



## Instrument specific keyword value hints

Matheus Guilherme Brito - 2022-04-20 - Comments (0) - Phase 3 FAQs

### **Q: Could you please provide some information regarding the format of APEX 1-D spectra?**

A: The format defined in the Phase 3 SDPS for 1-D spectral products applies also in the case of APEX reduced spectra, with few modifications:

1. The following keyword defined as mandatory for spectral products do not apply in the case of APEX spectra: OBID1.
2. While the keyword FEBE1 indicating the Frontend-backend combination becomes mandatory in this case.

Example of the values of some specific keywords:

Primary header

```
ORIGIN = 'APEX' / Facility
TELESCOP = 'APEX-12m' / Telescope name I
NSTRUME= 'APEXHET' / Instrument name
FEBE1 = 'HET230-XFFTS2' / Frontend-backend combination
OBSTECH = 'SPECTRUM' / Technique of observation
PRODCATG= 'SCIENCE.SPECTRUM' / Data product category
```

Extension header

```
EXTNAME = 'SPECTRUM' / FITS Extension name
TTYPE1 = 'FREQ ' / Label for field 1
TUTYP1 = 'Spectrum.Data.SpectralAxis.Value'
TUNIT1 = 'GHz ' / Physical unit of field 1
TUCD1 = 'em.freq ' / UCD of field 1
TDMIN1 = 229.011 / Start in spectral coord.
TDMAX1 = 233.000 / Stop in spectral coord.
TTYPE2 = 'FLUX ' / Label for field 2
TUTYP2 = 'Spectrum.Data.FluxAxis.Value'
TUNIT2 = 'mJy ' / Physical unit of field 2
```

TUCD2 = 'phot.flux.density;em.freq' / UCD of field 2  
TTYPE3 = 'ERR ' / Label for field 3  
TUTYP3 = 'Spectrum.Data.FluxAxis.Accuracy.StatError'  
TUNIT3 = 'mJy ' / Physical unit of field 3  
TUCD3 = 'stat.error;phot.flux.density;em.freq' / UCD of field 3

Please also note that the values of the following keywords need to be provided in nm:

WAVELMIN= 1291867.18750 / [nm] Minimum wavelength

*It corresponds to the value of TDMIN1 converted from GHz to nm (conversion factor: 299792458)*

WAVELMAX= 1309075.80566 / [nm] Maximum wavelength

*It corresponds to the value of TDMAX1 converted from GHz to nm (conversion factor: 299792458)*

SPEC\_BIN= 111.744273793 / [nm] Wavelength bin size

SPEC\_VAL= 1300471.49658 / [nm] Mean Wavelength

SPEC\_BW = 17208.6181641 / [nm] Bandpass Width Wmax – Wmin

The following link may be useful to reconstruct the provenance information, it provides the mapping between the original file name to the archive id, and calculating the exposure time:

[http://archive.eso.org/wdb/wdb/eso/apex\\_origfile/form](http://archive.eso.org/wdb/wdb/eso/apex_origfile/form)

## Q: What shall I do in the case of GTC data?

A: The origin keywords shall be set as follows:

ORIGIN = 'GRANTECAN'

TELESCOP = 'GTC'

INSTRUME = 'CANARICAM' or 'OSIRIS'

In addition to the above keywords, the use of GTCPRGID and GTCOBID (to be adopted from the original data) is recommended.

## Q: Possible algorithm for ABMAGSAT computation

In the case of the VIMOS imaging pipeline, an adaptation of the method used by the PESSTO survey (A&A, 2015, 579, pg. 25) is the following:

ABMAGSAT = zeropoint -2.5\*log10(((pi/4.\*ln(2)))\*(satlev-mean\_sky)\*(psf\_fwhm/pixel\_scale)^2)/EFF\_EXPT)

where the parameters are those written to the following keywords:

```
satlev = HIERARCH ESO QC SATURATION
zeropoint = HIERARCH ESO QC MAGZPT
mean_sky = HIERARCH ESO QC MEAN_SKY
pdf_fwhm = PSF_FWHM
pixel_scale = HIERARCH ESO QC WCS_SCALE
EFF_EXPT = the effective exposure time (= CASUEXPT)
```

## Q: How to compute the MJD-END of a SOFI spectrum?

The end time of a Phase 3 SOFI 1d spectrum product (MJD-END) must be computed using the following formula:

$$\text{MJD-END} = \text{MJD-OBS of the last raw observation} + \text{NDIT} * (\text{DIT} + 1.8) / 86400$$

where the 1.8 seconds accounts for the necessary overheads, and 86400 scales back from seconds to days.

## Q: What is the correct EFFRON for median-combined SOFI images?

**Example:** There are 7 raw images, each resulting from averaging together 5 detector integrations (NDIT = 5). A science product is generated by reducing and median-combining those 7 raw images.

**In this case:**

$$\text{EFFRON} = 12 * \text{sqrt}(\text{PI}/2) / \text{sqrt}(7 * 5)$$

where PI is 3.14159, and 12 is the detector readout noise of SOFI in electrons.

## Q: May you please clarify what the OBSTECH keyword values are?

A: We support the OBSTECH keywords listed in the table below, in addition to those defined by the SDP standard document.

| INSTRUME | Mode | Origin of keyword value | TELESCOP | OBSTECH |
|----------|------|-------------------------|----------|---------|
|----------|------|-------------------------|----------|---------|

|           |              |                                  |         |     |                     |
|-----------|--------------|----------------------------------|---------|-----|---------------------|
| OSIRIS    | Imaging      | Broad band<br>(SDSS filters)     | OBSMODE | GTC | 'IMAGE'             |
|           |              | Narrow band<br>(Tunable filters) |         |     | 'IMAGE,FABRY-PEROT' |
|           |              | Medium band<br>(SHARDS filters)  |         |     | 'IMAGE'             |
|           | Spectroscopy | Long slit                        |         |     | 'SPECTRUM'          |
| CanariCAM | Imaging      |                                  |         |     | 'IMAGE,CHOPNOD'     |
|           |              |                                  |         |     | 'IMAGE,NODDING'     |
|           |              |                                  |         |     | 'IMAGE,CHOPPING'    |
|           |              |                                  |         |     | 'IMAGE,STARE'       |
|           | Spectroscopy |                                  |         |     | 'SPECTRUM,CHOPNOD'  |
|           |              |                                  |         |     | 'SPECTRUM,NODDING'  |
|           |              |                                  |         |     | 'SPECTRUM,CHOPPING' |
|           |              |                                  |         |     | 'SPECTRUM,STARE'    |

Tags

FAQ

Phase 3

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- [How to convert a spectrum to the required binary table format](#)
- [How to migrate catalogues from ASCII to FITS format](#)
- [How to rename downloaded products to their original file names](#)
- [How to transfer files to the FTP area](#)