High energy requests for spectrum and SED data models

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What is the problem?

For most scientists VO data are expected to be "science ready"

Good, but not so easy

At high energy, we are not playing with energy or ADU, but with single photons

Or in some case with effect of a single photon

There, the Quantum Physics is at play

Heisenberg relations : impossible to derive a "true energy"

Probabilities are the key ingredient

Translating measure into energy/frequency is possible but…

Need a knowledge of the calibration, that is always improving with time (for us, entropy is the best synonym of calibration)

Need a knowledge of the instrument settings at the time of the measure

Need a knowledge of the spectrum a-priori

What are our needs?

For all measurements, the info need to come with the information needed to correct

- An improvement of the calibration
- The use of another model (i.e. fit of the Spectrum/SED)
- The possible bad quality of the measure

We thus need:

- ✓ A model extension
  - This has to be flexible, yet with some standard rules for naming convention
- ✓ A calibration extension
  - This is mostly the name and version of the calibration, but also a standard name for the filter, the instrument setup, and so on
- ✓ A quality extension
  - These are additional keywords to the DM in use

What do we propose?

We are producing a note for the IVOA with Mark Cresitello-Dittmar with all the requirements we need

We propose a discussion on that note for its implementation in the SpectrumDM v2.0 for spectral issues, and in the forthcoming SedDM for specific SED issues.

Bonus: what is misleading!

Some concepts, clear in optical are not so obvious at high energy

SpatialAxis.coverage.* in spectrum : for optical, this is the position of the slit, obvious. At high energy, we are using the whole detector and the spectrum quality is linked to the source position on the detector: should this means the position of the source (where the spectrum is extracted) or the center of the field of view (similar to the center of the slit in optical) ?

SED segments: in optical, this is a "spectrum", either high resolution or low resolution (i.e. some photometric points altogether) obvious. At high energy, each data point has its own uncertainties and should be considered as a segment. However, several quantities are then reported several times (segment coverage = point coverage, for instance). Should the IVOA relax some "mandatory" constraints to avoid a VOTable affected by stuttering?