB) [detection image]
200 IA624_FLUXERR_APER2 IA624 fixed aperture flux error (2",AB) [detection image]
201 IA624_FLUX_APER3    IA624 fixed aperture flux (3",AB) [detection image]
202 IA624_FLUXERR_APER3 IA624 fixed aperture flux error (3",AB) [detection image]
203 IA624_MAG_APER2     IA624 fixed aperture magnitude (2",AB)
204 IA624_MAGERR_APER2  IA624 fixed aperture mag error (2",AB)
205 IA624_MAG_APER3     IA624 fixed aperture magnitude (3",AB)
206 IA624_MAGERR_APER3  IA624 fixed aperture mag error (3",AB)
207 IA624_MAG_AUTO      IA624 auto magnitude (AB)
208 IA624_MAGERR_AUTO   IA624 auto mag error (AB)
209 IA624_MAG_ISO       Isophotal magnitude
210 IA624_MAGERR_ISO    rms uncertainty on magIA624
211 IA624_FLAGS         Internal Flag
212 IA624_IMAFLAGS_ISO  External Flag
213 IA679_FLUX_APER2    IA679 fixed aperture flux (2",AB) [detection image]
214 IA679_FLUXERR_APER2 IA679 fixed aperture flux error (2",AB) [detection image]
215 IA679_FLUX_APER3    IA679 fixed aperture flux (3",AB) [detection image]
216 IA679_FLUXERR_APER3 IA679 fixed aperture flux error (3",AB) [detection image]
217 IA679_MAG_APER2     IA679 fixed aperture magnitude (2",AB)
218 IA679_MAGERR_APER2  IA679 fixed aperture mag error (2",AB)
219 IA679_MAG_APER3     IA679 fixed aperture magnitude (3",AB)
220 IA679_MAGERR_APER3  IA679 fixed aperture mag error (3",AB)
221 IA679_MAG_AUTO      IA679 auto magnitude (AB)
222 IA679_MAGERR_AUTO   IA679 auto mag error (AB)
223 IA679_MAG_ISO       Isophotal magnitude
224 IA679_MAGERR_ISO    rms uncertainty on magIA679
225 IA679_FLAGS         Internal Flag
226 IA679_IMAFLAGS_ISO  External Flag
227 IA738_FLUX_APER2    IA738 fixed aperture flux (2",AB) [detection image]
228 IA738_FLUXERR_APER2 IA738 fixed aperture flux error (2",AB) [detection image]
229 IA738_FLUX_APER3    IA738 fixed aperture flux (3",AB) [detection image]
230 IA738_FLUXERR_APER3 IA738 fixed aperture flux error (3",AB) [detection image]
231 IA738_MAG_APER2     IA738 fixed aperture magnitude (2",AB)
232 IA738_MAGERR_APER2  IA738 fixed aperture mag error (2",AB)
233 IA738_MAG_APER3     IA738 fixed aperture magnitude (3",AB)
234 IA738_MAGERR_APER3  IA738 fixed aperture mag error (3",AB)
235 IA738_MAG_AUTO      IA738 auto magnitude (AB)
236 IA738_MAGERR_AUTO   IA738 auto mag error (AB)
237 IA738_MAG_ISO       Isophotal magnitude
238 IA738_MAGERR_ISO    rms uncertainty on magIA738
239 IA738_FLAGS         Internal Flag
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240 IA738_IMAFLAGS_ISO  External Flag
241 IA767_FLUX_APER2    IA767 fixed aperture flux (2",AB) [detection image]
242 IA767_FLUXERR_APER2 IA767 fixed aperture flux error (2",AB) [detection image]
243 IA767_FLUX_APER3    IA767 fixed aperture flux (3",AB) [detection image]
244 IA767_FLUXERR_APER3 IA767 fixed aperture flux error (3",AB) [detection image]
245 IA767_MAG_APER2     IA767 fixed aperture magnitude (2",AB)
246 IA767_MAGERR_APER2  IA767 fixed aperture mag error (2",AB)
247 IA767_MAG_APER3     IA767 fixed aperture magnitude (3",AB)
248 IA767_MAGERR_APER3  IA767 fixed aperture mag error (3",AB)
249 IA767_MAG_AUTO      IA767 auto magnitude (AB)
250 IA767_MAGERR_AUTO   IA767 auto mag error (AB)
251 IA767_MAG_ISO       Isophotal magnitude
252 IA767_MAGERR_ISO    rms uncertainty on magIA767
253 IA767_FLAGS         Internal Flag
254 IA767_IMAFLAGS_ISO  External Flag
255 IB427_FLUX_APER2    IB427 fixed aperture flux (2",AB) [detection image]
256 IB427_FLUXERR_APER2 IB427 fixed aperture flux error (2",AB) [detection image]
257 IB427_FLUX_APER3    IB427 fixed aperture flux (3",AB) [detection image]
258 IB427_FLUXERR_APER3 IB427 fixed aperture flux error (3",AB) [detection image]
259 IB427_MAG_APER2     IB427 fixed aperture magnitude (2",AB)
260 IB427_MAGERR_APER2  IB427 fixed aperture mag error (2",AB)
261 IB427_MAG_APER3     IB427 fixed aperture magnitude (3",AB)
262 IB427_MAGERR_APER3  IB427 fixed aperture mag error (3",AB)
263 IB427_MAG_AUTO      IB427 auto magnitude (AB)
264 IB427_MAGERR_AUTO   IB427 auto mag error (AB)
265 IB427_MAG_ISO       Isophotal magnitude
266 IB427_MAGERR_ISO    rms uncertainty on magIB427
267 IB427_FLAGS         internal Flag
268 IB427_IMAFLAGS_ISO  External Flag
269 IB464_FLUX_APER2    IB464 fixed aperture flux (2",AB) [detection image]
270 IB464_FLUXERR_APER2 IB464 fixed aperture flux error (2",AB) [detection image]
271 IB464_FLUX_APER3    IB464 fixed aperture flux (3",AB) [detection image]
272 IB464_FLUXERR_APER3 IB464 fixed aperture flux error (3",AB) [detection image]
273 IB464_MAG_APER2     IB464 fixed aperture magnitude (2",AB)
274 IB464_MAGERR_APER2  IB464 fixed aperture mag error (2",AB)
275 IB464_MAG_APER3     IB464 fixed aperture magnitude (3",AB)
276 IB464_MAGERR_APER3  IB464 fixed aperture mag error (3",AB)
277 IB464_MAG_AUTO      IB464 auto magnitude (AB)
278 IB464_MAGERR_AUTO   IB464 auto mag error (AB)
279 IB464_MAG_ISO       Isophotal magnitude
280 IB464_MAGERR_ISO    rms uncertainty on magIB464
281 IB464_FLAGS         Internal Flag
282 IB464_IMAFLAGS_ISO  External Flag
283 IB505_FLUX_APER2    IB505 fixed aperture flux (2",AB) [detection image]
284 IB505_FLUXERR_APER2 IB505 fixed aperture flux error (2",AB) [detection image]
285 IB505_FLUX_APER3    IB505 fixed aperture flux (3",AB) [detection image]
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286 IB505_FLUXERR_APER3 IB505 fixed aperture flux error (3",AB) [detection image]
287 IB505_MAG_APER2     IB505 fixed aperture magnitude (2",AB)
288 IB505_MAGERR_APER2  IB505 fixed aperture mag error (2",AB)
289 IB505_MAG_APER3     IB505 fixed aperture magnitude (3",AB)
290 IB505_MAGERR_APER3  IB505 fixed aperture mag error (3",AB)
291 IB505_MAG_AUTO      IB505 auto magnitude (AB)
292 IB505_MAGERR_AUTO   IB505 auto mag error (AB)
293 IB505_MAG_ISO       Isophotal magnitude
294 IB505_MAGERR_ISO    rms uncertainty on magIB505
295 IB505_FLAGS         internal Flag
296 IB505_IMAFLAGS_ISO  External flag
297 IB574_FLUX_APER2    IB574 fixed aperture flux (2",AB) [detection image]
298 IB574_FLUXERR_APER2 IB574 fixed aperture flux error (2",AB) [detection image]
299 IB574_FLUX_APER3    IB574 fixed aperture flux (3",AB) [detection image]
300 IB574_FLUXERR_APER3 IB574 fixed aperture flux error (3",AB) [detection image]
301 IB574_MAG_APER2     IB574 fixed aperture magnitude (2",AB)
302 IB574_MAGERR_APER2  IB574 fixed aperture mag error (2",AB)
303 IB574_MAG_APER3     IB574 fixed aperture magnitude (3",AB)
304 IB574_MAGERR_APER3  IB574 fixed aperture mag error (3",AB)
305 IB574_MAG_AUTO      IB574 auto magnitude (AB)
306 IB574_MAGERR_AUTO   IB574 auto mag error (AB)
307 IB574_MAG_ISO       Isophotal magnitude
308 IB574_MAGERR_ISO    rms uncertainty on magIB574
309 IB574_FLAGS         Internal Flag
310 IB574_IMAFLAGS_ISO  External Flag
311 IB709_FLUX_APER2    IB709 fixed aperture flux (2",AB) [detection image]
312 IB709_FLUXERR_APER2 IB709 fixed aperture flux error (2",AB) [detection image]
313 IB709_FLUX_APER3    IB709 fixed aperture flux (3",AB) [detection image]
314 IB709_FLUXERR_APER3 IB709 fixed aperture flux error (3",AB) [detection image]
315 IB709_MAG_APER2     IB709 fixed aperture magnitude (2",AB)
316 IB709_MAGERR_APER2  IB709 fixed aperture mag error (2",AB)
317 IB709_MAG_APER3     IB709 fixed aperture magnitude (3",AB)
318 IB709_MAGERR_APER3  IB709 fixed aperture mag error (3",AB)
319 IB709_MAG_AUTO      IB709 auto magnitude (AB)
320 IB709_MAGERR_AUTO   IB709 auto mag error (AB)
321 IB709_MAG_ISO       Isophotal magnitude
322 IB709_MAGERR_ISO    rms uncertainty on magIB709
323 IB709_FLAGS         Internal Flag
324 IB709_IMAFLAGS_ISO  External Flag
325 IB827_FLUX_APER2    IB827 fixed aperture flux (2",AB) [detection image]
326 IB827_FLUXERR_APER2 IB827 fixed aperture flux error (2",AB) [detection image]
327 IB827_FLUX_APER3    IB827 fixed aperture flux (3",AB) [detection image]
328 IB827_FLUXERR_APER3 IB827 fixed aperture flux error (3",AB) [detection image]
329 IB827_MAG_APER2     IB827 fixed aperture magnitude (2",AB)
330 IB827_MAGERR_APER2  IB827 fixed aperture mag error (2",AB)
331 IB827_MAG_APER3     IB827 fixed aperture magnitude (3",AB)
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332 IB827_MAGERR_APER3  IB827 fixed aperture mag error (3",AB)
333 IB827_MAG_AUTO      IB827 auto magnitude (AB)
334 IB827_MAGERR_AUTO   IB827 auto mag error (AB)
335 IB827_MAG_ISO       Isophotal magnitude
336 IB827_MAGERR_ISO    rms uncertainty on magIB827
337 IB827_FLAGS         Internal Flag
338 IB827_IMAFLAGS_ISO  External Flag
339 NB711_FLUX_APER2    NB711 fixed aperture flux (2",AB) [detection image]
340 NB711_FLUXERR_APER2 NB711 fixed aperture flux error (2",AB) [detection image]
341 NB711_FLUX_APER3    NB711 fixed aperture flux (3",AB) [detection image]
342 NB711_FLUXERR_APER3 NB711 fixed aperture flux error (3",AB) [detection image]
343 NB711_MAG_APER2     NB711 fixed aperture magnitude (2",AB)
344 NB711_MAGERR_APER2  NB711 fixed aperture mag error (2",AB)
345 NB711_MAG_APER3     NB711 fixed aperture magnitude (3",AB)
346 NB711_MAGERR_APER3  NB711 fixed aperture mag error (3",AB)
347 NB711_MAG_AUTO      NB711 auto magnitude (AB)
348 NB711_MAGERR_AUTO   NB711 auto mag error (AB)
349 NB711_MAG_ISO       Isophotal magnitude
350 NB711_MAGERR_ISO    rms uncertainty on magNB711
351 NB711_FLAGS         Internal Flag
352 NB711_IMAFLAGS_ISO  External Flag
353 NB816_FLUX_APER2    NB816 fixed aperture flux (2",AB) [detection image]
354 NB816_FLUXERR_APER2 NB816 fixed aperture flux error (2",AB) [detection image]
355 NB816_FLUX_APER3    NB816 fixed aperture flux (3",AB) [detection image]
356 NB816_FLUXERR_APER3 NB816 fixed aperture flux error (3",AB) [detection image]
357 NB816_MAG_APER2     NB816 fixed aperture magnitude (2",AB)
358 NB816_MAGERR_APER2  NB816 fixed aperture mag error (2",AB)
359 NB816_MAG_APER3     NB816 fixed aperture magnitude (3",AB)
360 NB816_MAGERR_APER3  NB816 fixed aperture mag error (3",AB)
361 NB816_MAG_AUTO      NB816 auto magnitude (AB)
362 NB816_MAGERR_AUTO   NB816 auto mag error (AB)
363 NB816_MAG_ISO       Isophotal magnitude
364 NB816_MAGERR_ISO    rms uncertainty on magNB816
365 NB816_FLAGS         Internal Flag
366 NB816_IMAFLAGS_ISO  External Flag
367 SPLASH_1_FLUX       SPLASH_1 flux in a 3" aperture
368 SPLASH_1_FLUX_ERR   SPLASH_1 flux error in a 3" aperture
369 SPLASH_1_MAG        SPLASH_1 magnitude in a 3" aperture
370 SPLASH_1_MAGERR     SPLASH_1 magnitude error in a 3" aperture
371 SPLASH_2_FLUX       SPLASH_2 flux in a 3" aperture
372 SPLASH_2_FLUX_ERR   SPLASH_2 flux error in a 3" aperture
373 SPLASH_2_MAG        SPLASH_2 magnitude in a 3" aperture
374 SPLASH_2_MAGERR     SPLASH_2 magnitude error in a 3" aperture
375 SPLASH_3_FLUX       SPLASH_3 flux in a 3" aperture
376 SPLASH_3_FLUX_ERR   SPLASH_3 flux error in a 3" aperture
377 SPLASH_3_MAG        SPLASH_3 magnitude in a 3" aperture
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378 SPLASH_3_MAGERR     SPLASH_3 magnitude error in a 3" aperture
379 SPLASH_4_FLUX       SPLASH_4 flux in a 3" aperture
380 SPLASH_4_FLUX_ERR   SPLASH_4 flux error in a 3" aperture
381 SPLASH_4_MAG        SPLASH_4 magnitude in a 3" aperture
382 SPLASH_4_MAGERR     SPLASH_3 magnitude error in a 3" aperture
383 Hw_FLUX_APER2       Hw fixed aperture flux (2",AB) [detection image]
384 Hw_FLUXERR_APER2    Hw fixed aperture flux error (2",AB) [detection image]
385 Hw_FLUX_APER3       Hw fixed aperture flux (3",AB) [detection image]
386 Hw_FLUXERR_APER3    Hw fixed aperture flux error (3",AB) [detection image]
387 Hw_MAG_APER2        Hw fixed aperture magnitude (2",AB)
388 Hw_MAGERR_APER2     Hw fixed aperture mag error (2",AB)
389 Hw_MAG_APER3        Hw fixed aperture magnitude (3",AB)
390 Hw_MAGERR_APER3     Hw fixed aperture mag error (3",AB)
391 Hw_MAG_AUTO         Hw auto magnitude (AB)
392 Hw_MAGERR_AUTO      Hw auto mag error (AB)
393 Hw_MAG_ISO          Isophotal magnitude
394 Hw_MAGERR_ISO       rms uncertainty on magHw
395 Hw_FLAGS            Internal Flag
396 Hw_IMAFLAGS_ISO     External Flag
397 Ksw_FLUX_APER2      Ksw fixed aperture flux (2",AB) [detection image]
398 Ksw_FLUXERR_APER2   Ksw fixed aperture flux error (2",AB) [detection image]
399 Ksw_FLUX_APER3      Ksw fixed aperture flux (3",AB) [detection image]
400 Ksw_FLUXERR_APER3   Ksw fixed aperture flux error (3",AB) [detection image]
401 Ksw_MAG_APER2       Ksw fixed aperture magnitude (2",AB)
402 Ksw_MAGERR_APER2    Ksw fixed aperture mag error (2",AB)
403 Ksw_MAG_APER3       Ksw fixed aperture magnitude (3",AB)
404 Ksw_MAGERR_APER3    Ksw fixed aperture mag error (3",AB)
405 Ksw_MAG_AUTO        Ksw auto magnitude (AB)
406 Ksw_MAGERR_AUTO     Ksw auto mag error (AB)
407 Ksw_MAG_ISO         Isophotal magnitude
408 Ksw_MAGERR_ISO      rms uncertainty on magKsw
409 Ksw_FLAGS           Internal Flag
410 Ksw_IMAFLAGS_ISO    External Flag
411 yHSC_FLUX_APER2     yHSC fixed aperture flux (2",AB) [detection image]
412 yHSC_FLUXERR_APER2  yHSC fixed aperture flux error (2",AB) [detection image]
413 yHSC_FLUX_APER3     yHSC fixed aperture flux (3",AB) [detection image]
414 yHSC_FLUXERR_APER3  yHSC fixed aperture flux error (3",AB) [detection image]
415 yHSC_MAG_APER2      yHSC fixed aperture magnitude (2",AB)
416 yHSC_MAGERR_APER2   yHSC fixed aperture mag error (2",AB)
417 yHSC_MAG_APER3      yHSC fixed aperture magnitude (3",AB)
418 yHSC_MAGERR_APER3   yHSC fixed aperture mag error (3",AB)
419 yHSC_MAG_AUTO       yHSC auto magnitude (AB)
420 yHSC_MAGERR_AUTO    yHSC auto mag error (AB)
421 yHSC_MAG_ISO        Isophotal magnitude
422 yHSC_MAGERR_ISO     rms uncertainty on magyHSC
423 yHSC_FLAGS          Internal Flag
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424 yHSC_IMAFLAGS_ISO   External Flag
425 FLUX_24             MIPS 24 mum flux
426 FLUXERR_24          MIPS 24 mum mJy flux uncertainty
427 MAG_24              m(24) the apparent isophotal magnitude
428 MAGERR_24           Error in mag-24
429 ID_A24              ID in the 24um catalog
430 FLUX_100            PACS/PEP 100 mum flux
431 FLUXERR_100         PACS/PEP 100 mum mJy flux uncertainty
432 FLUX_160            PACS/PEP 160 mum flux
433 FLUXERR_160         PACS/PEP 160 mum mJy flux uncertainty
434 FLUX_250            SPIRE/HERMES 250 mum flux
435 FLUXERR_250         SPIRE/HERMES 250 mum mJy flux uncertainty (instrumental noise)
436 FLUXERRTOT_250      SPIRE/HERMES 250 mum mJy flux uncertainty (total (inst+conf) noise)
437 FLUX_350            SPIRE/HERMES 350 mum flux
438 FLUXERR_350         SPIRE/HERMES 250 mum mJy flux uncertainty (instrumental noise)
439 FLUXERRTOT_350      SPIRE/HERMES 250 mum mJy flux uncertainty (total (inst+conf) noise)
440 FLUX_500            SPIRE/HERMES 500 mum flux
441 FLUXERR_500         SPIRE/HERMES 500 mum mJy flux uncertainty (instrumental noise)
442 FLUXERRTOT_500      SPIRE/HERMES 500 mum mJy flux uncertainty (total (inst+conf) noise)
443 ID_CHANDRA2016      Observation ID in Chandra COSMOS catalog
444 ID2006              Observation ID in the 1st version of the catalog from Capak
445 ID2008              Observation ID in the 2ndversion of the catalog from Capak
446 ID2013              Observation ID ( catalog from Ilbert et al. 2013)
447 MAG_GALEX_NUV       GALEX magnitude NUV
448 MAGERR_GALEX_NUV    GALEX magnitude error NUV
449 MAG_GALEX_FUV       GALEX FUV magnitude
450 MAGERR_GALEX_FUV    GALEX FUV magnitude error
451 FLUX_GALEX_NUV      GALEX NUV calibrated flux
452 FLUXERR_GALEX_NUV   GALEX NUV flux error
453 FLUX_GALEX_FUV      GALEX FUV flux
454 FLUXERR_GALEX_FUV   GALEX FUV flux error
455 FLUX_814W           flux F814W
456 FLUXERR_814W        flux error F814W
457 NAME_VLA90CM        name of the sources in VLA 90cm catalog
458 FLUXPEAK_90CM       peak flux of the radio source
459 FLUXPEAKERR_90CM    rms uncertainty in the peak flux of the radio source
460 FLUXINT_90CM        total integrated flux of the radio source
461 FLUXINTERR_90CM     rms uncertainty total integrated flux of the radio source
462 RMSBKG_90CM         measured local rms noise at the source position
463 NAME_JVLDEEP        name of the sources in JVL Deep catalog
464 NAME_JVLLARGE       name of the sources in JVL Large catalog
465 FLUXPEAK_20CM       peak flux of the radio source
466 FLUXPEAKERR_20CM    rms uncertainty in the peak flux of the radio source
467 FLUXINT_20CM        total integrated flux of the radio source
468 FLUXINTERR_20CM     rms uncertainty total integrated flux of the radio source
469 RMSBKG_20CM         measured local rms noise at the source position
```

```
470 ID_XMM              Observation ID XMM-Newton
471 FLUX_XMM_05_2       0.5-2 keV band flux from XMM/Newton
472 FLUX_XMM_2_10       2-10 keV band flux from XMM/Newton
473 FLUX_XMM_5_10       5-10 keV band flux from XMM/Newton
474 HARDNESS_XMM        hardness ratio
475 ID_CHANDRA09        Observation ID Chandra COSMOS catalog
476 FLUX_CHANDRA_05_2   0.5-2 keV band flux from Chandra COSMOS catalog
477 FLUX_CHANDRA_2_10   2-10 keV band flux from Chandra COSMOS catalog
478 FLUX_CHANDRA_05_10  0.5-10 keV band flux from Chandra COSMOS catalog
479 ID_NUSTAR           Observation ID Nustar
480 FLUX_NUSTAR_3_24    3-24 keV band flux from Nustar catalog
481 FLUXERR_NUSTAR_3_24 3-24 keV band flux error from Nustar catalog
482 FLUX_NUSTAR_3_8     3-8 keV band flux from Nustar catalog
483 FLUXERR_NUSTAR_3_8  3-8 keV band flux error from Nustar catalog
484 FLUX_NUSTAR_8_24    8-24 keV band flux from Nustar catalog
485 FLUXERR_NUSTAR_8_24 8-24 keV band flux error from Nustar catalog
486 HARDNESS_NUSTAR     hardness ratio
487 HARDNESSLOW_NUSTAR  hardness ratio lower bound
488 HARDNESSUP_NUSTAR   hardness ratio upper bound
489 FLAG_XRAYBLEND      flag for blended sources
490 OFFSET_MAG          offset applied to the aperture magnitudes to obtain total quantities
491 PHOTOZ              median of the likelihood distribution
492 TYPE               Type
493 ZPDF               photo-z measured using the galaxy templates
494 ZPDF_L68           lower limit, 68% confidence level
495 ZPDF_H68           upper limit, 68% confidence level
496 ZMINCHI2           photo-z measured using the galaxy templates
497 CHI2_BEST          reduced chi2 [-99 if less than 3 filters] for zMinChi2
498 ZP_2               second photo-z solution
499 CHI2_2             reduced chi2 for the second photo-z solution
500 NBFILT             Number of filters used in the fit
501 ZQ                 photoz for the AGN library
502 CHIQ               reduced chi2
503 MODQ               best fit template
504 MODS               model for the star library
505 CHIS               reduced chi2
506 MODEL              BC03 model at zPDF
507 AGE                BC03 age
508 EXTINCTION         Extinction
509 M_NUV              Absolute magnitude of NUV galex
510 M_U                Absolute magnitude of Subaru u* band
511 M_B                Absolute magnitude of Subaru B band
512 M_V                Absolute magnitude of Subaru V band
513 M_R                Absolute magnitude of Subaru r+ band
514 M_I                Absolute magnitude of Subaru i+ band
515 M_Z                Absolute magnitude of Subaru z-band (new filter)
```

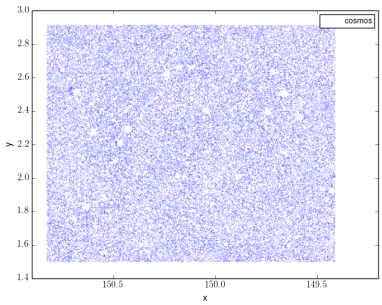
```
516 M_Y                 Absolute magnitude of VISTA Y-band
517 M_J                 Absolute magnitude of VISTA J-band
518 M_H                 Absolute magnitude of VISTA H-band
519 M_K                 Absolute magnitude of VISTA Ks-band
520 MNUV_MR             Dust corrected M(NUV)-M(R) color at zPDF
521 CLASS               0:quiescent/1:star-forming based on the NUV-R/R-J
522 MASS_MED            log Stellar mass from BC03 best-fit template. median of the PDF
523 MASS_MED_MIN68      lower limit, 68% confidence level
524 MASS_MED_MAX68      upper limit, 68% confidence level
525 MASS_BEST           log Stellar mass from BC03 best-fit template
526 SFR_MED             log SFR from BC03 best-fit template. median of the PDF
527 SFR_MED_MIN68       lower limit, 68% confidence level
528 SFR_MED_MAX68       upper limit, 68% confidence level
529 SFR_BEST            log SFR from BC03 best-fit template. Taken at the minimum chi2
530 SSFR_MED            log sSFR from BC03 best-fit template. median of the PDF
531 SSFR_MED_MIN68      lower limit, 68% confidence level
532 SSFR_MED_MAX68      upper limit, 68% confidence level
533 SSFR_BEST           log sSFR from BC03 best-fit template. Taken at the minimum chi2
534 L_NU                log(dust corr lum in erg/s/Hz) in NUV filter
535 L_R                 log(dust corr lum in erg/s/Hz) in r filter
536 L_K                 log(dust corr lum in erg/s/Hz) in K filter
```

4 Appendix: flags and regions

This Appendix explains graphically each of the different regions present in catalogue file and how they may be selected. The region files (represented as DS9 polygon files) are available here: `ftp://ftp.iap.fr/pub/from_users/hjmcc/COSMOS2015/region-files.tar.gz`.

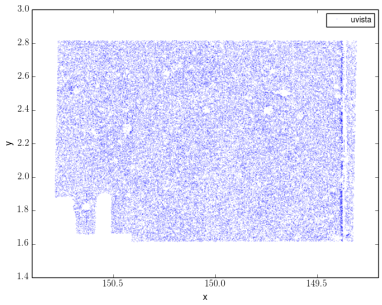
==========COSMOS==========

Area	**2deg2**
Description	tangent pt= [150.1163213,2.20973097]
Nbr of objects	**773118**
File_Name	***cosmos_cen.reg***
Keyword	**FLAG_COSMOS==1**



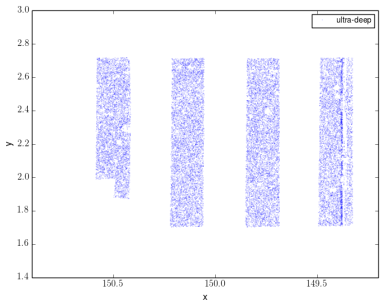
==========UVISTA==========

Area	**1.70deg2**
Description	The area covered by UVISTA
Nbr of objects	**646939**
File_Name	**polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**FLAG_HJMCC==0+FLAG_HJMCC==2**



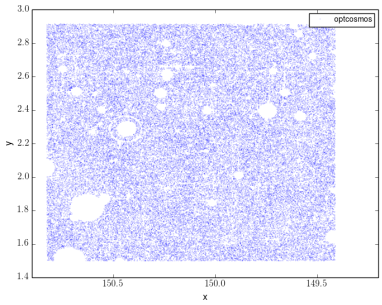
==========UDEEP==========

Area	0.62 deg2
Description	The area covered by UDeep stripes
Nbr of objects	**247203**
File_Name	**Deep-stripes.reg**
Keyword	**FLAG_DEEP==1**



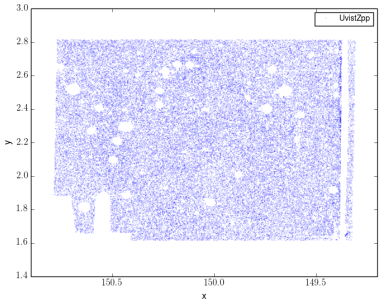
========== !OPT & COSMOS ==========

Area	1.77 deg2
Description	Safe objects inside the 2deg2 COSMOS square
Nbr of objects	**694478**
File_Name	**cosmos_cen.reg & COSMOS.Peter2.reg**
Keyword	**FLAG_PETER==0+FLAG_COSMOS==1**



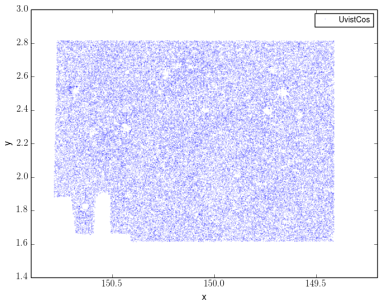
==========UVISTA & zpp==========

Area	1.59 deg2
Description	Good area in the chi2 images
Nbr of objects	**606887**
File_Name	**Polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**FLAG_HJMCC==0**



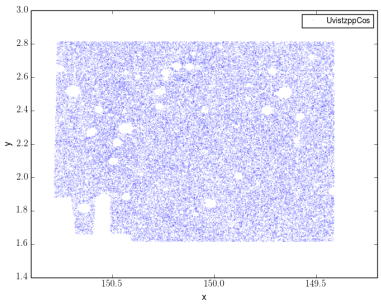
==========UVISTA & COSMOS==========

Area	1.58 deg2
Description	Intersection Uvista and 2deg2 COSMOS
Nbr of objects	**604265**
File_Name	**cosmos_cen.reg & Polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**(FLAG_HJMCC==0 + FLAG_HJMCC==2) & FLAG_COSMOS==1**



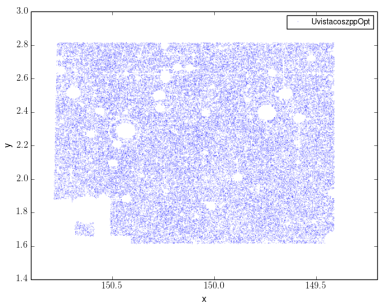
==========UVISTA & zpp & COSMOS==========

Area	1.51 deg2
Description	Intersection Good area in the chi2 image and 2deg2 COSMOS
Nbr of objects	**576762**
File_Name	**cosmos_cen.reg & Polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**FLAG_HJMCC==0 &FLAG_COSMOS==1**



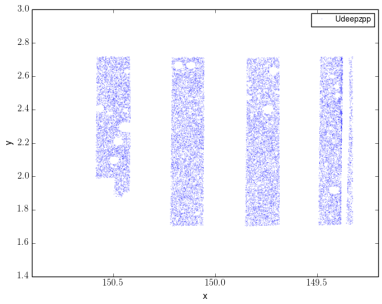
==========UVISTA & zpp & COSMOS & !OPT==========

Area	1.38 deg2
Description	Intersection Good area in the chi2 image and 2deg2 COSMOS and not masked in optical
Nbr of objects	**536077**
File_Name	**cosmos_cen.reg & Polygon_UVISTA-dr2_Ks_08_15.reg & Cosmos.Peter2.reg**
Keyword	**FLAG_HJMCC==0 &FLAG_COSMOS==1 & FLAG_PETER==0**



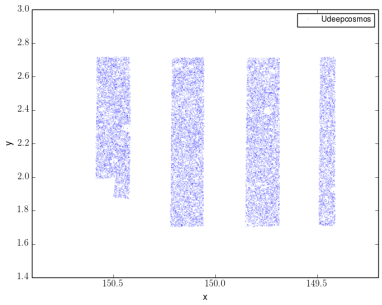
==========UDEEP & zpp ==========

Area	0.56 deg2
Description	Intersection Good area in the chi2 image and 2deg2 COSMOS
Nbr of objects	227278
File_Name	**Deep-stripes.reg & Polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**FLAG_HJMCC==0 &FLAG_Deep==1**



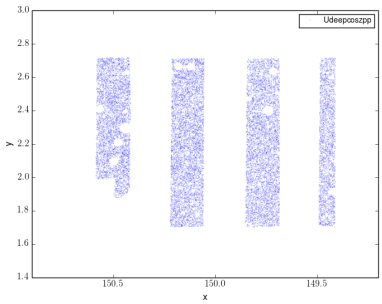
==========UDEEP & COSMOS==========

Area	0.53 deg2
Description	Intersection Deep stripes and 2deg2 COSMOS
Nbr of objects	213716
File_Name	**Deep-stripes.reg & cosmos_cen.reg**
Keyword	**FLAG_Cosmos==1 &FLAG_Deep==1**



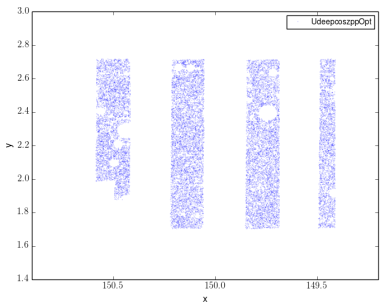
==========UDEEP & COSMOS &zpp ==========

Area	0.51 deg2
Description	Intersection Deep stripes and 2deg2 COSMOS and good area in chi2
Nbr of objects	204275
File_Name	**Deep-stripes.reg & cosmos_cen.reg & polygon_UVISTA-dr2_Ks_08_15.reg**
Keyword	**FLAG_Cosmos==1 &FLAG_Deep==1 & FLAG_HJMCC==0**



==========UDEEP & COSMOS &zpp & !Opt==========

Area	0.46 deg2
Description	Intersection Deep stripes and 2deg2 COSMOS and good area in chi2 and non masked in optics
Nbr of objects	190650
File_Name	**Deep-stripes.reg & cosmos_cen.reg & polygon_UVISTA-dr2_Ks_08_15.reg & Cosmos.Peter2.reg**
Keyword	**FLAG_Cosmos==1 &FLAG_Deep==1 & FLAG_HJMCC==0 & FLAG_PETER==0**



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A full list of references for the data sources used in this catalogue can be found in Laigle et al. (2016).

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