Strasbourg DADI contribution to IVOA TimeSeries priority

F.Bonnarel (CDS)

On behalf of Strasbourg DADI TimeSeries group :

Ada Nebot - chair-, Mireille Louys, Laurent Michel, S.Derrière, T.Boch, G.Landais

External collaborations : Dave Morris, Jiri Nadvornik, Mark Cresitello, Marco Molinaro, Baptiste Cecconi

Summary of presentation

- DADI in IVOA Working groups
- Work so far
- Use cases
- Discovery
- Accessing
- Data representation

DADI in IVOA Working Groups

- IVOA Work on TimeSeries. Working group chaired by DADI partners.
  - TDIG = Ada Nebot, Dave Morris
  - DM = Mark Cresitello, Laurent Michel
  - DAL = François Bonnarel, Marco Molinaro
  - Planetary IG: Baptiste Cecconi
  - Major contribution of M.Louys 5Semantis WG chair)
- Projects : GAVO + Prag, VizieR, Gaia, SVO, LSST
- Weakness of non european participation

Work so far ?

Was an IVOA priority. Actual work started around Trieste interop meeting fall 2016.

- ASTERICS DADI/CLEOPATRA meeting and Tech Forum in March 2017
  - First discussion on a serialization proposed by Jiri
  - First overal discussion on TimeSeries Discovery metadata
- TDIG/DAL/DM sessions in Shangai interop (May 2017) and
- TDIG/DAL/DM sessions in Santiago Interop (October 2017)
  - Use cases and experience
  - DAL view
  - New model proposal
  - Serializations
- DADI meeting in Strasbourg (December)
  - Progress on metadata
  - Progress on modelling
  - Progress on serializations attempts convergence
- IVOA note summarizing use cases, issues, serializations and prototypes in progres → Victoria ?

Use cases

- Gaia : multiband light curves in DR1
- SVO light curves
- VizieR : …. catalogs have time information ; heterogeneous
  - Photometry, relative photometry, radial velocities, etc...
  - Catalog = TimeSeries for a single object
  - Catalogs merging several object TimeSeries
  - TimeSeries as associated data to the main catalog (links)

Use cases

- GAPS (exoplanets)
  - Star features important for discovery and analysis
- XMM :
  - TimeSeries of spectra
  - TimeSeries of TimeSeries
- Planetary data (Euro Planet)
  - Planetary data have strong evolution aspects → time
  - EPNCore has more characterisation details on the Time axis than ObsCore

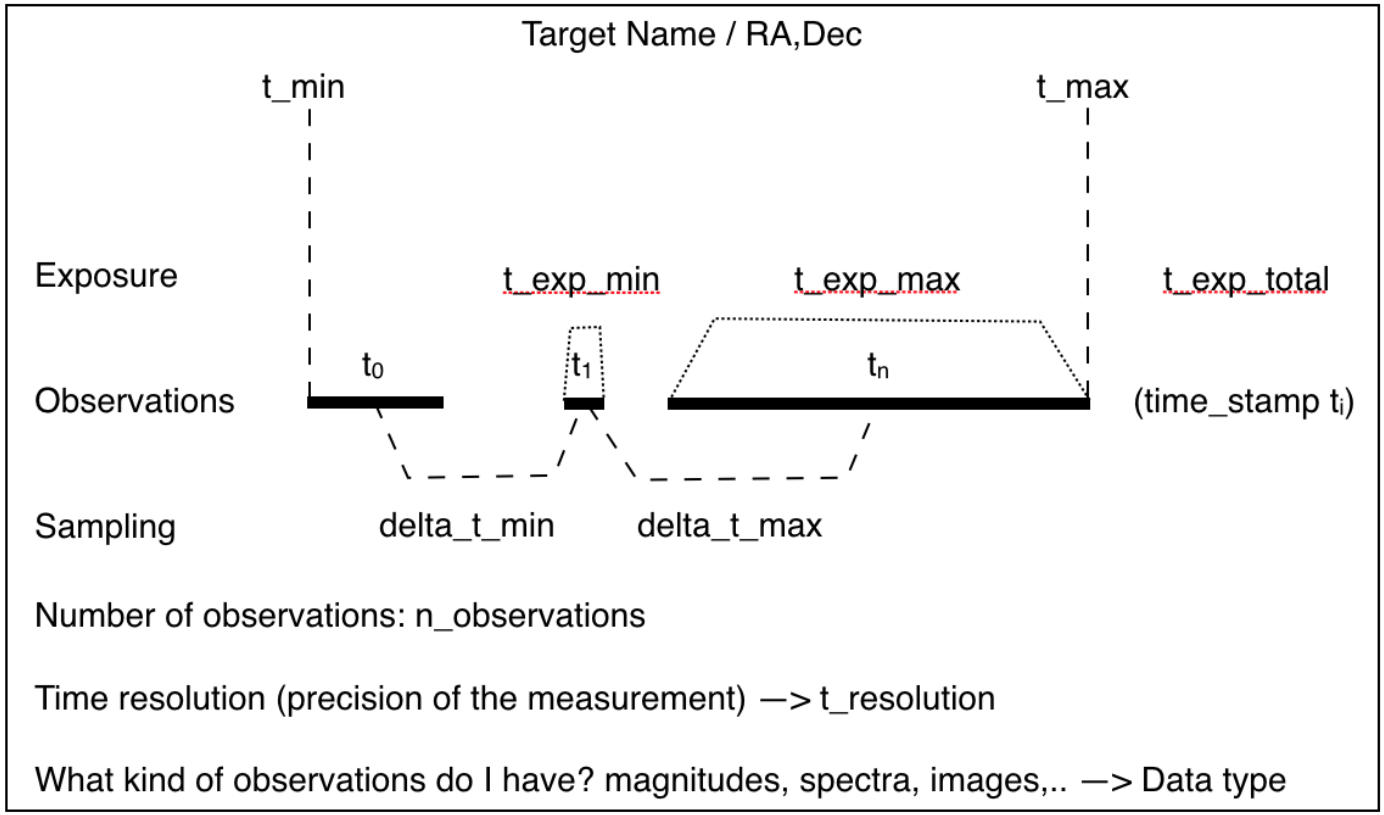
Metadata : for discovery and other purposes

- Time Frame (see STC, WCS):
  - Scale : TT, TDB, TAI...
  - Reference position : barycenter …
  - Time Origin (if representation is « time offset »)
- Time Representation (see STC, WCS)
  - JD, MJD, ISO, or « Time offset »

Metadata : for discovery and other purposes

- Discovery Consensus so far :
  - Most of Obscore is fine
  - Insistance of TARGET as alternative to ICRS position
  - Cadence and exposure time min max at sample level
- Discussion
  - How to describe what is varying with time ?
    - (multi-valued) o_ucd ?
    - Dataproduct_subtype ? Mandatory ? Fixed list ?
  - Periodicity and phase characterisation description ?
    - Let this to data representation ? Data analysis ?
    - Not in basic discovery metadata

Time Series metadata on Time axis



TimeSeries discovery

- 3 discovery modes
  - Source driven (direct or via DataLink)
  - ObsCore/SIAV2-like driven (are extensions needed ?)
  - Physical Content driven (project specific?)

Source driven (Use case : GAIA)
Obscore-like driven(use case :SVO, planets, GAIA, all)

- Source
  - We retrieve sources via a TAP or an SCS service
  - For each source an URL retrieves TimeSeries
  - How do we put a standard tag on this URL ?
  - See discussion on DataLink feedback
- Obscore-like
  - Obscore allows discovery of « data_product=TimeSeries » datasets with other constraints
  - + cadence , sample exposure time...
  - Close to previous SSA-like approach (SVO)

Physical Content- driven (INAF exoplanets, ESA missions)

- List of metadata
  - Signal periodicity
  - Periods
  - Object type candidate (exoplanet, variable star, etc..)
  - Transiancy
  - Artefacts
  - Etc…
- Requires specific analysis
  - Project specific
  - Additional physical content metadata table.
  - Joints to Obscore-like table

DAL perspective

- Consensus so far
  - Keep « multi-d DAL framework » as a basis (ObsCore/TAP, SIA2, DataLink,SODA)
  - TimeSeries Extensions (see above) for ObsCore, SIAV2, SODA
  - TimeSeries DataModel and serialization is a spec
- How to proceed for these extensions ?
    - Extensions on protocols + light hat « TimeSeries DiscoveryAcces protocol »

How DAL can tackle all this ?

- Discovery : Obscore :
  - set a couple of additional TimeSeries metadata field in ivoa schema

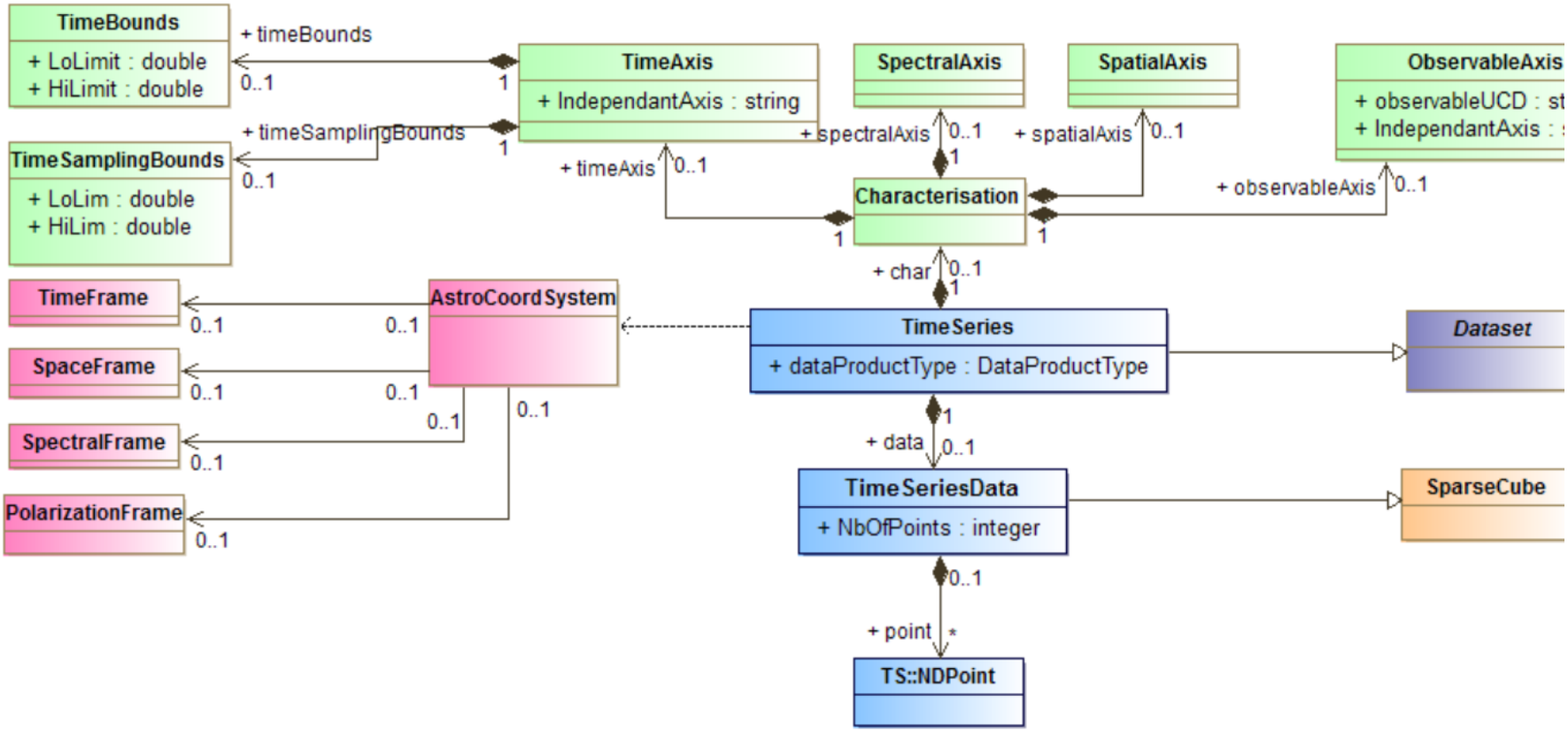
- Access : Data Representation :
  - Requires modelling and serialization
  - ---> It's a DM task (see tommorrow)

How DAL can tackle all this ?

- SODA : TimeSeries generation :
  - Add a « DataProductType attribute » to SODA (to generate TimeSeries instead of Cubes)
  - Add resampling parameter(s) to SODA interface
- SIAV2 :
  - Reflect new Obscore-like attributes in the SIAV2 query parameters
  - Virtual data discovery capability : TimeSeries nots stored but generated

Data Model

- Consensus so far :
  - TimeSeries data model is
    - CubeDM (sparse) or an Extension of Cube.
    - Time as independant axis
- Points to be discussed
  - Which are the dependant axes ?
  - How to describe them
  - Cube model / axis agnosticity ?



TimeSeries Datamodel UML diagram
(M.Louys)

Legend

is associated to

derives from

is composed Of

Color code for classes

TimeSeries_DM

Characterisation_DM Class

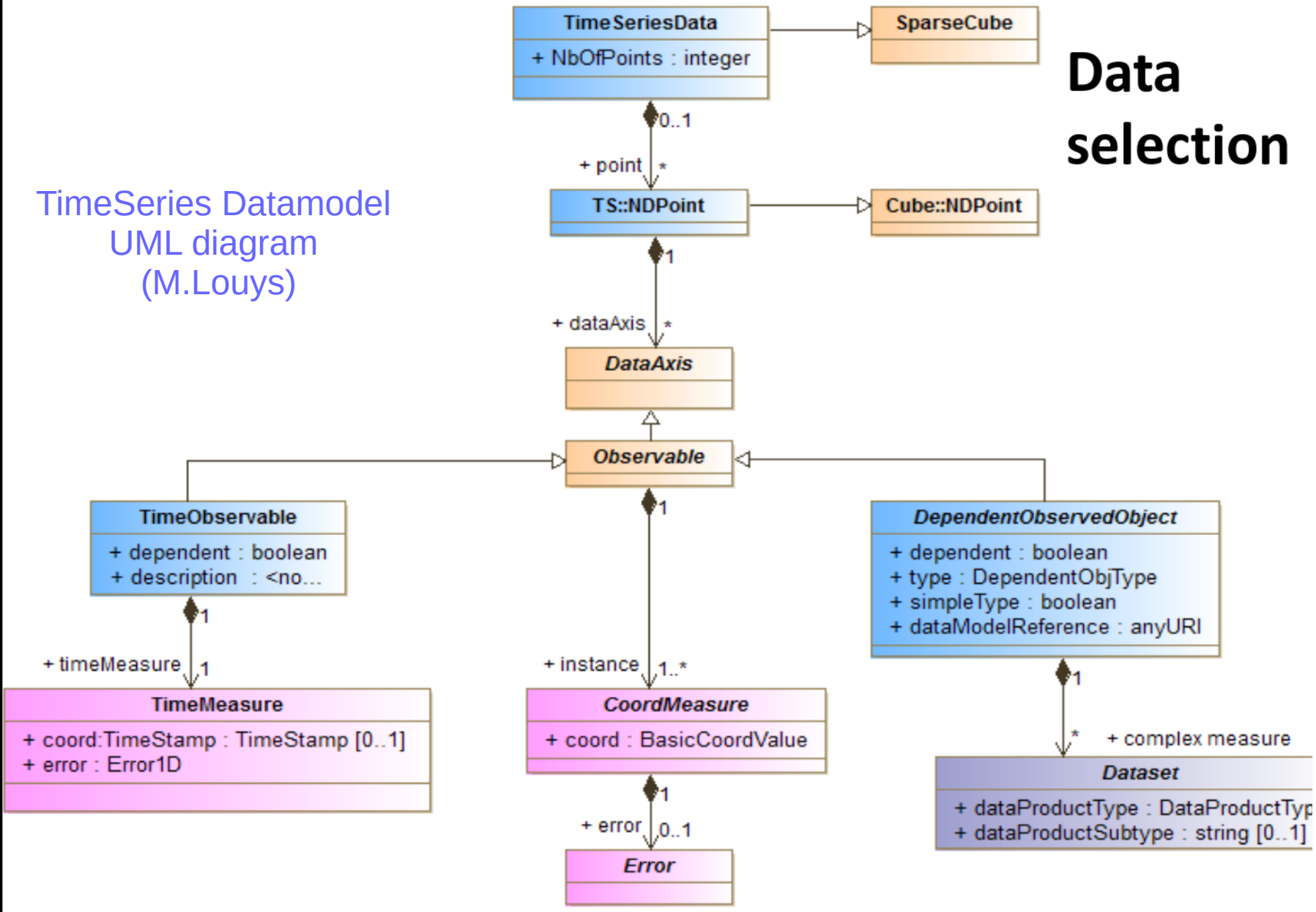
Cube_DM Class

STC_DM Class

Discovery
→ Characterisation DM

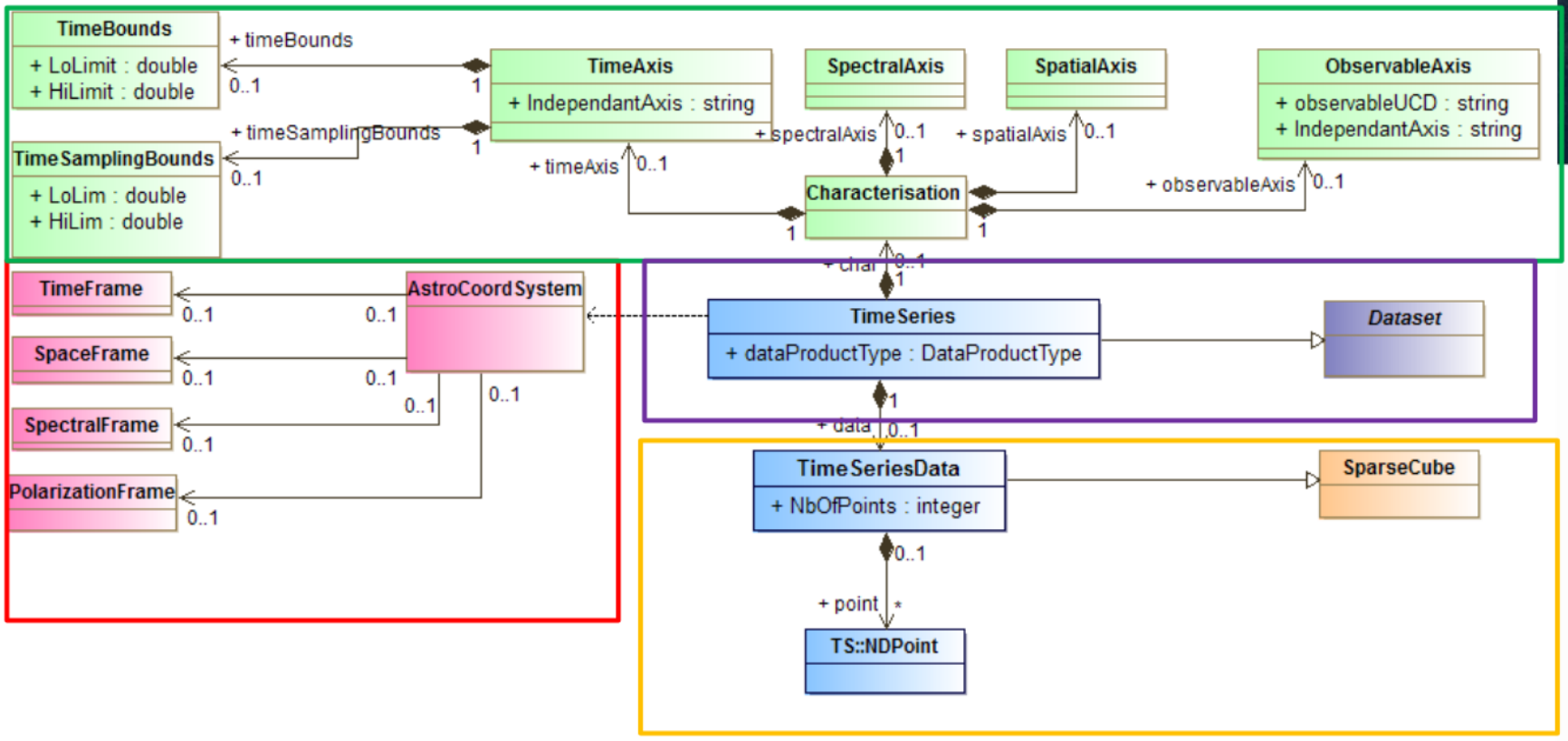
Data selection

TimeSeries Datamodel
UML diagram
(M.Louys)



TimeSeries representations DataModel serializations

- Data organization :Main data tables + additional Tables/GROUPS of PARAMS (for metadata)
- Which DataModel Mapping ? Several proposals to be discussed
  - Utypes (all role and meaning information conveyed at the column level)
    - GROUP/FIELD separation (utypes on both on GROUP, FIELD)
    - Classical one (long composed utypes on FIELDS/columns)
  - VO-DML mapping (rebuild model objects from VOTable)
    - Full mapping (Cresitello)
    - Light (L.Michel)



Legend

is associated to

derives from

is composed Of

Color code for classes

- TimeSeries_DM
- Characterisation_DM Class
- Cube_DM Class
- STC_DM Class

Purple : TimeSeries – Dataset

Green : characterisation

Pink : Coord Systems

Yellow : (TimeSeries)Data

TimeSeries representations DataModel serializations

- Data organization :Main data tables + additional Tables/GROUPS of PARAMS (for metadata)
- Which DataModel Mapping ? Several proposals to be discussed
  - Utypes (all role and meaning information conveyed at the column level)
    - Classical one (long composed utypes on FIELDS/columns)
    - GROUP/FIELD separation (utypes on both on GROUP, FIELD)
  - VO-DML mapping (rebuild model objects from VOTable)
    - Light (L.Michel)
    - Full mapping (Cresitello)

Data section

```
- <GROUP utype="ts:TimeSeriesData" name="TimeSeriesData">
      <FIELDref utype="ts:TimeSeriesData.NDPoint.TimeObservable.TimeMeasure.MJD" ref="HJD"/>
    - <GROUP name="spatial">
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.Position2D.SpatialValue2D[0]" ref="raj2000"/>
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.Position2D.SpatialValue2D[1]" ref="dej2000"/>
      </GROUP>
    - <GROUP name="Flux">
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.CoordMeasure.PhotometryPoint" ref="FLX"/>
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.CoordMeasure.PhotometryPointError" ref="FLXERR"/>
      </GROUP>
    - <GROUP>
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.CoordMeasure.PhotometryPoint" ref="MAG"/>
          <FIELDref utype="ts:TimeSeriesData.NDPoint.dependantObservedObject.CoordMeasure.PhotometryPointError" ref="MAGERR"/>
      </GROUP>
  </GROUP>
- <FIELD ID="HJD" datatype="double" name="HJD" ref="tif" unit="d" ucd="time;obs.exposure">
      <DESCRIPTION>Epoch at midpoint of observation in heliocentric modified julian date</DESCRIPTION>
  </FIELD>
- <FIELD ID="raj2000" datatype="double" name="raj2000" ref="posf" unit="deg" ucd="pos.eq.ra">
      <DESCRIPTION>Observed RA of the object</DESCRIPTION>
  </FIELD>
- <FIELD ID="dej2000" datatype="double" name="dej2000" ref="posf" unit="deg" ucd="pos.eq.dec">
      <DESCRIPTION>Observed declination of the object</DESCRIPTION>
  </FIELD>
- <FIELD ID="FLX" datatype="float" name="FLX" ref="phot" unit="erg/s/cm2/std" ucd="phot.flux">
      <DESCRIPTION>Photon Flux</DESCRIPTION>
  </FIELD>
+ <FIELD ID="FLXERR" datatype="float" name="FLXERR" ref="phot" unit="erg/s/cm2/std" ucd="stat.error;phot.flux">
- <FIELD ID="MAG" datatype="float" name="MAG" ref="phot" unit="mag" ucd="phot.mag">
      <DESCRIPTION>Magnitude of the object</DESCRIPTION>
  </FIELD>
- <FIELD ID="MAGERR" datatype="float" name="MAGERR" ref="phot" unit="mag" ucd="stat.error;phot.mag">
      <DESCRIPTION>Error of the magnitude</DESCRIPTION>
  </FIELD>
- <DATA>
    - <TABLEDATA>
```

TimeSeries representations DataModel serializations

- Data organization :Main data tables + additional Tables/GROUPS of PARAMS (for metadata)
- Which DataModel Mapping ? Several proposals to be discussed
  - Utypes (all role and meaning information conveyed at the column level)
    - Classical one (long composed utypes on FIELDS/columns)
    - GROUP/FIELD separation (utypes on both on GROUP, FIELD)
  - VO-DML mapping (rebuild model objects from VOTable)
    - Light (L.Michel)
    - Full mapping (Cresitello)

Mapping in a VOTable

VO-DML light mapping (L.Michel)

This VOTable contains a time series

```
<MODEL>
    <NAME>lmtimeserie</NAME>
    <URL>http://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/tesselation/lmtimeserie.vo-dml.xml</URL>
    <IDENTIFIER>ivo://ivoa.org/dm/sample/LMSource/0.1</IDENTIFIER>
</MODEL>
<MODEL>
    <NAME>lmobservable</NAME>
    <URL>http://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/tesselation/lmobservable.vo-dml.xml</URL>
    <IDENTIFIER>ivo://ivoa.org/dm/sample/LMObservable/1</IDENTIFIER>
</MODEL>
```

Resolve the model namespace

```
<TEMPLATES tableref="_table1">
    <TUPLE dmtype="lmtimeserie:TimeSerie">
        <TUPLE dmrole="lmtimeserie:TimeSerie.TimeAxis" dmtype="lmtimeserie:TimeAxis">
            <VALUE dmrole="lmtimeserie:TimeAxis.TimeFrame" table_ref="_0117pYWsEJmSbhJP" />
        </TUPLE>
        <TUPLE dmrole="lmtimeserie:TimeSerie.ObservableAxis" dmtype="lmtimeserie:ObservableAxis">
            <VALUE dmrole="lmtimeserie:TimeSerie.ObservableModel" source="child">lmobservable</VALUE>
        </TUPLE>
        <COLLECTION dmrole="lmtimeserie:TimeSerie.Points" dmtype="lmtimeserie:Point" arraysize="*">
            <TUPLE dmtype="lmtimeserie:Point">
                <VALUE dmrole="lmtimeserie:TimeAxis.TimeStamp" table_ref="timestamp_100" />
                <TUPLE dmtype="lmobservable:Observable">
                    <VALUE dmrole="lmobservable:Observable.long" table_ref="pos_ra_csa_100" />
                    <VALUE dmrole="lmobservable:Observable.lat" table_ref="pos_dec_csa_100" />
                    <VALUE dmrole="lmobservable:Observable.velocity" table_ref="velocity_100" />
                    <VALUE dmrole="lmobservable:Observable.imag" table_ref="image_100" />
                    <VALUE dmrole="lmobservable:Observable.magnitude" table_ref="magnitude_100" />
                <TUPLE>
            </TUPLE>
        </COLLECTION>
    <TUPLE>
</TEMPLATES>
```

Reference to the dependant axis mode

WARNING: Annotations have been simplified for the purpose of this talk.

Ongoing work

- DAL chair/vice-chair to propose a DAL guideline as an IVOA note ---> IVOA discussion to be driven
- Data modelling and representation IVOA note in progress (volute)
  - 4 Test TimeSeries = Mono band light curve, Multiband/shift in time light curve, GAPS (exoplanet with plenty of non photometric parameters) GAIA TimeSeries
  - Attempts by Jiri Nadvornik, L.Michel, F.Bonnarel, M.Cresitello
  - Prototype implementation in VizieR

IVOA Note

International
Virtual
Observatory
Alliance

IVOA TimeSeries data modelling and representation

Version 1.0

IVOA Note 2018-03-21

Working group
TimeDomain
This version
http://www.ivoa.net/documents/TSSerializationNote/20180321
Latest version
http://www.ivoa.net/documents/TSSerializationNote
Previous versions

Author(s)
Francois Bonnarel, Mireille Louys, Ada Nebot, Laurent Michel
Editor(s)
Ada Nebot

Version Control
Revision 4724, 2018-01-29 15:20:52 +0100 (lun. 29 janv. 2018)
https://volute.g-vo.org/svn/trunk/projects/ivoapub/ivoatexDoc/ivoatexDoc.tex

Separated GROUP/FIELD approach

```
  </DATA>
 </TABLE>
-<TABLE ID="data">
  -<!--
     Here are the data; We have one independant (Time) and three dependant Observables (ra-dec, flux, mag . the two latter come with their error
   -->
  -<!--
     Jiri:
            The same information can be expressed with less - as seen below. We are using TS metadata on the groups, while the domain models (stc, phot) utypes are used on the FIELDs themselves (which the cube doesn't have to do anything with). This way,
   -->
  -<GROUP name="TimeSeriesData" utype="ts:TSCube">
     <!-- Jiri: this is the cube itself, not only data -->
    -<GROUP utype="ts:TSCube.independent_axes">
       <FIELDref ref="JD"/>
     </GROUP>
    -<GROUP utype="ts:TSCube.dependent_axes">
       <FIELDref ref="MAGV"/>
     </GROUP>
   </GROUP>
  -<FIELD ID="JD" datatype="double" name="JD" ucd="time;obs.exposure" unit="d" utype="stc:TimeMeasure.MJD" ref="tif">
     <DESCRIPTION>Epoch at midpoint of observation in julian date</DESCRIPTION>
   </FIELD>
  -<FIELD ID="MAGV" datatype="float" name="MAGV" ucd="phot.flux" unit="mag" utype="phot:PhotometryPoint" ref="phot">
     <DESCRIPTION>V magnitude</DESCRIPTION>
   </FIELD>
  -<DATA>
    -<TABLEDATA>
      -<TR>
         <TD>2454082.8878</TD>
         <TD>17.0860</TD>
       </TR>
      -<TR>
         <TD>2454082.8886</TD>
         <TD>17.0880</TD>
       </TR>
      -<TR>
         <TD>2454082.8894</TD>
         <TD>17.0860</TD>
       </TR>
      -<TR>
         <TD>2454082.8902</TD>
         <TD>17.1260</TD>
       </TR>
```

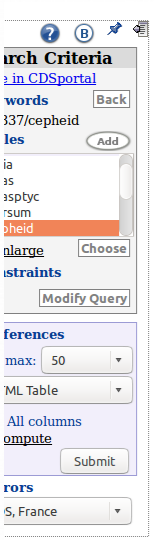
Cube model utypes (Containers)

Axis model utypes (Time an phot)

Full VO-DML mapping approach

```
</MODEL>
-<MODEL>
    <NAME>ivoa</NAME>
  -<URL>
      https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa/vo-dml/IVOA-v1.0.vo-dml.xml
    </URL>
  </MODEL>
-<MODEL>
    <NAME>meas</NAME>
  -<URL>
      https://volute.g-vo.org/svn/trunk/projects/dm/STC/vo-dml/STC_meas-v2.0.vo-dml.xml
    </URL>
  </MODEL>
-<GLOBALS>
  -<INSTANCE dmtype="cube:SparseCube">
      <!-- SparseCube DataProduct Instance -->
    -<COMPOSITION dmrole="cube:DataProduct.coordSys">
      -<INSTANCE dmtype="coords:AstroCoordSystem">
        -<REFERENCE dmrole="coords:AstroCoordSystem.coordFrame">
          -<FOREIGNKEY>
            -<PKFIELD>
                <LITERAL dmtype="ivoa:string" value="_TimeFrame"/>
              </PKFIELD>
            </FOREIGNKEY>
          -<FOREIGNKEY>
            -<PKFIELD>
                <LITERAL dmtype="ivoa:string" value="_SpaceFrame"/>
              </PKFIELD>
            </FOREIGNKEY>
          -<FOREIGNKEY>
            -<PKFIELD>
                <LITERAL dmtype="ivoa:string" value="_PhotFrame"/>
              </PKFIELD>
            </FOREIGNKEY>
          </REFERENCE>
        </INSTANCE>
      </COMPOSITION>
    -<COMPOSITION dmrole="cube:SparseCube.data">
        <EXTINSTANCES>_TimeSeriesData</EXTINSTANCES>
      </COMPOSITION>
    </INSTANCE>
  </GLOBALS>
-<TEMPLATES tableref="ndgnsolidgdea">
    <!-- Dataset Metadata - ObsDataset -->
  -<INSTANCE dmtype="ds:party.Organization">
    -<PRIMARYKEY>
      -<PKFIELD>
```


VizieR prototye



VizieR

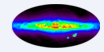
Show the target form
Show constraint information

The 4 columns in ***color*** are computed by VizieR, and are ***not part of the original data***.

I/337/cepheid *Post annotation*

Gaia DR1 (Gaia Collaboration, 2016) 2016A&A...595A...1G **ReadMe+ftp** **timeSerie**

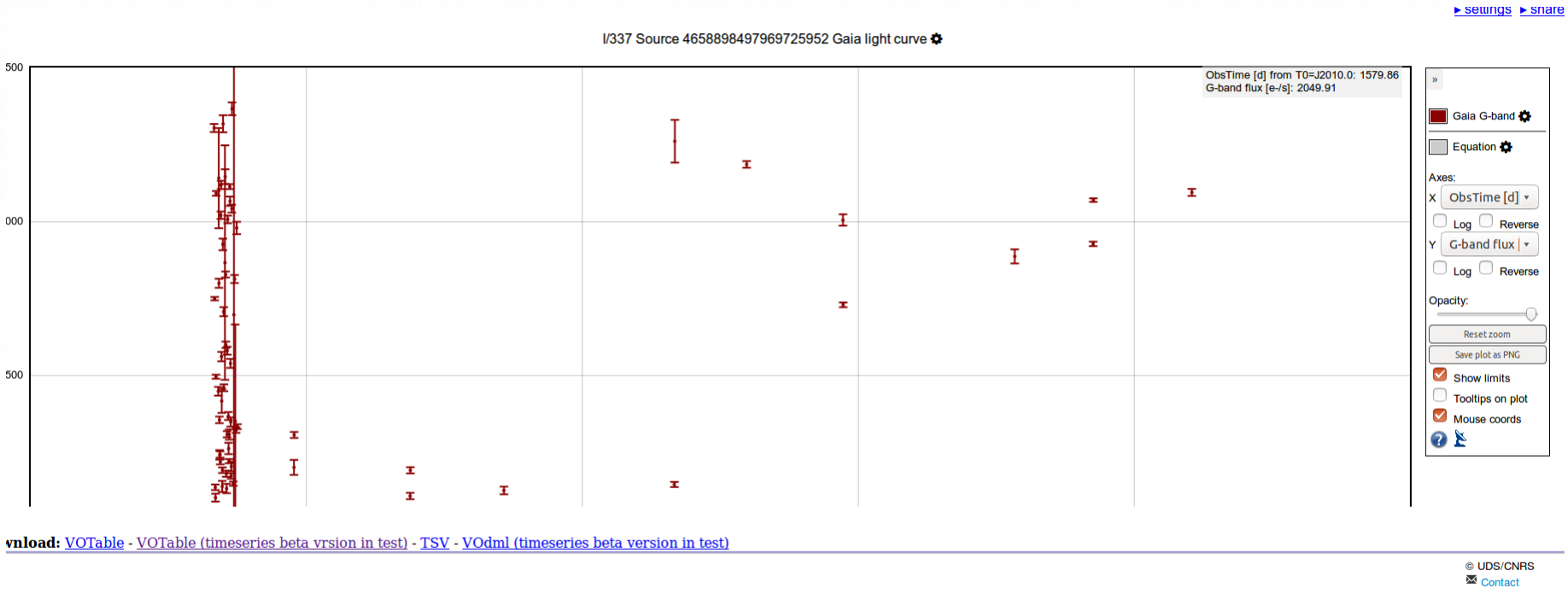
Cepheid stars identified in table VariableSummary as classification="CEP" (original column names in green) *(599 rows)* [METAtab] [METAcola] [stats]



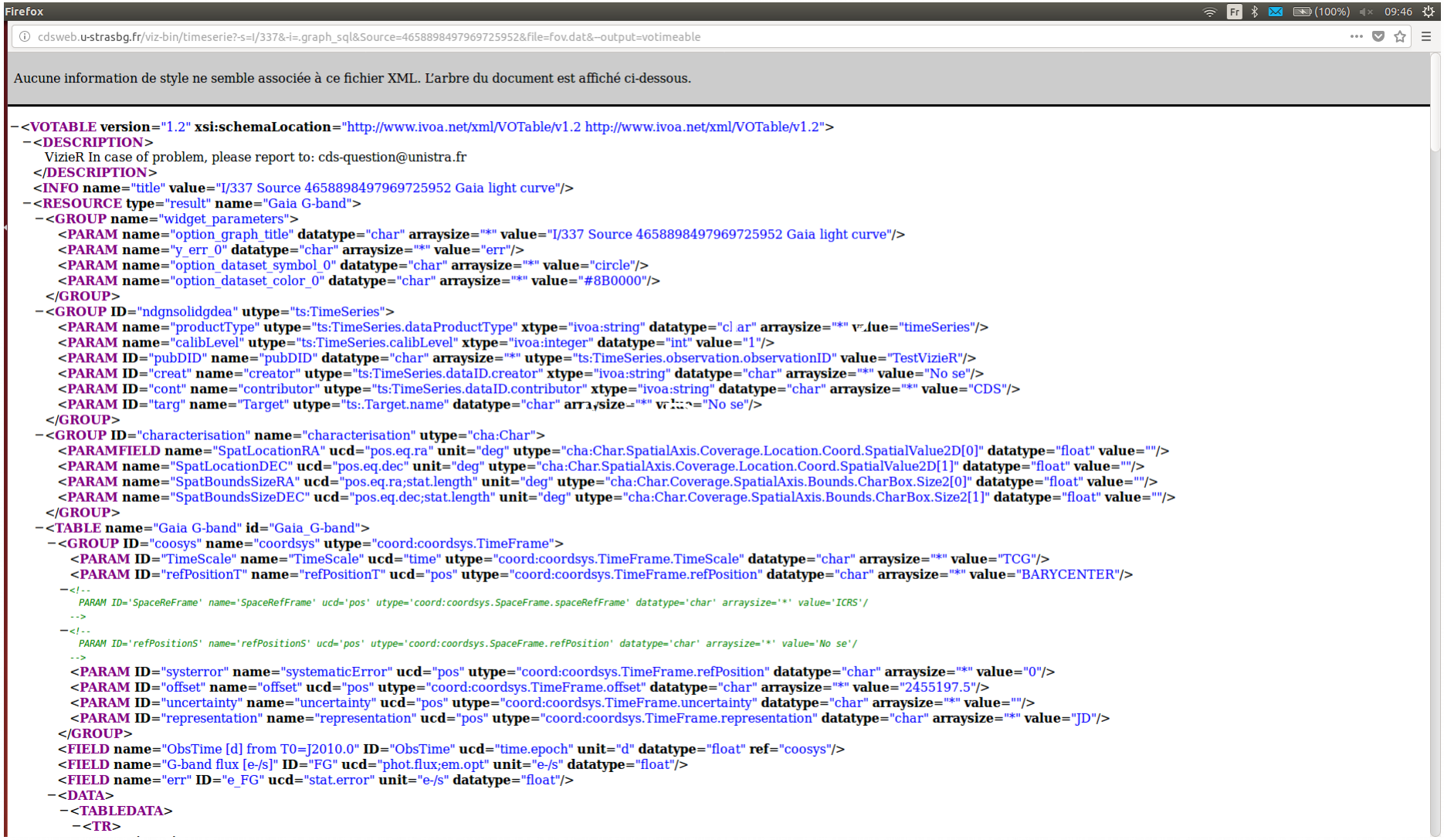
start AladinLite plot the output query using TAP/SQL

Full	LC	fov	TBest	TBest2	Mbest	Source	P1 d	EpG d	<Gmag> mag	AmpG mag	NHP1	R21G	phi21G	RA_ICRS deg	DE_ICRS deg	_RA.icrs deg	_DE.icrs deg
1	LC	fov	DCEP	—	UNDEFINED	4658898497969725952	0.81104349	1664.04407304	17.0100	0.419	3	0.193	4.139	80.4417418279	-66.9861900876	80.4417418279	-66.9861900
2	LC	fov	DCEP	—	FIRST_OVERTONE	4658898738488020864	3.38448730	1658.89869278	15.0480	0.338	4	0.182	3.695	80.4115015243	-66.9476771952	80.4115015243	-66.9476771
3	LC	fov	DCEP	—	UNDEFINED	4658925092406745984	2.69331244	1659.84418704	17.3720	0.112	1			78.8871350309	-67.1440231713	78.8871350309	-67.1440231
4	LC	fov	DCEP	—	FUNDAMENTAL	4658939214286774400	3.56278072	1658.55295617	15.6500	0.344	2	0.306	4.344	79.8382641810	-67.1136249309	79.8382641810	-67.1136249
5	LC	fov	DCEP	—	FIRST_OVERTONE	4658950381175117824	2.79569245	1660.51381113	15.1510	0.174	2	0.041	4.049	79.9507863890	-66.8238448295	79.9507863890	-66.8238448
6	LC	fov	DCEP	—	FUNDAMENTAL	4658956119278242688	5.22238334	1655.10218660	15.0250	0.862	4	0.477	4.468	79.4267360254	-66.6480295442	79.4267360254	-66.6480295
7	LC	fov	DCEP	—	FIRST_OVERTONE	4658960276779885056	1.39962121	1662.74142587	16.1550	0.362	3	0.203	4.138	79.0774160047	-66.7777281836	79.0774160047	-66.7777281
8	LC	fov	DCEP	—	FIRST_OVERTONE	4658968110800455040	2.18564218	1663.21217901	15.7010	0.289	2	0.115	4.385	79.2276629254	-66.6274827232	79.2276629254	-66.6274827
9	LC	fov	DCEP	—	FIRST_OVERTONE	4658969072873169536	2.44906328	1663.77790963	15.2650	0.337	2	0.060	4.418	79.1437679628	-66.5865626749	79.1437679628	-66.5865626
10	LC	fov	DCEP	—	FUNDAMENTAL	4658970241104217472	2.90669246	1661.81108296	16.0130	0.759	4	0.432	4.283	78.8939951447	-66.6467466	78.8939951447	-66.6467466
11	LC	fov	DCEP	—	FUNDAMENTAL	4659456740670442752	3.57527302	1658.73958036	15.4900	0.753	3	0.476	4.268	85.7639993508	-67.0764661314	85.7639993508	-67.0764661
12	LC	fov	DCEP	—	FIRST_OVERTONE	4659458527346797696	1.32562578	1663.71261361	16.1450	0.320	2	0.241	4.345	86.2315630903	-67.0800549791	86.2315630903	-67.0800549
13	LC	fov	DCEP	—	FUNDAMENTAL	4659460623290935168	5.42560958	1654.50555644	15.2020	0.413	3	0.337	4.668	86.2892914828	-67.0158001931	86.2892914828	-67.0158001
14	LC	fov	DCEP	—	FUNDAMENTAL	4659461241765373184	2.29321460	1660.71604944	16.0490	0.683	5	0.437	4.205	86.0456401016	-66.9992666985	86.0456401016	-66.9992666
15	LC	fov	DCEP	—	FIRST_OVERTONE	4659464024903476352	3.45100693	1657.81942313	15.0230	0.297	3	0.121	3.290	85.7003223028	-66.9427449711	85.7003223028	-66.9427449
16	LC	fov	DCEP	—	FIRST_OVERTONE	4659464883897843200	1.94143160	1660.88201578	15.7390	0.296	2	0.130	4.825	86.0436726396	-66.9232307845	86.0436726396	-66.9232307
17	LC	fov	DCEP	—	FIRST_OVERTONE	4659465227502800640	1.81105612	1661.77500792	15.7990	0.295	3	0.091	4.735	85.8820525670	-66.8796533252	85.8820525670	-66.8796533
18	LC	fov	DCEP	—	FIRST_OVERTONE	4659483339391441408	2.02794197	1661.46977585	15.5300	0.364	2	0.140	4.321	85.0131886781	-67.0716616361	85.0131886781	-67.0716616
19	LC	fov	DCEP	—	FUNDAMENTAL	4659494124040684032	7.47743782	1650.38164083	14.8800	0.180	2	0.143	5.660	84.6932441338	-67.0852792344	84.6932441338	-67.0852792
20	LC	fov	DCEP	—	FUNDAMENTAL	4659494879948476032	2.92545152	1660.07294073	15.7020	0.765	5	0.428	4.242	84.6697967355	-67.0349677043	84.6697967355	-67.0349677
21	LC	fov	DCEP	—	FIRST_OVERTONE	4659495154825994880	3.61472915	1657.36716036	14.9540	0.307	3	0.129	3.309	84.9383688599	-67.0564302421	84.9383688599	-67.0564302
22	LC	fov	T2CEP	W_VIR	NOT_APPLICABLE	4659497285129779584	12.34489304	1632.09072772	17.2710	0.128	1			84.4995522692	-67.0530549618	84.4995522692	-67.0530549
23	LC	fov	DCEP	—	FIRST_OVERTONE	4659499759031442432	3.83869397	1655.77401254	14.7890	0.277	3	0.149	3.529	84.4736181954	-66.9468487937	84.4736181954	-66.9468487
24	LC	fov	DCEP	—	FIRST_OVERTONE	4659502061133359232	3.65107544	1656.67707148	14.8270	0.295	3	0.101	3.186	85.5126413247	-67.1186067944	85.5126413247	-67.1186067
25	LC	fov	DCEP	—	FIRST_OVERTONE	4659510170032228736	2.56262634	1661.70271521	15.1910	0.374	2	0.114	4.396	85.0264708788	-66.8730142130	85.0264708788	-66.8730142
26	LC	fov	DCEP	—	FIRST_OVERTONE	5289779853168752384	2.57602789	1666.00543643	15.4970	0.110	1			119.2865231322	-62.3245006863	119.2865231322	-62.3245006
27	LC	fov	DCEP	—	FUNDAMENTAL	4659510307501954176	2.01301613	1660.46386339	16.2580	0.687	6	0.499	4.073	84.9958673647	-66.8370151586	84.9958673647	-66.8370151
28	LC	fov	DCEP	—	FUNDAMENTAL	4659512437774965120	4.96058526	1656.23198078	14.9100	0.760	5	0.464	4.437	85.4302310976	-66.8499643471	85.4302310976	-66.8499643
29	LC	fov	DCEP	—	FUNDAMENTAL	4659518588169281920	4.01889675	1656.19077016	15.5420	0.631	4	0.476	4.323	85.0478121914	-66.6840281518	85.0478121914	-66.6840281
30	LC	fov	DCEP	—	FIRST_OVERTONE	4659523845208113280	1.81235621	1661.43937585	16.0590	0.350	2	0.127	4.546	84.5374159062	-66.8811016974	84.5374159062	-66.8811016
31	LC	fov	DCEP	—	FUNDAMENTAL	4659525597553927680	8.72307463	1647.03095256	14.4750	0.364	3	0.289	5.651	84.3223320993	-66.7533061145	84.3223320993	-66.7533061
32	LC	fov	T2CEP	W_VIR	NOT_APPLICABLE	4659525872450052480	16.20356951	1621.96307480	16.8770	0.157	2	0.047	5.612	84.5891433732	-66.7890195521	84.5891433732	-66.7890195
33	LC	fov	DCEP	—	FIRST_OVERTONE	4659526044231432832	1.10378136	1663.85552967	16.5870	0.318	3	0.226	3.949	84.5292603186	-66.7851409564	84.5292603186	-66.7851409

VizieR prototye



VizieR prototye



VizieR prototye

```
−<VOTABLE xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.4_vodml https://volute.g-vo.org/viewvc/volute/trunk/projects/dm/vo-dml/xsd/votable_ext/VOTable-1.4_vodml.xsd?view=log ">
 −<DESCRIPTION>
    VizieR In case of problem, please report to: cds-question@unistra.fr
  </DESCRIPTION>
  <INFO name="title" value="I/337 Source 4658898497969725952 Gaia light curve"/>
 −<VODML>
    <GLOBALS/>
   −<MODELS>
     −<MODEL>
        <NAME>ivoa</NAME>
       −<URL>
          https://volute.g-vo.org/svn/trunk/projects/dm/vo-dml/models/ivoa/vo-dml/IVOA-v1.0.vo-dml.xml
        </URL>
      </MODEL>
     −<MODEL>
        <NAME>trans</NAME>
       −<URL>
          https://volute.g-vo.org/svn/trunk/projects/dm/STC/vo-dml/STC_trans_alt-v2.0.vo-dml.xml
        </URL>
      </MODEL>
     −<MODEL>
        <NAME>coords</NAME>
       −<URL>
          https://volute.g-vo.org/svn/trunk/projects/dm/STC/vo-dml/STC_coords-v2.0.vo-dml.xml
        </URL>
      </MODEL>
     −<MODEL>
        <NAME>meas</NAME>
       −<URL>
          https://volute.g-vo.org/svn/trunk/projects/dm/STC/vo-dml/STC_meas-v2.0.vo-dml.xml
        </URL>
      </MODEL>
    </MODELS>
    <GLOBALS/>
   −<TEMPLATES tableref="time-parameters">
     −<TUPLE dmrole="root">
       −<TUPLE dmrole="timeseries:Timeseries.dataSet">
          <VALUE dmrole="timeseries:dataset.DataSet.calib_level" source="@calibLevel"/>
          <VALUE dmrole="timeseries:dataset.DataSet.creator" source="@creat"/>
          <VALUE dmrole="timeseries:dataset.DataSet.contributor" source="@cont"/>
          <VALUE dmrole="timeseries:dataset.DataSet.publisher_did" source="@pubDID"/>
          <VALUE dmrole="timeseries:dataset.DataSet.target" source="@targ"/>
        </TUPLE>
        <TUPLE dmrole="timeseries:TimeSeries.spaceFrame" tableref="coosys"/>
        <TUPLE dmrole="timeseries:TimeSeries.timeFrame" tableref="coosys"/>
        <TUPLE dmrole="timeseries:TimeSeries.filter" tableref="coosys"/>
        <TUPLE dmrole="timeseries:TimeSeries.refPosition" tableref="char"/>
```