WEAVE
Input FITS Catalogues

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Input Catalogues

Before Coffee:

Overview of how we've converged on the structure and format of WEAVE Input Catalogues

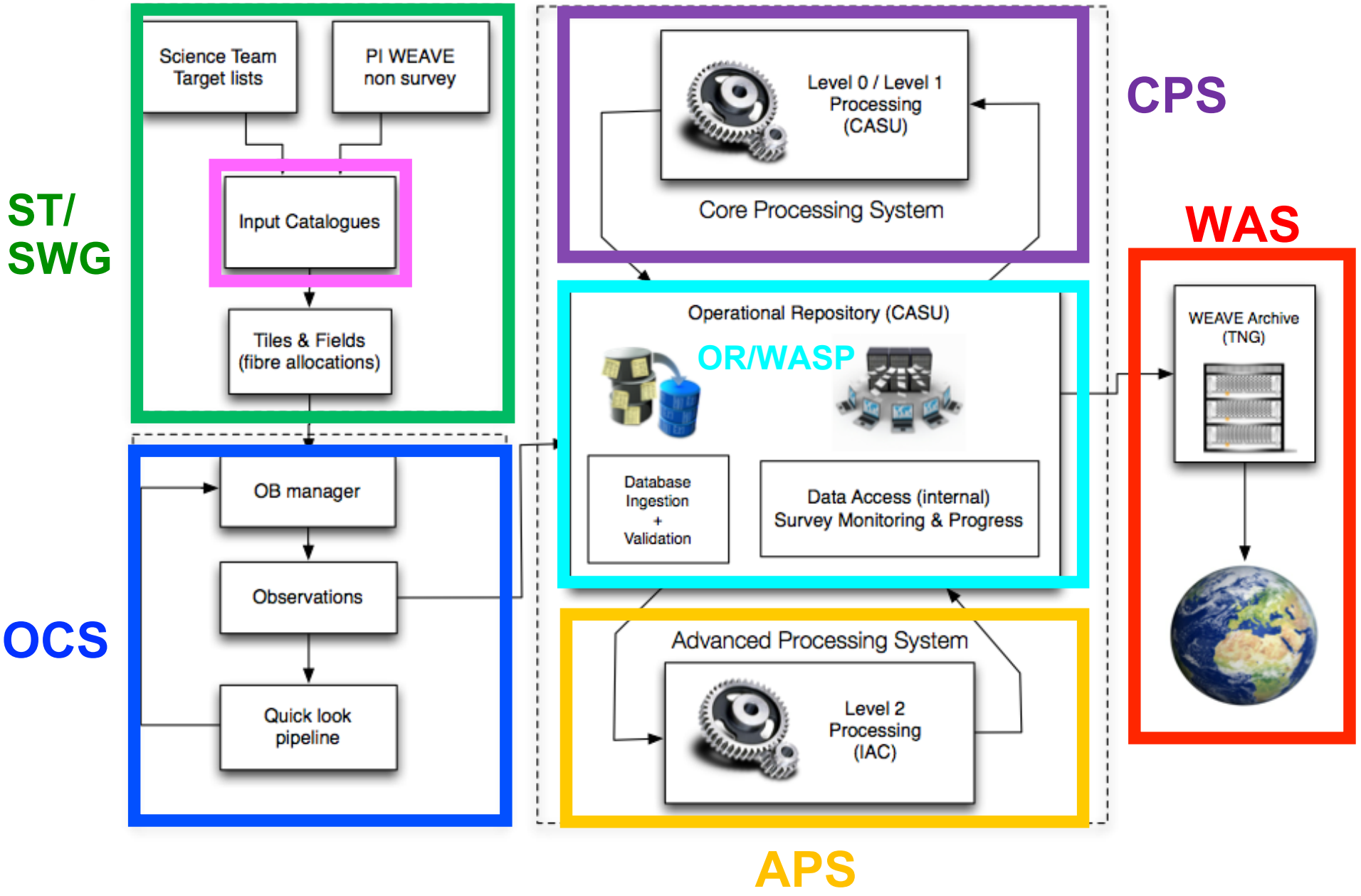
After Coffee:

Demos with online tools to help you build:

1. Your Input Catalogue FITS template
2. Codes for defining the instrument configurations that you want
3. Codes for defining the observing conditions that you want

Example data for you to play with

WEAVE Science Processing & Analysis



Input Catalogues

The format and structure of the catalogues are critical aspects of the data flow.

The target information must be well specified in order to permit the correct flow-down of information to the:

- Survey Working Group (SWG)
  - Optimal fibre allocation and placement using Configure
- Observatory Control System (OCS)
  - Optimal observing conditions and successful observation
- Core Processing System (CPS)
  - Optimal spectral extraction and reduction
- Advanced Processing System (APS)
  - Inform on output classification and spectral analysis
- WEAVE Archive System (WAS)
  - Database ingestion and delivery of catalogues, raw, L1 and L2 to users

→ the catalogues are expected to work very hard!

Input Catalogues

Each Input Catalogue comprises **two** types of data

1. **Science Processing & Analysis** –> needed to meet requirements from OCS, SWG, CPS, APS

2. **Survey Specific** –> provided by each survey to complement above data and for usability in WAS

Collated and consolidated these into one set of catalogue columns:
Latest count == 589 columns
== 70 SPA columns
== 519 SS columns

Catalogues must be FITS files

- Strict structure, comprehensively describes the data format
- Metadata = headers
- Data = images or binary tables

SPA Columns

- SPA columns are present in ALL input catalogues
- Not every catalogue will be concerned with all of these columns
- WASP will let you know if you are missing something

SPA Column Categories	Used by
Naming & Priority	SWG, OCS, WAS
Observing Mode and Conditions	SWG, OCS
Coordinates in the Gaia Reference Frame	SWG, OCS, WAS
IFU Specific	SWG, OCS
Photometry for Spectral Reduction	CPS
General settings	APS
PPXF settings	APS
GANDALF settings	APS
Line strength settings	APS
SSP settings	APS
IFU settings	APS
CSs/CDPs settings	APS

SPA Columns – SWG and OCS

SPA Column	SPA Column Description	Required/If Available/Optional	FIBINFO Table
Naming & Priority			
CNAME	WEAVE object name from coordinates	Filled by WASP	CNAME
TARGSRVY	The Survey where the target belongs	Required	TARGSRVY
TARGPROG	Optional description of (sub-)survey/programme	Optional	TARGPROG
TARGCAT	Catalogue filename	Required	TARGCAT
TARGID	The identifier of the target assigned by survey	Required	TARGID
TARGNAME	The target name	Optional	TARGNAME
TARGPRIO	Target relative priority within a survey (1-10)	Required	TARGPRIO
TARGUSE	T=target, S=sky, G=guide, C=calibration standard	Required	TARGUSE
TARGCLASS	Classification of the target assigned by survey	Required	TARGCLASS

TARGSRVY	WEAVE Surveys: GA-LRDISC, GA-LRHIGHLAT, GA-HR, GA-CALIB, STEPS, SCIP, WA, WC, WL, WQ, CCG, WD, GS Open Time: SW<YEAR><A,B><running number> e.g. SW2020B02
TARGPROG	Optional: Label to group a sub-sample e.g. Red Giants
TARGCAT	WEAVE Surveys: <TARGSRVY>_<TRIMESTER>.fits Open Time: <TARGSRVY>_<SEMESTER>.fits
TARGNAME	Optional: Alternative useful identifier e.g. Arcturus
TARGPRIO	MOS: 1 = lowest, 10 = highest (integer only!) – positive weighting in configure IFU: NULL values as priorities not applied
TARGCLASS	STAR, GALAXY, AGN, NEBULAR, MASK, UNKNOWN…

WEAVE data model set out in ICD-030

SPA Columns – SWG and OCS

SPA Column	SPA Column Description	Required/If Available/Optiona	FIBINFO Table
Observing Mode and Conditions			
PROGTEMP	Observing Programme Template	**Required**	PROGTEMP
OBSTEMP	Observing Constraints Template	**Required**	OBSTEMP
Coordinates in the Gaia Reference Frame			
GAIA_ID	Gaia ID	Required if available	
GAIA_DR	Gaia Data Release	**Required**	
GAIA_RA	Catalogue RA of object in decimal degrees	**Required**	TARGRA
GAIA_DEC	Catalogue Dec of object in decimal degrees	**Required**	TARGDEC
GAIA_EPOCH	Catalogue Epoch of the object in decimal years	**Required**	
GAIA_PMRA	Target proper motion in mas/yr in RA	Required if available	TARGPMRA
GAIA_PMRA_ERR	Error in target proper motion in mas/yr in RA	Required if available	
GAIA_PMDEC	Target proper motion in mas/yr in Dec	Required if available	TARGPMDEC
GAIA_PMDEC_ERR	Error in target proper motion in mas/yr in Dec	Required if available	
GAIA_PARAL	Target parallax in mas	Required if available	TARGPARAL
GAIA_PARAL_ERR	Error in target parallax in mas	Required if available	
IFU Specific			
HEALPIX*	HEALpix ID for Nside=16 nested unsigned integer	Filled by WASP	
IFU_SPAXEL*	Identifier for spaxel within IFU	Filled by WASP	IFU_SPAXEL
IFU_PA*	Position Angle for LIFU use	**Required if LIFU**	IFU_PA
IFU_DITHER*	IFU dither pattern code (0,3,5)	**Required if IFU**	IFU_DITHER

Demo with David

* **Exact column usage is work in progress**

If your coordinates are not on the Gaia Reference Frame the fibre placement will be off!

WEAVE data model set out in ICD-030

SPA Columns – CPS

SPA Column	SPA Column Description	Required/If Available/Optional	FIBINFO Table
Photometry for Spectral Reduction			
MAG_G	Magnitude for target in SDSS-like g band (AB)	Required if available	MAG_G_ERR
MAG_G_ERR	Error on MAG_G	Required if available	EMAG_G
MAG_R	Magnitude for target in SDSS-like r band (AB)	Required if available	MAG_R
MAG_R_ERR	Error on MAG_R	Required if available	EMAG_R
MAG_I	Magnitude for target in SDSS-like i band (AB)	Required if available	MAG_I
MAG_I_ERR	Error on MAG_I	Required if available	EMAG_I
GAIA_MAG_G	Magnitude for target in the Gaia G band (Vega)	Required if available	MAG_GG
GAIA_MAG_G_ERR	Error on GAIA_MAG_G	Required if available	EMAG_GG
GAIA_MAG_BP	Magnitude for target in the Gaia BP band (Vega)	Required if available	MAG_BP
GAIA_MAG_BP_ERR	Error on GAIA_MAG_BP	Required if available	EMAG_BP
GAIA_MAG_RP	Magnitude for target in the Gaia RP band (Vega)	Required if available	MAG_RP
GAIA_MAG_RP_ERR	Error on GAIA_MAG_RP	Required if available	EMAG_RP

These are used by CPS for:

1. Monitor the throughput of the fibres i.e. to test that the signal received is the signal expected
2. Perform the best possible flux calibration
3. Monitor positioning of the fibres to test they are being accurately placed

Magnitudes **MUST** be:

1. UNCORRECTED for extinction
2. SDSS-like on the AB system
   a. Equivalent to the Gunn filters (e.g. PS1 filters, CFHT MegaPrime or MegaCam filters) but not the SDSS Fiber Magnitudes (wrong size fibres).
   b. Assumed below atmosphere at airmass of ~1.3 (canonical SDSS)

Buyer Beware: Without input magnitudes as specified, CPS can NOT guarantee optimal extraction

WEAVE data model set out in ICD-030

SPA Columns – APS

SPA Column	SPA Column Description		SPA Column	SPA Column Description
General settings			**Line strength settings**	
APS_WL_MIN	Minimum rest-frame wavelength to be considered		APS_LS	Extract indices and convert them to SSP prop.
APS_WL_MAX	Maximum rest-frame wavelength to be considered		APS_LS_RES	Spectral resolution of the index measurement
APS_Z	The redshift of the system		APS_LS_NUM_MC	Number of MC simulations to extract errors
APS_SIGMA	Initial guess of the velocity dispersion		**SSP settings**	
APS_TEMPL_LIB	Library of spectral templates		APS_SSP_NUM_WLKR	Number of walkers for the SP MCMC algorithm
APS_TEMPL_LIB_NORM	Normalise the spectral template library		APS_SSP_NUM_CHAIN	Number of iterations in the SP MCMC algorithm
PPXF settings			**IFU settings**	
APS_PPXF_WL_MIN	Minimum rest-frame wavelength to be used by pPXF		APS_IFU_MASK	Mask this fibre in the IFU analysis
APS_PPXF_WL_MAX	Maximum rest-frame wavelength to be used by pPXF		APS_IFU_TSSL	Spatial-bin the IFU data prior to the analysis
APS_PPXF_MOM	Number of kinematic moments to be extracted		APS_IFU_TSSL_TYPE	Type of spatial binning for the data
APS_PPXF_DEG_ADD	Degree of the additive Legendre polynomial		APS_IFU_TSSL_TARG_SNR	Target SNR per pixel for the spatial binning
APS_PPXF_DEG_MULT	Degree of the multiplicative Legendre polynomial		APS_IFU_TSSL_MIN_SNR	Minimum SNR per pixel for the spatial binning
APS_PPXF_NUM_MC	Number of MC simulations to extract pPXF errors		APS_IFU_TSSL_COVAR	Correct for spatial correlations
GANDALF settings			APS_IFU_SRC_ID	Identifier for sources within an IFU mosaic
APS_GNDLF	Run GANDALF to extract emission-line kinematics		APS_IFU_SRC_RA	RA of the centre of its IFU source
APS_GNDLF_ERR	Derive errors on the emission-line analysis		APS_IFU_SRC_DEC	Dec of the centre of its IFU source
APS_GNDLF_RED	Include the effect of reddening by dust		**CSs/CDPs settings**	
APS_GNDLF_EBV	De-redden the spectra for galactic extinction		APS_FLAG	Bit mask to indicate what CSs/CDPs will be run

- APS inputs each have a default settings
- Only change these to tweak how APS does the analysis
- Understand what you are tweaking before playing with them!

WEAVE data model set out in ICD-030

519 Survey-Specific Columns

COORDCAT
COORDCAT_DEC
COORDCAT_DR
COORDCAT_EPOCH
COORDCAT_ID
COORDCAT_RA
EBVCAT
EBVCAT_DEC
EBVCAT_DR
EBVCAT_EBV
EBVCAT_EBV_ERR
EBVCAT_RA
FEHCAT
FEHCAT_DEC
FEHCAT_DR
FEHCAT_FEH
FEHCAT_FEH_ERR
FEHCAT_ID
FEHCAT_RA
GA_TARGBITS
GA_TARGDATE
GA_TARGREV
GAIA_GAL_LAT
GAIA_GAL_LONG
GAIA_MAG_QSO
GAIA_MAG_QSO_ERR
GALEX_DEC
GALEX_DR
GALEX_ID
GALEX_MAG_FUV
GALEX_MAG_FUV_ERR
GALEX_MAG_NUV
GALEX_MAG_NUV_ERR
GALEX_RA
IGAPS_DR
IGAPS_ID
IGAPS_MAG_G
IGAPS_MAG_G_ERR
IGAPS_MAG_HA
IGAPS_MAG_HA_ERR
IGAPS_MAG_I
IGAPS_MAG_I_ERR
IGAPS_MAG_R_I
IGAPS_MAG_R_I_ERR
IGAPS_MAG_R_U
IGAPS_MAG_R_U_ERR
IGAPS_MAG_U
IGAPS_MAG_U_ERR
IRCAT
IRCAT_DEC
IRCAT_DR
IRCAT_ID
IRCAT_MAG_BAND1
IRCAT_MAG_BAND1_ERR
IRCAT_MAG_BAND2
IRCAT_MAG_BAND2_ERR
IRCAT_MAG_BAND3
IRCAT_MAG_BAND3_ERR
IRCAT_MAG_BAND4
IRCAT_MAG_BAND4_ERR
IRCAT_RA
SPTZR_DEC
SPTZR_DR
SPTZR_ID
SPTZR_MAG_MIPS1
SPTZR_MAG_MIPS1_ERR
SPTZR_MAG_MIPS2
SPTZR_MAG_MIPS2_ERR
SPTZR_MAG_MIPS3
SPTZR_MAG_MIPS3_ERR
SPTZR_MAG_IRAC1
SPTZR_MAG_IRAC1_ERR
SPTZR_MAG_IRAC2
SPTZR_MAG_IRAC2_ERR
SPTZR_MAG_IRAC3
SPTZR_MAG_IRAC3_ERR
SPTZR_MAG_IRAC4
SPTZR_MAG_IRAC4_ERR
SPTZR_RA
JPAS_DEC
JPAS_DR
JPAS_EPOCH
JPAS_ID
JPAS_MAG_10069
JPAS_MAG_10069_ERR
JPAS_MAG_3518
JPAS_MAG_3518_ERR
JPAS_MAG_3785
JPAS_MAG_3785_ERR
JPAS_MAG_3900
JPAS_MAG_3900_ERR
JPAS_MAG_4000
JPAS_MAG_4000_ERR
JPAS_MAG_4100
JPAS_MAG_4100_ERR
JPAS_MAG_4200
JPAS_MAG_4200_ERR
JPAS_MAG_4300
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JPAS_MAG_4500_ERR
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JPAS_MAG_4900_ERR
JPAS_MAG_5000
JPAS_MAG_5000_ERR
JPAS_MAG_5100
JPAS_MAG_5100_ERR
JPAS_MAG_5200
JPAS_MAG_5200_ERR
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JPAS_MAG_5300_ERR
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JPAS_MAG_5400_ERR
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JPAS_MAG_6000_ERR
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JPAS_MAG_6200
JPAS_MAG_6200_ERR
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JPAS_MAG_6300_ERR
JPAS_MAG_6400
JPAS_MAG_6400_ERR
JPAS_MAG_6500
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JPAS_MAG_6600
JPAS_MAG_6600_ERR
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JPAS_MAG_6700_ERR
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JPAS_MAG_6800_ERR
JPAS_MAG_6900
JPAS_MAG_6900_ERR
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JPAS_MAG_7000_ERR
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JPAS_MAG_7200_ERR
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JPAS_MAG_7300_ERR
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JPAS_MAG_8000_ERR
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JPAS_MAG_8100_ERR
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JPAS_MAG_8200_ERR
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JPAS_MAG_8500
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JPAS_MAG_8600
JPAS_MAG_8600_ERR
JPAS_MAG_8700
JPAS_MAG_8700_ERR
JPAS_MAG_8800
JPAS_MAG_8800_ERR
JPAS_MAG_8900
JPAS_MAG_8900_ERR
JPAS_MAG_9000_A9000
JPAS_MAG_9000_ERR
JPAS_MAG_9100
JPAS_MAG_9100_ERR
JPAS_MAG_G
JPAS_MAG_G_ERR
JPAS_MAG_QSO
JPAS_MAG_QSO_ERR
JPAS_MAG_QSO_FILT
JPAS_MAG_R
JPAS_MAG_R_ERR
JPAS_MAG_U
JPAS_MAG_U_ERR
JPAS_RA
LOFAR_CLASS
LOFAR_CLASS_XID
LOFAR_DEC
LOFAR_DEC_ERR
LOFAR_DR
LOFAR_FIELD
LOFAR_FLUX_PEAK
LOFAR_FLUX_PEAK_ERR
LOFAR_FLUX_TOTAL
LOFAR_FLUX_TOTAL_ERR
LOFAR_ID
LOFAR_ID_SUBCAT
LOFAR_LBA_CAT
LOFAR_LBA_DR
LOFAR_LBA_FLUX_PEAK
LOFAR_LBA_FLUX_PEAK_ERR
LOFAR_LBA_FLUX_TOTAL
LOFAR_LBA_FLUX_TOTAL_ERR
LOFAR_LBA_ID
LOFAR_LBA_RMS
LOFAR_LUM
LOFAR_LUM_ERR
LOFAR_MAJ
LOFAR_MAJ_ERR
LOFAR_MIN
LOFAR_MIN_ERR
LOFAR_PA
LOFAR_PA_ERR
LOFAR_POINTING
LOFAR_RA
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[illegible]
LOFAR_RMS
LOGGCAT
LOGGCAT_DEC
LOGGCAT_DR
LOGGCAT_ID
LOGGCAT_LOGG
LOGGCAT_LOGG_ERR
LOGGCAT_RA
NIRCAT
NIRCAT_DEC
NIRCAT_DR
NIRCAT_ID
NIRCAT_MAG_H
NIRCAT_MAG_H_ERR
NIRCAT_MAG_J
NIRCAT_MAG_J_ERR
NIRCAT_MAG_K
NIRCAT_MAG_K_ERR
NIRCAT_MAG_Y
NIRCAT_MAG_Y_ERR
NIRCAT_RA
OPTCAT
OPTCAT_DEC
OPTCAT_DR
OPTCAT_ID
OPTCAT_MAG_B
OPTCAT_MAG_B_ERR
OPTCAT_MAG_G
OPTCAT_MAG_G_ERR
OPTCAT_MAG_I
OPTCAT_MAG_I_ERR
OPTCAT_MAG_R
OPTCAT_MAG_R_ERR
OPTCAT_MAG_U
OPTCAT_MAG_U_AU
OPTCAT_MAG_U_ERR
OPTCAT_MAG_V
OPTCAT_MAG_V_ERR
OPTCAT_MAG_Y
OPTCAT_MAG_Y_ERR
OPTCAT_MAG_Z
OPTCAT_MAG_Z_AZ
OPTCAT_MAG_Z_ERR
OPTCAT_RA
PAU_DEC
PAU_DR
PAU_ID
PAU_MAG_G
PAU_MAG_G_ERR
PAU_MAG_I
PAU_MAG_I_ERR
PAU_MAG_NB455
PAU_MAG_NB455_ERR
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PAU_MAG_NB465_ERR
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PAU_MAG_NB475_ERR
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PAU_MAG_NB485_ERR
PAU_MAG_NB495
PAU_MAG_NB495_ERR
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PAU_MAG_NB505_ERR
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PAU_MAG_NB565_ERR
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PAU_MAG_NB835
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PAU_MAG_NB845
PAU_MAG_NB845_ERR
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PAU_MAG_R_ERR
PAU_MAG_U
PAU_MAG_U_ERR
PAU_MAG_Z
PAU_MAG_Z_ERR
PAU_RA
PHOT_LOGG
PHOT_LOGG_ERR
PHOT_TEFF
PHOT_TEFF_ERR
PHOTOZCAT
PHOTOZCAT_DEC
PHOTOZCAT_DR
PHOTOZCAT_ID
PHOTOZCAT_RA
PHOTOZCAT_Z
PHOTOZCAT_Z_CHISQ
PHOTOZCAT_Z_ERR
PHOTOZCAT_Z_GALTEMP
PHOTOZCAT_Z_SEC
PHOTOZCAT_Z_SEC_ERR
PS1_DEC
PS1_DR
PS1_ID
PS1_MAG_G
PS1_MAG_G_ERR
PS1_MAG_I
PS1_MAG_I_ERR
PS1_MAG_R
PS1_MAG_R_ERR
PS1_MAG_Y
PS1_MAG_Y_ERR
PS1_MAG_Z
PS1_MAG_Z_ERR
PS1_RA
QSOSRC
QSOSRC_DEC
QSOSRC_RA
QSOSRC_Z
QSOSRC_Z_ERR
QSOSRC_PROB
S1400_CAT
S1400_DR
S1400_FLUX_PEAK
S1400_FLUX_PEAK_ERR
S1400_FLUX_TOTAL
S1400_FLUX_TOTAL_ERR
S1400_ID
S1400_RMS
S3000_CAT
S3000_DR
S3000_FLUX_PEAK
S3000_FLUX_PEAK_ERR
S3000_FLUX_TOTAL
S3000_FLUX_TOTAL_ERR
S3000_ID
S3000_RMS
S325_CAT
S325_DR
S325_FLUX_PEAK
S325_FLUX_PEAK_ERR
S325_FLUX_TOTAL
S325_FLUX_TOTAL_ERR
S325_ID
S325_RMS
S625_CAT
S625_DR
S625_FLUX_PEAK
S625_FLUX_PEAK_ERR
S625_FLUX_TOTAL
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SCHLGL_AV_TOTAL
SDSS_DEC
SDSS_DR
SDSS_EPOCH
SDSS_FIBRE_MAG_G
SDSS_FIBRE_MAG_G_ERR
SDSS_FIBRE_MAG_I
SDSS_FIBRE_MAG_I_ERR
SDSS_FIBRE_MAG_R
SDSS_FIBRE_MAG_R_ERR
SDSS_ID
SDSS_MAG_G
SDSS_MAG_G_ERR
SDSS_MAG_I
SDSS_MAG_I_ERR
SDSS_MAG_R
SDSS_MAG_R_ERR
SDSS_MAG_U
SDSS_MAG_U_ERR
SDSS_MAG_Z
SDSS_MAG_Z_ERR
SDSS_PHOTO_Z
SDSS_PHOTO_Z_ERR
SDSS_RA
SDSS_SPEC_Z
SDSS_SPEC_Z_ERR
SPECTRAL_INDEX_144_1400
SPECTRAL_INDEX_144_1400_ER
R
SPECZCAT
SPECZCAT_DEC
SPECZCAT_DR
SPECZCAT_ID
SPECZCAT_RA
SPECZCAT_Z
SPECZCAT_Z_ERR
SPECZCAT_Z_FLAG
STEPS_PHOT_FLAG
STEPS_SELECT_IAB
STEPS_SELECT_Z
STEPS_SELECT_Z_FLAG
TEFFCAT
TEFFCAT_DEC
TEFFCAT_DR
TEFFCAT_ID
TEFFCAT_RA
TEFFCAT_TEFF
TEFFCAT_TEFF_ERR
UHS_DR
UHS_ID
UHS_MAG_J
UHS_MAG_J_ERR
VPHAS_DR
VPHAS_ID
VPHAS_MAG_G
VPHAS_MAG_G_ERR
VPHAS_MAG_HA
VPHAS_MAG_HA_ERR
VPHAS_MAG_I
VPHAS_MAG_I_ERR
VPHAS_MAG_R
VPHAS_MAG_R_ERR
VPHAS_MAG_R2
VPHAS_MAG_R2_ERR
VPHAS_MAG_U
VPHAS_MAG_U_ERR
WD_COM
WISE_DEC
WISE_ID
WISE_DR
WISE_MAG_W1
WISE_MAG_W1_ERR
WISE_MAG_W2
WISE_MAG_W2_ERR
WISE_MAG_W3
WISE_MAG_W3_ERR
WISE_MAG_W4
WISE_MAG_W4_ERR
WISE_RA

SS Columns – Key Groupings

Generic Photometric Sources	Generic Coordinates	Specific Extinction
IRCAT	COORDCAT	SCHLGL_AV_TOTAL
NIRCAT		
OPTCAT	**Generic Stellar Parameters**	**Specific Spectral Index**
	TEFFCAT	SPECTRAL_INDEX_144_1400
Specific Photometric Sources	LOGGCAT	SPECTRAL_INDEX_144_1400_ERR
GALEX	FEHCAT	
IGAPS		**Gaia Related**
SPTZR	**Generic Redshift**	GAIA_GAL_LAT
JPAS	PHOTOZCAT	GAIA_GAL_LONG
LOFAR	SPECZCAT	GAIA_MAG_QSO
PAU		GAIA_MAG_QSO_ERR
PS1	**Generic QSO**	
SDSS	QSOSRC	**Specific TARGSRVY**
UHS		GA_TARGBITS
VPHAS	**Radio observations**	GA_TARGDATE
WISE	S1400_CAT	GA_TARGREV
	S3000_CAT	STEPS_PHOT_FLAG
Generic Colour Excess	S325_CAT	STEPS_SELECT_IAB
EBVCAT	S625_CAT	STEPS_SELECT_Z
		STEPS_SELECT_Z_FLAG
		WD_COM

SS Columns – Standardisation

General Scheme for Column Groupings

Column	Column Description
==CAT	Source of the == observations
==CAT_ID	Target identifier associated with ==CAT
==CAT_DR	Data release of ==CAT_ID
==CAT_RA	==CAT_ID Right Ascension (decimal degrees)
==CAT_DEC	==CAT_ID Declination (decimal degrees)
==CAT_MAG_X	Magnitude in X band for ==CAT_ID
==CAT_MAG_X_ERR	Error on ==CAT_MAG_X
==CAT_MAG_X_AX	Extinction associated with ==CAT_MAG_X
Other Suffixes	FLAG, FLUX, PEAK, RMS, CHISQ, FIELD, …

Generic: Optical Catalogues

OPTCAT	Source of the UBVRIugirzy (OPT) observations
OPTCAT_DEC	OPTCAT_ID Declination (decimal degrees)
OPTCAT_DR	Data release of OPTCAT_ID
OPTCAT_ID	Target identifier associated with OPTCAT
OPTCAT_MAG_B	Magnitude in the B band for OPTCAT_ID
OPTCAT_MAG_B_ERR	Error on OPTCAT_MAG_B
OPTCAT_MAG_G	Magnitude in the g band for OPTCAT_ID
OPTCAT_MAG_G_ERR	Error on OPTCAT_MAG_G
OPTCAT_MAG_I	Magnitude in the I or i band for OPTCAT_ID
OPTCAT_MAG_I_ERR	Error on OPTCAT_MAG_I
OPTCAT_MAG_R	Magnitude in the R or r band for OPTCAT_ID
OPTCAT_MAG_R_ERR	Error on OPTCAT_MAG_R
OPTCAT_MAG_U	Magnitude in the U or u band for OPTCAT_ID
OPTCAT_MAG_U_AU	Extinction associated with OPTCAT_MAG_U
OPTCAT_MAG_U_ERR	Error on OPTCAT_MAG_U
OPTCAT_MAG_V	Magnitude in the V band for OPTCAT_ID
OPTCAT_MAG_V_ERR	Error on OPTCAT_MAG_V
OPTCAT_MAG_Y	Magnitude in the y band for OPTCAT_ID
OPTCAT_MAG_Y_ERR	Error on OPTCAT_MAG_Y
OPTCAT_MAG_Z	Magnitude in the z band for OPTCAT_ID
OPTCAT_MAG_Z_AZ	Extinction associated with OPTCAT_MAG_Z
OPTCAT_MAG_Z_ERR	Error on OPTCAT_MAG_Z
OPTCAT_RA	OPTCAT_ID Right Ascension (decimal degrees)

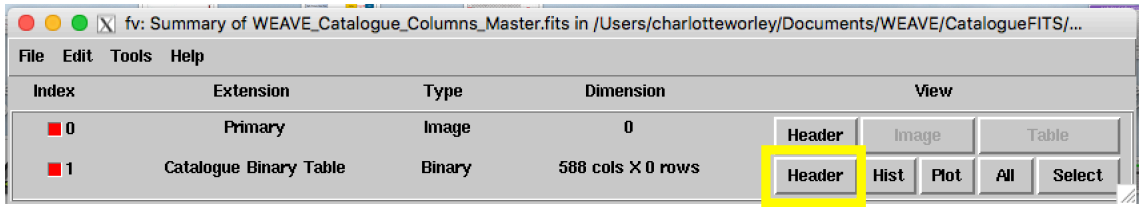
Specific: Spitzer

SPTZR_DEC	SPTZR_ID Declination (decimal degrees)
SPTZR_DR	Spitzer data release
SPTZR_ID	Spitzer target identifier
SPTZR_MAG_MIPS1	Magnitude in MIPS 24um band for SPTZR_ID
SPTZR_MAG_MIPS1_ERR	Error on SPTZR_MAG_MIPS1
SPTZR_MAG_MIPS2	Magnitude in MIPS 70um band for SPTZR_ID
SPTZR_MAG_MIPS2_ERR	Error on SPTZR_MAG_MIPS2
SPTZR_MAG_MIPS3	Magnitude in MIPS 160um band for SPTZR_ID
SPTZR_MAG_MIPS3_ERR	Error on SPTZR_MAG_MIPS3
SPTZR_MAG_IRAC1	Magnitude in IRAC 3.6um channel for SPTZR_ID
SPTZR_MAG_IRAC1_ERR	Error on SPTZR_MAG_IRAC1
SPTZR_MAG_IRAC2	Magnitude in IRAC 4.5um channel for SPTZR_ID
SPTZR_MAG_IRAC2_ERR	Error on SPTZR_MAG_IRAC2
SPTZR_MAG_IRAC3	Magnitude in IRAC 5.8um channel for SPTZR_ID
SPTZR_MAG_IRAC3_ERR	Error on SPTZR_MAG_IRAC3
SPTZR_MAG_IRAC4	Magnitude in IRAC 8.0um channel for SPTZR_ID
SPTZR_MAG_IRAC4_ERR	Error on SPTZR_MAG_IRAC4
SPTZR_RA	SPTZR_ID Right Ascension (decimal degrees)

SS Columns – Standardisation

FITS header keywords specifying catalogue columns as binary tables

Keyword	Description/Usage
TTYPE	Name of column.
TFORM	Data format - A=string, E=floating point, D=double precision, I=integer
TUNIT	Measurement unit of column value. Not present if no units needed
TNULL	Value which FITS interprets as NULL. Assumes empty string {‘’} for strings, floating point NULL (NaN) for real. Explicitly specify for positive integer (e.g. -1)
TDMIN TDMAX	Range of expected values: alphanumeric, real, positive real, integer, positive integer. Assumes (-inf,inf). If range is more restricted than infinity then include (min:max) for restrictions
TPROP	Public or Proprietary: If column should be restricted access in WAS due to MOU with external organisation use ‘1’, otherwise ‘0’
TDISP	Precision of value for checking and display
TUCD	Unified content descriptor for VO compliance




```
TTYPE327= 'OPTCAT  '           / Source of the UBVRIugirzy (OPT) observations
TFORM327= '50A     '           / data format of field: ASCII Character
TDISP327= 'A50     '           / Display format for column
TUCD327 = 'meta.dataset'       / UCD for column
TPROP327= '0       '           / Public column
TTYPE328= 'OPTCAT_DEC'         / OPTCAT_ID Declination (decimal degrees)
TFORM328= 'D       '           / data format of field: 8-byte DOUBLE
TDISP328= 'F11.7   '           / Display format for column
TUCD328 = 'pos.eq.dec'         / UCD for column
TPROP328= '0       '           / Public column
TUNIT328= 'deg     '           / physical unit of field
TDMIN328=                -90.0 / Minimum value expected for field
TDMAX328=                 90.0 / Maximum value expected for field
```

SS Columns – Standardisation

General Scheme for Column Groupings

Column	Column Description
==CAT	Source of the == observations
==CAT_ID	Target identifier associated with ==CAT
==CAT_DR	Data release of ==CAT_ID
==CA	
==CA	
==CA	
==CA	
==CA	
Other	

This is already all decided.
For Science Verification or Open Time you just decide from the SS list which columns you want for your input catalogue

How? See Demo later

FITS header keywords specifying catalogue columns as binary tables

Keyw	
TTYPE	
TFOR	
TUNIT	
TNUL	for ive integer (e.g. -1)
TDMIN TDMAX	Range of expected values: alphanumeric, real, positive real, integer, positive integer. Assumes (-inf,inf). If range is more restricted than infinity then include (min:max) for restrictions
TPROP	Public or Proprietary: If column should be restricted access in WAS due to MOU with external organisation use ‘1’, otherwise ‘0’
TDISP	Precision of value for checking and display
TUCD	Unified content descriptor for VO compliance

Matching to SS Columns to SPA Columns

SPA Column	SPA Column Description	Required/If Available/Optional	FIBINFO Table
Photometry for Spectral Reduction			
MAG_G	Magnitude for target in SDSS-like g band (AB)	Required if available	MAG_G_ERR
MAG_G_ERR	Error on MAG_G	Required if available	EMAG_G
MAG_R	Magnitude for target in SDSS-like r band (AB)	Required if available	MAG_R
MAG_R_ERR	Error on MAG_R	Required if available	EMAG_R
MAG_I	Magnitude for target in SDSS-like i band (AB)	Required if available	MAG_I
MAG_I_ERR	Error on MAG_I	Required if available	EMAG_I

Magnitudes **MUST** be:
1. UNCORRECTED for extinction
2. SDSS-like on the AB system (see slide 9 for details)
3. **One of the SS Columns in your input catalogue FITS file**

Example: You want CPS to use the PanSTARRS i magnitude for the spectral reduction.

1. Ensure **PS1_MAG_I** and **PS1_MAG_I_ERR** are one of the SS columns in your catalogue FITS file
2. Put PanSTARRS i magnitudes and errors into **PS1_MAG_I** and **PS1_MAG_I_ERR** columns
3. **ALSO** put PanSTARRS i magnitudes and errors into the SPA **MAG_I** and **MAG_I_ERR** columns, thus **PS1_MAG_I – MAG_I = 0**

   But then how will anyone know which SS column you used?
4. In your FITS file Primary Header (Extension 0) put **PS1_MAG_I** in the **MAG_I_CM** keyword

Matching to SS Columns to SPA Columns

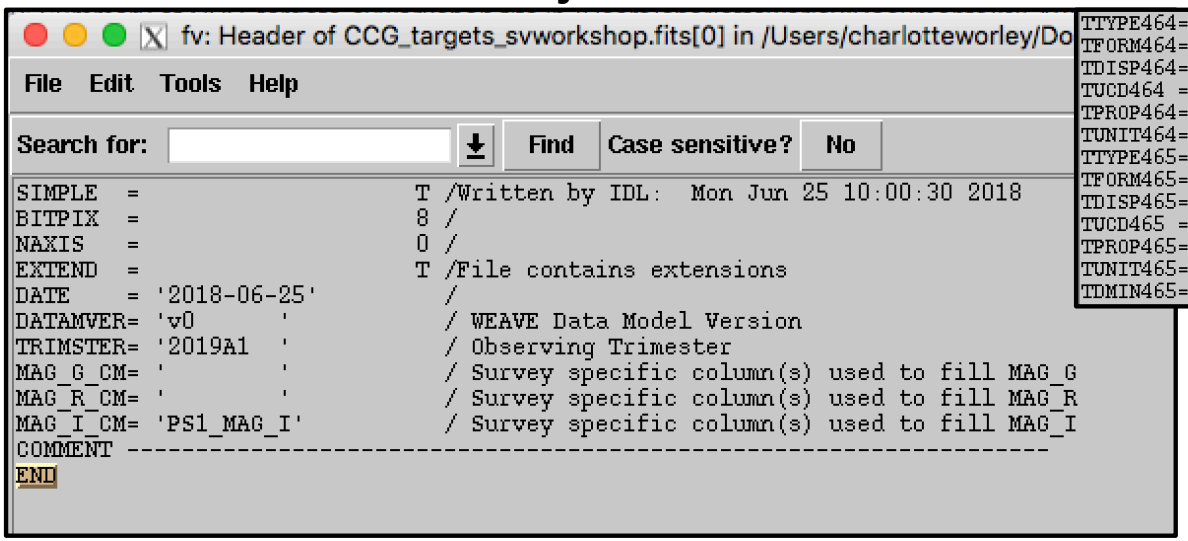
Example: You want CPS to use the PanSTARRS i magnitude for the spectral reduction.

1. Ensure **PS1_MAG_I** and **PS1_MAG_I_ERR** are one of the SS columns in your catalogue FITS file
2. Put PanSTARRS i magnitudes and errors into **PS1_MAG_I** and **PS1_MAG_I_ERR** columns
3. **ALSO** put PanSTARRS i magnitudes and errors into the SPA **MAG_I** and **MAG_I_ERR** columns, thus **PS1_MAG_I – MAG_I = 0**

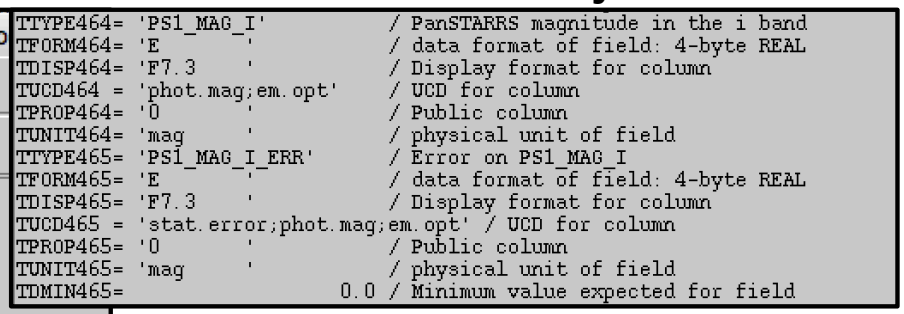
But then how will anyone know which SS column you used?

4. In your FITS file Primary Header (Extension 0) put **PS1_MAG_I** in the **MAG_I_CM** keyword

Extension 0 Primary Header



Extension 1 Header: Binary Table



Questions then Demos