

High energy requirements for a SED data model

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Considering the high energy science and data requirements, having in mind the SSA data model, we propose a list of keywords to be inserted in the SED data model for high energy data.

Into the document, this is not indicated, but each attribute has to be qualified by an UCD and a type (J2000, B1950, Galactic, Ecliptic for a position, for example) when needed. We stress that the units we have indicated are chosen in order to fit with a DOUBLE and to have the required significativity (millisecond accuracy for any time, for example). We indicate for each attribute if it must be present (mandatory) or should be present (optional). Several of these keywords do exist in the current drafts; they are listed here as these keywords are the “minimal list of keywords for high energy data”. They are listed in two sections: one for keywords to be listed once in the SED file, one for keywords to be listed in all segments of the SED.

Last, this document has been prepared with a point source object in mind, and some refinements may be needed to fit with the case of extended objects.

I. Single occurrence keywords

Creator: the tool that created the SED (mandatory)

Creation Date: the date of the creation of the SED (mandatory)

RA: RA indicated by the user (optional)

DEC: DEC indicated by the user (optional)

Radius: radius of the research cone when building the SED (mandatory)

Name: name of the object indicated by the user (optional if RA and DEC are indicated, mandatory otherwise). Note that the name has to be resolved by NED and/or SIMBAD to be useful

NH: High energy column density in the direction of the object (optional)

AV: optical extinction in the direction of the object (optional)

Redshift: redshift of the object (mandatory). In case of unknown redshift, insert a negative value.

II. SED Segment keywords

Start_range: Start of the frequency range of the observation (mandatory). Units are Hz

End_range: End of the frequency range of the observation (mandatory). Units are Hz

Threshold: Frequency threshold for the observation (mandatory). In case of no threshold, this key must report the Start_range value. Units are Hz

Start_validity: Start time of the observation or in case of catalog extracted data start of the catalog in MJD (mandatory, 0 if unknown)

End_validity: End time of the observation or in case of catalog extracted data start of the catalog in MJD (mandatory, 0 if unknown)

Livetime: real integration time of the observation, taking out detector dead times, non observation periods, and other instrumental bias (mandatory)

Model_name: name of the model used to obtain the flux density (mandatory in case of flux density)

Model_parameter_number: number of parameters of the model used to obtain the flux density (mandatory in case of flux density)

Parameter_X_name: name of the Xth parameter of the model used to obtain the flux density (mandatory in case of flux density). Note that X is a number (i.e. Parameter_1_name, Parameter_2_name, and so on)

Parameter_X_value: value of the Xth parameter of the model used to obtain the flux density (mandatory in case of flux density)

Parameter_X_error_positive: value of the positive error on the Xth parameter (mandatory in case of flux density, negative value if not known, 0 value if fixed)

Parameter_X_error_negative: value of the negative error on the Xth parameter (mandatory in case of flux density, negative value if not known, 0 value if fixed)

Model_fit_dof: degree of freedom of the fit of the model (mandatory in case of flux density, 0 value if fit not done and/or model fixed without fit)

Model_fit_chi2: chi2 value of the fit of the model (mandatory in case of flux density, 0 value if fit not done and/or model fixed without fit)

SNR: signal to noise ratio of the observation (mandatory, negative value if unknown)

Observatory: Observatory or mission that produced the data (mandatory)

Instrument: Instrument that produced the data (mandatory)

Filter: filter in use at the time of the data production (mandatory). Note that this attribute can be redundant with start_range and end_range in case of optical data, but is needed at high energy. The values “none” or “unknown” are correct values when they apply

Calibrated: Boolean indicating if the data are calibrated (i.e. flux) or not (i.e. count rate). This is mandatory

Calibration_version: version of the calibration used to calibrate the data. Mandatory if calibrated is true. Can be a number, a date, or a list of numbers.

Calibration_name: name of the calibration used to calibrate the data. Mandatory if calibrated is true. Can be either a global name (CALDB), an URL pointing to a page listing the calibration used, an URL pointing to a TAP service of calibration files (to be proposed at the next VO Interop meeting).

Point_alpha: pointing direction in RA (optional). Assume to be equal to RA if not present

Point_delta: pointing direction in DEC (optional). Assume to be equal to DEC if not present

Airmass: air mass of the observation (optional)

Zenith_angle: Angle between the observation and the zenith (optional)

Instrumental_setup: instrument setup of the observation (optional)

Telescope_number: number of telescopes in use in case of very high energy and/or interferometric observation (optional)

Moon_angle: angle between the observation and the moon (optional)

Moon: value between 0 (new moon) and 28 (optional)

Earth_limb: angle between the observation and the earth limb (optional)

Solar_angle: angle between the observation and the sun (optional)

History: all modifications and processing done to the SED segment (mandatory). The history MUST be propagated without modification, so that the user can know precisely what has been done to the data.

Comment: any other info not covered by the attributes. The comments are chosen by the data provider and MUST be propagated without modification. A comment is not mandatory, but it is good to insert a comment indicating a reference (article reference, observation ID, run ID, url of observation log,...). The comment attributes can be as numerous as needed.

III. To do and to consider

- The SSA data model request an aperture angle, which has no meanings at high energy. Instead, the Point Spread Function, which depends on the energy, is a key parameter for spectral analysis. How this should be reported?