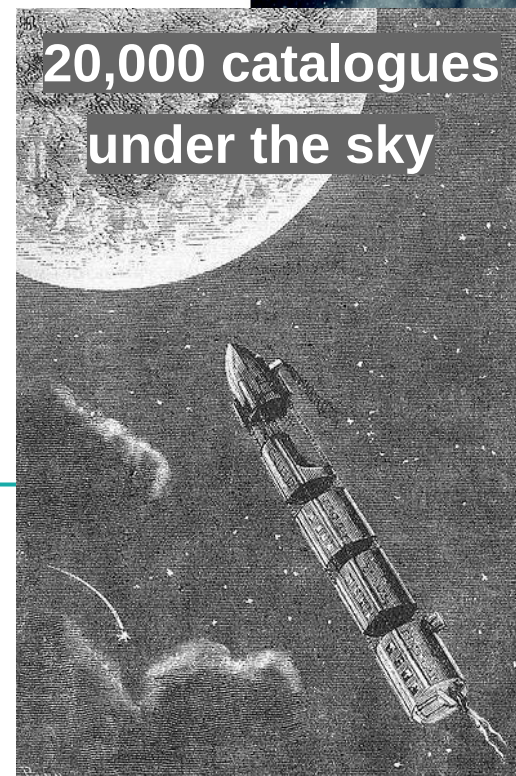




20,000 catalogues
under the sky



Modèle de données 'riche' et Provenance

-
VOFrance 2021

G.Landais, L.Michel
M.Servillat, F.Bonnarel, M.Louys,
M.Sanguillon

et toute l'équipe VizieR !



CENTRE DE DONNÉES
ASTRONOMIQUES DE STRASBOURG

Catalogues outputs



ALFALFA extragalactic HI source catalog : J/ApJ861/49

Access to: [View](#) [FTP](#) [ReadMe](#) [Table](#) [API](#) [Table](#) [Table](#)

Authors : Haynes M.P., Giovanelli R., Karli B.R. et al.

VizieR DOI : 10.26907/25424010.1882050

Keywords: Survey; HI case; Galaxies; radio; Redshift; Optical

Observation (OCC)

Abstract: We present the catalog of ~33500 extragalactic HI line sources detected by the completed ALFALFA (ALFALFA) survey out to z=0.36, including both high signal-to-noise ratio (>=5) detections and ones of lower quality that coincide in both position and recession velocity with galaxies of known redshift. We review the observing technique, data reduction pipeline, and catalog construction process, focusing on details of particular relevance to understanding the catalog's content and parameters. We further describe our new available the digital fit line search, associated with the cataloged sources. In addition to the extragalactic HI line detectors, we report nine confirmed OH megarsers (OHs) and 21 OHs.

VizieR local

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

ALFALFA extragalactic HI source catalog (Haynes, 2018)
ALFALFA extragalactic HI source catalog; corrected version (August 2019) (21502 rows)

NGC	Name	RAJ2000	DEJ2000	RAO	DEO	VELO	W50	W80	HI flux	S/NR	rms	Dist	z	logMHI	z _{HI}	file	Simbad	SDSS	LEDA	
105367		00 00 04.405	26 36 00 00 00.8	+05 26 33 11983	274	39	281	1.14	0.06	8.1	1.91	166.0	2.3	9.87	0.05	J1A103367.fits	Simbad	NED	LEDA	
333313		00 00 46.924	54 32 23 59	+4 24 54 27	11181	313	20	333	1.80	0.09	13.2	154.8	2.8	10.01	0.05	J1A333313.fits	Simbad	NED	LEDA	
331900	476-009b	00 00 02.523	05 05 00 00 01.4	+23 05 15	4463	160	4	194	1.96	0.07	14.7	25	50.6	0.4	0.75	0.18	J1A331900.fits	Simbad	NED	LEDA
331061	456-013	00 00 02.515	52 20 00 00 02.1	+15 52 54	6007	260	45	266	1.13	0.09	6.7	40	85.2	2.4	0.29	0.06	J1A331061.fits	Simbad	NED	LEDA
149570		00 00 01.612	42 30 00 00 01.1	+12 42 57	10164	245	6	256	1.0	0.06	1.1	105.70	0.0	0.00	0.00	J1A10570.fits	Simbad	NED	LEDA	
331405		00 00 03.326	00 59 00 00 03.5	+26 00 50	10409	315	8	343	1.1	0.05	1.1	331.405	0.0	0.00	0.00	J1A331405.fits	Simbad	NED	LEDA	
102096		00 00 06.828	12 07 00 00 06.8	+28 12 07	16254	197	1	433	1.1	0.05	1.1	102096	0.0	0.00	0.00	J1A102096.fits	Simbad	NED	LEDA	
630358	382-015	00 00 07.540	02 49 00 00 07.5	+00 02 56	7089	70	9	103	1.1	0.05	1.1	630358	0.0	0.00	0.00	J1A630358.fits	Simbad	NED	LEDA	
103938		00 00 10.940	16 54 00 00 11.7	+04 16 57	3545	83	6	94	1.1	0.05	1.1	103938	0.0	0.00	0.00	J1A103938.fits	Simbad	NED	LEDA	
331966	382-016	00 00 11.540	01 23 00 00 12.0	+01 07 12	3700	214	22	295	1.1	0.05	1.1	331966	0.0	0.00	0.00	J1A331966.fits	Simbad	NED	LEDA	
102571		00 00 17.227	23 59 00 00 17.3	+27 24 03	4654	104	3	124	2.00	0.06	18.0	2.29	65.9	2.1	0.31	0.05	J1A102571.fits	Simbad	NED	LEDA
102728		00 00 21.210	08 38 00 00 21.4	+31 01 18	566	21	6	36	0.31	0.03	7.5	142	9.1	2.2	0.78	0.22	J1A102728.fits	Simbad	NED	LEDA
331907	517-010	00 00 20.034	36 41 00 00 22.3	+34 36 51	2087	104	13	149	0.99	0.08	7.2	75	176.2	2.3	0.86	0.06	J1A331907.fits	Simbad	NED	LEDA
104676		00 00 22.420	08 09 00 00 22.3	+20 47 48	6852	190	9	220	2.49	0.11	13.6	295	92.9	2.2	0.70	0.05	J1A104676.fits	Simbad	NED	LEDA
105370		00 00 27.705	32 56 00 00 28.5	+05 33 21	11313	345	6	252	1.04	0.08	6.6	2.26	182.5	2.3	0.91	0.06	J1A105370.fits	Simbad	NED	LEDA

Search associated data among the VizieR catalogues

This web page is an access to the VizieR Associated data (images, spectra, timeseries, SED) which comes from publications. This tool is the result of the documentation assigned by the authors of the catalogues and supervised by the CDS documentalist team (see the VizieR operation tool).

VO compatibility
The meta-data and the search engine are built according to the VO framework (ESA, SIA, CDS/TA) and can so be queried by VizieR software. The data are gathered with the SIA/SSA engines, and the VO data model CDS/VO has been implemented for the documentation.

Simple search:

Q Search by position:

Q Search by spectral band:

Q Search by time data:

Q Search by catalog:

Q Spectrum / Time series image:

500 entries max

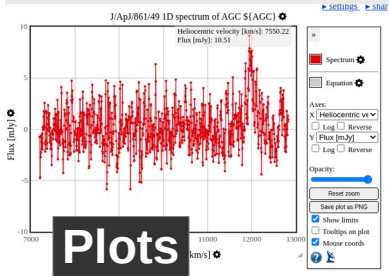
500 entries

Preview Target Data collection RA Dec Band min

AGC1	J/ApJ861/49	0.650	18.448	31.061	342
AGC3	J/ApJ861/49	0.693	18.889	31.061	344
AGC4	J/ApJ861/49	0.724	4.206	31.061	342
AGC6	J/ApJ861/49	0.792	21.960	31.061	342

Arctico Intra
Tolosa
Arctico Trullo
Arctico

SIA/SSA Image/spectra



Index de /pub/cats/J/ApJ/861/49

[répertoire parent]

Nom	Taille	Date de modification
+foot5.gif	1.4	
+foot6.gif	12.4	
ReadMe	13.5	
sp7	14/03/2018 01:00:00	
table2.dat.gz	1.2 MB	12/08/2019 02:00:00
table3.dat	2.0 kB	11/07/2019 02:00:00

FTP

API

J/ApJ/861/49
Author: Haynes M.P.
The ALFALFA extragalactic HI source catalog. (2018)

ADQL/SQL

Modify the query with the upper table

Max records: all limit 100

Quickview: only 10 results

```

1 -- output format = csv
2 SELECT TOP 100 * FROM J/ApJ/861/49/table2;
3 -- J/ApJ/861/49/table2;
4 -- J/ApJ/861/49/table2;
5 -- J/ApJ/861/49/table2;
6 -- J/ApJ/861/49/table2;
7 FROM J/ApJ/861/49/table2;
8 WHERE J/ApJ/861/49/table2;

```

Agc name raj2000 dej2000 rao deo vhel w50 e w50 w20 hflux e hf

131094	45.4862	0.87	45.4758	0.8636	11999	359	6	371	2.09	0.16
131094	45.4862	0.87	45.4758	0.8636	11999	359	6	371	2.09	0.16
131097	45.695	0.9769	45.6983	0.9647	11879	134	9	144	0.69	0.11
131097	45.695	0.9769	45.6983	0.9647	11879	134	9	144	0.69	0.11

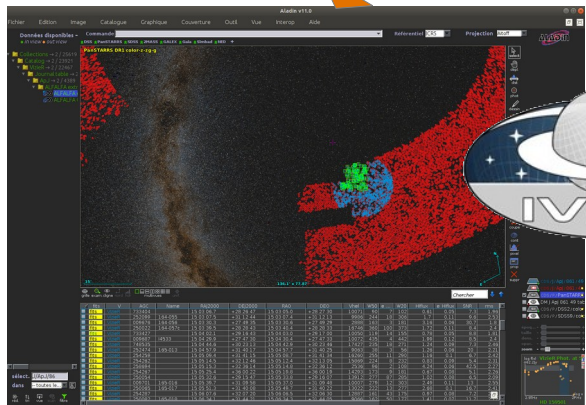
Agc name raj2000 dej2000 rao deo vhel w50 e w50 w20 hflux e hf

Query name: "J/ApJ/861/49/table2" Output format: CSV

List of your TAP queries

name	phase	start	end
J/ApJ86149table2	COMPLETED	Tue Jan 09 17:12:34 CET 2021	Sun Jan 10 17:12:34 CET 2021

download (CSV)



70% of the queries returned in VO format (VOTable)

FLASH INFO

□ Type de meta-data



- Type de description utile à la recherche ou informative
 - Description générale du contenu
titre du catalogue, tables, mots clés, description des colonnes , UCD, ..
 - Description d'origine
dates (publication/mise à jour..), article d'origine (bibcode), auteur(s), origine des données et des méta-données ..
- Description utile pour la réutilisation des données
 - identifiants
 - Description pour réutiliser/comparer les données:
système de coordonnées, unité, type..
 - Association de colonnes :
 - Grouper des colonne impliquant une même mesure
 - Grouper des mesures différentes (ex : temps+magnitude)

□ La description des données



Où trouve t'on l'information dans VizieR ?

- **Les pages web regroupent l'ensemble des informations**
 - Identifiants, titres, auteurs, description des tables/colonnes
 - Les systèmes de coordonnées disponible dans les table META VizieR
- **Les DOI (pour les catalogues A&A + AAS)**
 - Identifiants, origine des données (article), keywords..
- **Le registry VO**
 - Idem que DOI + description des tables
 - Mais absence des systèmes de coordonnées
- **Les sorties VOTables (ex: conesearch) décrivent les tables/colonnes**
 - Systèmes de doordonnes (COOSYS/TIMESYS)
 - Pas de metadonnées photometriques
 - Pas dindication d'origine: DOI/bibcodes, auteurs...

La description des données

La description VOTable

```
<VOTABLE version="1.4" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="http://www.ivoa.net/xml/VOTable/v1.3"
  xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.3 http://www.ivoa.net/xml/VOTable/v1.3">
  <DESCRIPTION>
    VizieR Astronomical Server vizier.u-strasbg.fr
    Date: 2021-03-19T09:26:35 [V1.99+ (14-Oct-2013)]
    Explanations and Statistics of UCDS: See LINK below
    In case of problem, please report to: cds-question@unistra.fr
  </DESCRIPTION>
  <INFO ID="VERSION" name="votable-version" value="1.99+ (14-Oct-2013)"/>
  <RESOURCE ID="JAJ 133 2464" name="J/AJ/133/2464">
    <DESCRIPTION>Parameters and abundances of nearby giants (Luck+, 2007)</DESCRIPTION>
    <COOSYS ID="J2000" system="eq_FK5" equinox="J2000"/>
    <TABLE ID="J AJ 133 2464 stars" name="J/AJ/133/2464/stars">
      <DESCRIPTION>Program star parameters</DESCRIPTION>
      <FIELD name="RAJ2000" ucd="pos.eq.ra" ref="J2000" datatype="double" width="11" precision="7" unit="deg">
        <DESCRIPTION>Right ascension (FK5, Equinox=J2000.0) (computed by VizieR, not part of the original data)</DESCRIPTION>
      </FIELD>
      <FIELD name="DEJ2000" ucd="pos.eq.dec" ref="J2000" datatype="double" width="11" precision="7" unit="deg">
        <DESCRIPTION>Declination (FK5, Equinox=J2000.0) (computed by VizieR, not part of the original data)</DESCRIPTION>
      </FIELD>
      <FIELD name="HD" ucd="meta.id;meta.main" datatype="int" width="6">
        <DESCRIPTION>The HD identification number</DESCRIPTION>
        <LINK href="http://vizier.u-strasbg.fr/viz-bin/VizieR-4?-info=XML&out.add=&source=J/AJ/133/2464&corr=FK">
      </FIELD>
      <FIELD name="Vmag" ucd="phot.mag;em.opt.V" datatype="float" width="6" precision="3" unit="mag">
        <DESCRIPTION>Apparent V band magnitude</DESCRIPTION>
      </FIELD>
      <FIELD name="SpType" ucd="src.spType" datatype="char" arraysize="11">
        <DESCRIPTION>Spectral type (2)</DESCRIPTION>
      </FIELD>
      <FIELD name="plx" ucd="pos.parallax.trig" datatype="float" width="5" precision="2" unit="mas">
        <DESCRIPTION>Parallax</DESCRIPTION>
      </FIELD>
      <FIELD name="dist" ucd="pos.distance;pos.heliocentric" datatype="float" width="5" precision="3" unit="pc">
        <DESCRIPTION>Distance from parallax</DESCRIPTION>
      </FIELD>
      <FIELD name="RV" ucd="spect.dopplerVeloc;pos.heliocentric" datatype="float" width="6" precision="2" unit="km/s">
        <DESCRIPTION>Radial velocity</DESCRIPTION>
      </FIELD>
      <FIELD name="e RV" ucd="stat.error" datatype="float" width="5" precision="2" unit="km/s">
        <DESCRIPTION>Error in RV</DESCRIPTION>
      </FIELD>
      <FIELD name="r RV" ucd="meta.ref;pos.frame" datatype="char" arraysize="1">
        <DESCRIPTION>[LFM] Source for RV (3)</DESCRIPTION>
      </FIELD>
      <FIELD name="Simbad" datatype="char" arraysize="6*>
        <DESCRIPTION>Simbad column added by the CDS</DESCRIPTION>
      </FIELD>
      <FIELD name="RA" ucd="pos.eq.ra;meta.main" ref="J2000" datatype="double" width="9" precision="5" unit="deg">
        <DESCRIPTION>Right Ascension (J2000) from SIMBAD (not part of the original data)</DESCRIPTION>
      </FIELD>
      <FIELD name="DEC" ucd="pos.eq.dec;meta.main" ref="J2000" datatype="double" width="9" precision="5" unit="deg">
        <DESCRIPTION>Declination (J2000) from SIMBAD (not part of the original data)</DESCRIPTION>
      </FIELD>
    <DATA><TABLEDATA>
    <TR><TD>001.0824756</TD><TD>-16.5290361</TD><TD>225197</TD><TD>5.781</TD><TD>K0III</TD><TD>11.29</TD><TD>88.6</TD><TD>25.89</TD>
    <TR><TD>001.1749217</TD><TD>+67.1664456</TD><TD>225216</TD><TD>5.691</TD><TD>K1III</TD><TD>10.30</TD><TD>97.1</TD><TD>-28.43</TD>
```

méta-data
(auteur, années)
en texte sans
utilisation de standard

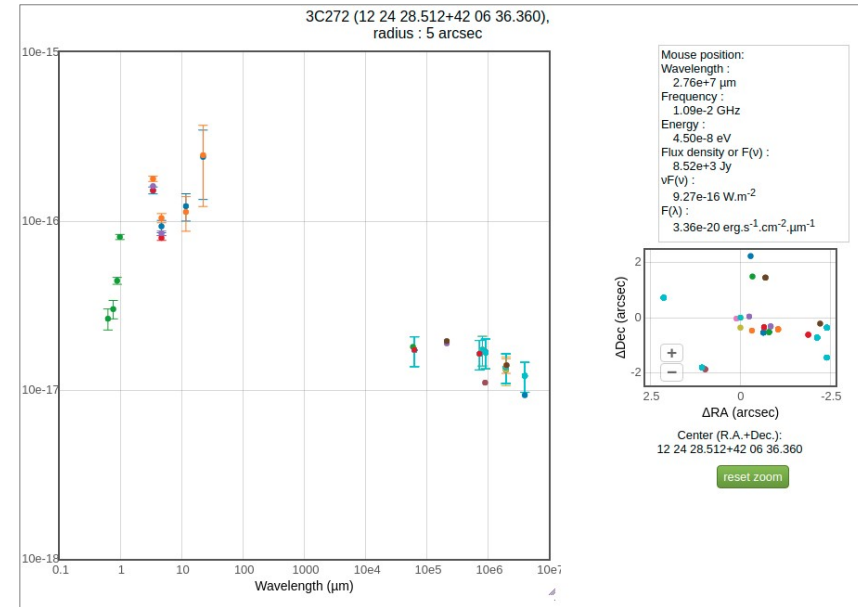
Colonne magnitude
non décrite
(filtre, système)

La description (riche) des données



La description de la photométrie

- Compilation de sources issues de différents catalogues/instruments et mesurés dans des systèmes différents
- Les filtres sont assignés par le CDS.
→ Ils permettent la transformation dans un système uniformisé (Jsky)
- Les filtres ne font pas partis des données originales



photid	fltrid	famid	ucdid	system	filter	lambda0 um	dlambda um	freq0 GHz	dfreq GHz	Fmag0 Jy	Ncat	Ntup	comment
302	1	0	929	ISAAC	SZ	1.061	0.1534	2.826e+05	4.085e+04	1.952e+03	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	2	0	929	ISAAC	Js	1.243	0.1523	2.412e+05	2.956e+04	1.559e+03	1	74	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	3	0	928	ISAAC	H	1.637	0.2879	1.832e+05	3.222e+04	1.025e+03	1	74	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	4	0	927	ISAAC	NB207	2.069	0.0296	1.449e+05	2074	7.229e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	5	0	927	ISAAC	NB213	2.128	0.0311	1.409e+05	2059	6.863e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	6	0	927	ISAAC	Ks	2.152	0.2719	1.393e+05	1.76e+04	6.658e+02	4	36796	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	7	0	927	ISAAC	NB217	2.168	0.0301	1.383e+05	1919	6.379e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	8	0	927	ISAAC	NB229	2.286	0.0324	1.311e+05	1859	6.065e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	9	0	926	ISAAC	NB328	3.275	0.0574	9.153e+04	1604	3.170e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	10	0	926	ISAAC	L	3.749	0.5768	7.998e+04	1.231e+04	2.472e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	11	0	926	ISAAC	NB380	3.803	0.0673	7.883e+04	1395	2.437e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	12	0	925	ISAAC	NB407	4.067	0.0751	7.371e+04	1361	2.131e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
302	13	0	925	ISAAC	NBm	4.656	0.1016	6.439e+04	1405	1.645e+02	0	0	http://www.eso.org/sci/facilities/paranal/instruments/isaac/inst/isaac_img.html
303	1	0	931	SOFI	Z	0.9	0.14	3.331e+05	5.182e+04		0	0	http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html
303	2	0	929	SOFI	Js	1.24	0.16	2.418e+05	3.12e+04		1	59	http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html
303	3	0	929	SOFI	J	1.247	0.29	2.404e+05	5.591e+04		6	368991	http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html
303	4	0	928	SOFI	H	1.653	0.297	1.814e+05	3.259e+04		5	368889	http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html
303	5	0	927	SOFI	Ks	2.162	0.275	1.387e+05	1.764e+04		5	354583	http://www.eso.org/sci/facilities/lasilla/instruments/sofi/inst/Imaging.html

La description (riche) des données



Description de mesure en groupant des colonnes

ex: la colonne de RV1 (velocity) est qualifiée avec :

- une colonne d'erreur (e_RV1)
- un nombre d'observations pour le calcul de la valeur (o_RV1)

A parameter has frequently associated values, and we have adopted the rule of association with the *one-letter-underscore prefix*: if a column is obviously associated to another one — typically mean errors or uncertainty flags — we use one of the *underscore prefixes* listed in prefix.

Conventions used for label prefix:

Symbol	Explanation
a_label	aperture used for parameter label
B_label	for an upper bound (maximal value) on parameter label
b_label	for a lower bound (minimal value) on parameter label
D_label	for a difference (Δ) on parameter label (e.g. O-C)
d_label	for a number of degrees of freedom or for number of digits on p
E_label	mean error (upper limit) on parameter label
e_label	mean error (σ) on parameter label
f_label	flag on parameter label
L_label	Likelihood on parameter label
l_label	limit flag on parameter label
m_label	multiplicity index on parameter label to resolve ambiguities
n_label	note (remark) on parameter label
o_label	number of observations on parameter label
q_label	quality on parameter label
r_label	reference (source) for parameter label
s_label	dispersion (σ) on parameter label (the σ of a mean of N values is equal to the dispersion divided by \sqrt{N})
u_label	uncertainty flag on parameter label
w_label	weight of parameter label
x_label	unit in which parameter label is expressed

Massive LMC stars AAOmega spectroscopy (Evans+, 2015) [2015A&A...584A...5E](#) [ReadMe+ftp](#)

J/A+A/584/A5 [Post annotation](#) [spectrum](#) [Similar Catalogs](#)

1.J/A+A/584/A5/table2 Observational parameters of target stars[spectrum] (263 rows)

[Simple Constraint](#) [List Of Constraints](#) [Submit](#) [Reset All](#)

Query by [Constraints](#) applied on Columns (Output Order: + -)

Show	Sort	Column	Clear	Constraint	Explain (UCD)
<input type="checkbox"/>	<input type="radio"/>	recno	<input type="text"/>		Record number assigned by the VizieR team. Should Not be used for identification. (meta.record)
<input checked="" type="checkbox"/>	<input type="radio"/>	sp1	<input type="text" value="sp1"/>		spectrum at 4375Å (meta.ref.url) spectrum
<input checked="" type="checkbox"/>	<input type="radio"/>	sp2	<input type="text" value="sp2"/>		spectrum at 4100+4700Å (meta.ref.url) spectrum
<input checked="" type="checkbox"/>	<input type="radio"/>	AAO	<input type="text"/>		AAOmega star number (meta.id)
<input checked="" type="checkbox"/>	<input type="radio"/>	RAJ2000	<input type="text"/>		"h:m:s" (i) Right Ascension (J2000) (pos.eq.ra;meta.main)
<input checked="" type="checkbox"/>	<input type="radio"/>	DEJ2000	<input type="text"/>		"d:m:s" (i) Declination (J2000) (pos.eq.dec;meta.main)
<input checked="" type="checkbox"/>	<input type="radio"/>	SpType	<input type="text"/>	(char)	MK spectral classification (src.spType)
<input checked="" type="checkbox"/>	<input type="radio"/>	RV1	<input type="text"/>		km/s (n) Primary velocity (phys.veloc;pos.heliocentric)
<input checked="" type="checkbox"/>	<input type="radio"/>	e_RV1	<input type="text"/>		km/s (n) rms uncertainty on RV1 (stat.error)
<input checked="" type="checkbox"/>	<input type="radio"/>	o_RV1	<input type="text"/>		(n) Number of measurements for RV1 (meta.number)
<input checked="" type="checkbox"/>	<input type="radio"/>	RV2	<input type="text"/>		km/s (n) Secondary velocity (phys.veloc;pos.heliocentric)
<input checked="" type="checkbox"/>	<input type="radio"/>	e_RV2	<input type="text"/>		km/s (n) rms uncertainty on RV2 (stat.error)
<input checked="" type="checkbox"/>	<input type="radio"/>	o_RV2	<input type="text"/>		(n) Number of measurements for RV2 (meta.number)
<input checked="" type="checkbox"/>	<input type="radio"/>	Bin	<input type="text"/>	(char)	Binary status (meta.code)
<input checked="" type="checkbox"/>	<input type="radio"/>	ONames	<input type="text"/>	(char)	Other name(s) (Note 1) (meta.id;meta.main)

Usual mathematical functions may be specified in the label, with parentheses or a dot; for instance, the logarithm of the effective temperature could be labelled $\log(Te)$ or $\log.Te$.

□ L'annotation VOTable Mango



Mango est un Data-model

Le Data-model Mango (L.Michel) est un système d'annotation d'une VOTable :

- Les attributs des Data-models dans Mango ne sont jamais obligatoire
- Met en valeur les mesures incluses dans une table
- Mango permet d'associer des colonnes
- Mango permet d'ajouter des données associées

Mes mesures Mango

Les mesures sont exprimées avec des Data-model (ex: Coords, PhotDM, Provenance)

Pour VizieR: une mesure peut disposer de paramètres (ou colonnes) qui qualifient la mesure (ex: une erreur, un flag de qualité, etc.)

A Component and Association Based Model For Source Data



Présentation IVOA 2020 (L.Michel)

□ Sériailisation VOTable



Comparaison de sortie VOTable - VOTable+Mango

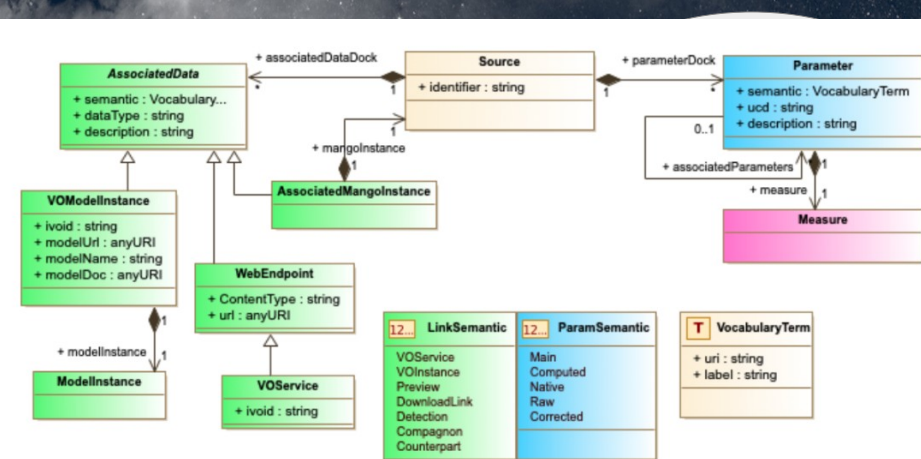
meta-data		VOTable	Mango
keywords	[VO-registry]		
auteurs	[VO-registry]		x (provDM)
Catalogue d'origine (bibcode/DOI)	[VO-registry]		x (provDM)
Explication des catalogues/tables/colonnes	[VO-registry]	x	x
unité/type	[VO-registry]	x	x
Systeme de coordonnées		x	x
Systemes temporelle		x	x
Systeme photométrique			x (PhptoDM)
Regroupement de colonnes pas mesure			x
Spécification de l'origine des colonnes			x (provDM)
Associer des mesures différentes (ex: série temporelle: time + magnitude)			x

Utilisation VizierR

Développement d'un "beta-prototype"

script Python qui transforme une VOTable
(qui s'appuie sur la nomenclature VizierR)

<http://viz-beta.u-strasbg.fr/viz-bin/Mango?-source=J/A+A/584/A5>



```
-<INSTANCE dmrole="mango:Source.parameters" dmtpe="mango:Source.Parameter">
  <ATTRIBUTE dmrole="mango:Parameter.instance" dmtpe="ivo:string" value="main"/>
  <ATTRIBUTE dmrole="mango:Parameter.ucd" dmtpe="ivo:string" value="phys.veloc;pos.heliocentric"/>
  <ATTRIBUTE dmrole="mango:Parameter.description" dmtpe="ivo:string" value="main column"/>
-<INSTANCE dmrole="meas:Measure" dmtpe="meas:GenericMeasure">
  -<INSTANCE dmrole="meas:GenericMeasure" dmtpe="meas:GenericMeasure.coord">
    <ATTRIBUTE dmrole="meas:GenericMeasure.coord.value" dmtpe="ivo:real" ref="RV1"/>
  </INSTANCE>
  -<INSTANCE dmrole="meas:Measure.error" dmtpe="meas:Error">
    -<INSTANCE dmrole="meas:Error.statError" dmtpe="meas:Symmetrical">
      -<INSTANCE dmrole="meas:Symmetrical.radius" dmtpe="ivo:RealQuantity">
        <ATTRIBUTE dmrole="ivo:RealQuantity.value" dmtpe="ivo:real" ref="e_RV1"/>
      </INSTANCE>
    </INSTANCE>
  </INSTANCE>
</INSTANCE>
-<COLLECTION dmrole="mango:Source.Parameter.associatedParameters" dmtpe="mango:Source.Parameter">
  -<INSTANCE dmrole="mango:Source.parameters" dmtpe="mango:Source.Parameter">
    <ATTRIBUTE dmrole="mango:Parameter.instance" dmtpe="ivo:string" value="main"/>
    <ATTRIBUTE dmrole="mango:Parameter.ucd" dmtpe="ivo:string" value="meta.number;obs"/>
    <ATTRIBUTE dmrole="mango:Parameter.description" dmtpe="ivo:string" value="number of observations"/>
  -<INSTANCE dmrole="meas:Measure" dmtpe="meas:GenericMeasure">
    -<INSTANCE dmrole="meas:GenericMeasure" dmtpe="meas:GenericMeasure.coord">
      <ATTRIBUTE dmrole="meas:GenericMeasure.coord.value" dmtpe="ivo:real" ref="o_RV1"/>
    </INSTANCE>
  </INSTANCE>
</COLLECTION>
</INSTANCE>
```

□ La Provenance VizieR



Pourquoi la Provenance dans VizieR ?

- Des informations sur l'origine des données pour les utilisateurs.
→ Dans un document unique « la Provenance d'un catalogue »

Informations Provenance : (permettant une meilleure traçabilité)

- Origine (article), auteurs, date de publications, ...
 - Données : tables, données associées
 - Opération sur les tables (fusion, ajout de positions)
 - Ajout des filtres (et de leur provenance)
-
- Pour inclure les systèmes photométrique dans les sorties VizieR (ex:Mango)
→ nécessite de clarifier le processus d'assignation des filtres car cette information n'est pas dans les données reçues
 - S'inscrire dans le mouvement des sciences ouvertes

Provenance VizierR



- Initiative VizierR qui prend corps suite au VOFrance 2020
- Groupe “français” pour définir une sortie Provenance en accord avec le modèle IVOA ProvDM :
 - F.Bonnarel (CDS)
 - G.Landais (CDS)
 - M.Louys (IceCube)
 - M.Sanguillon (LUPM)
 - M.Servillat (LUTH)

Exploring Provenance tracing for VizierR catalogues

Data origin is one of the basic metadata expected in the FAIR context. The information exists in the VizierR database and is made available for the end-user through the Vizier Web pages, the DOI metadata or in the VO Registry catalogue record. However, most of the VizierR queries are executed in the Virtual Observatory framework using standards which don't include information like the reference of the article, the authors or the date of publication.

For this reason, we explored the implementation of the recent IVOA Provenance data model in the VizierR context in order to provide the information in a machine readable format. The Provenance model allows to outline the VizierR table curation activity. It specifies data origin, affiliations and exposes metadata consumed in the publication workflow : photometric calibration with metadata extracted from remote services, reference article, etc.

The exploration results in a prototype which provides the catalogue provenance information in YAML, RDF, in a VODML based mapping or with a plot visualisation.

70 % of VizierR queries generated within the VO network !

Queries generated by applications such as topcat, aladin, Cassis or APIs such as “astroqueries” which relay a limited information of origin.

Add the origin of the data in Virtual Observatory network for end-users

- We propose to add the following basic provenance metadata :
- Authors
 - Article references
 - Date of publication

- We also propose to enrich the metadata with more details :
- the resources used to build the final catalogue (in VizierR the original tables and metadata such as filters)
 - the roles of agents in the workflows : authors, editors, curator.

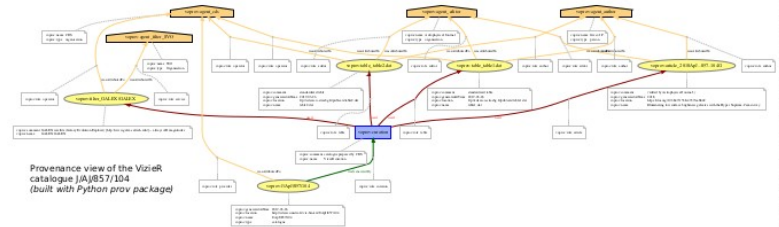
Implementations of the Provenance DM

The IVOA Provenance Data-model is based on the W3C recommendations. The model structure is made of 3 components: Agents, Activities and Entities and includes roles to specify entities-agents relations. Provenance is related by definition to the origin of a product (where does it come from?), but also the path followed to generate this product (what has been done?).

The goal for VizierR consists to provide provenance for end-users. The VizierR Provenance is limited to information useful for users to understand the catalog.



We developed a web service, developed in Python using the « prov » library which enables to provides Provenance in different format : RDF, PNG, SVG



Exploration of a rich VOTable

In addition to RDF format, we explore an XML serialisation mapping based on VO Data Model language (VODml). This mapping could be ingested into a VOTable and allows to rebuild the Datamodel instances.



Model mapping of the photometry Entity in XML coming from the SVO service

Model mapping of the main Entity (the VizierR catalogue) in XML with CDS as provider



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gilles.landais@astro.unistra.fr

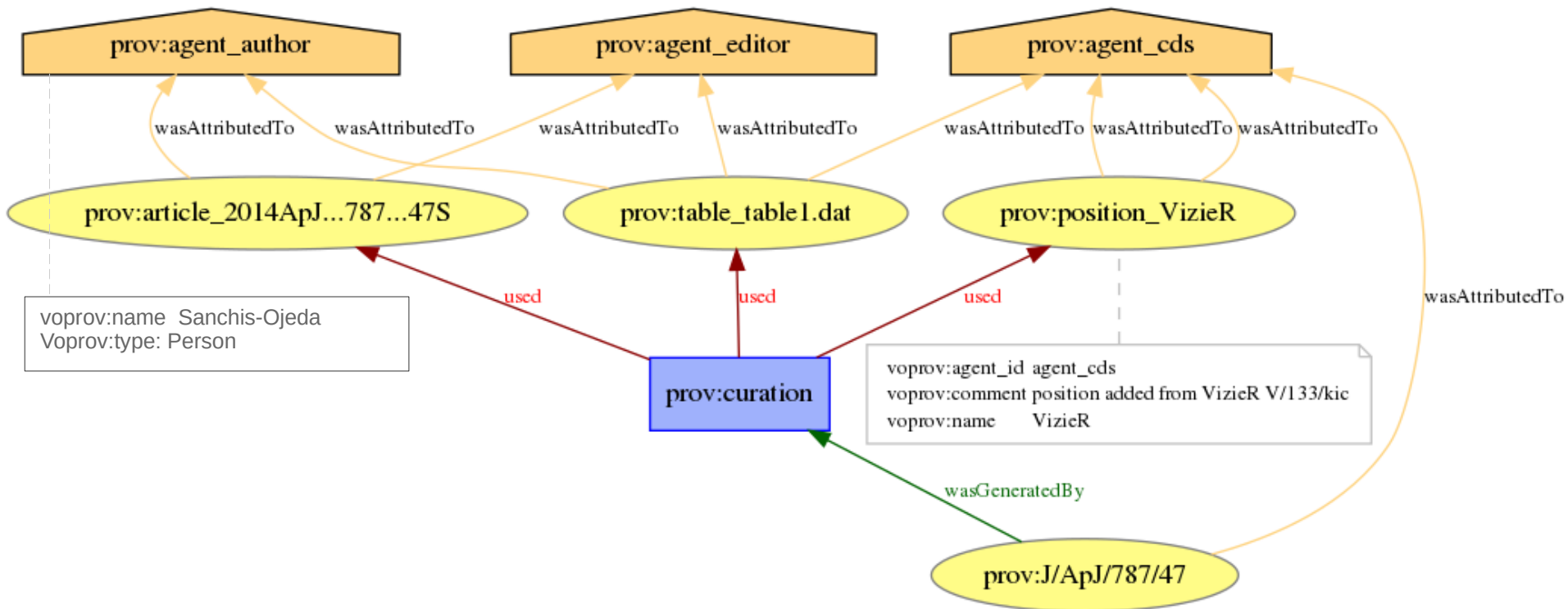


□ Provenance VizieR



Exemple: 106 Kepler ultra-short-period planets (Sanchis-Ojeda) : J/ApJ/787/47

<https://cdsarc.unistra.fr/viz-bin/provenance?cat=J/ApJ/787/47&out=prov:png&filter=true>

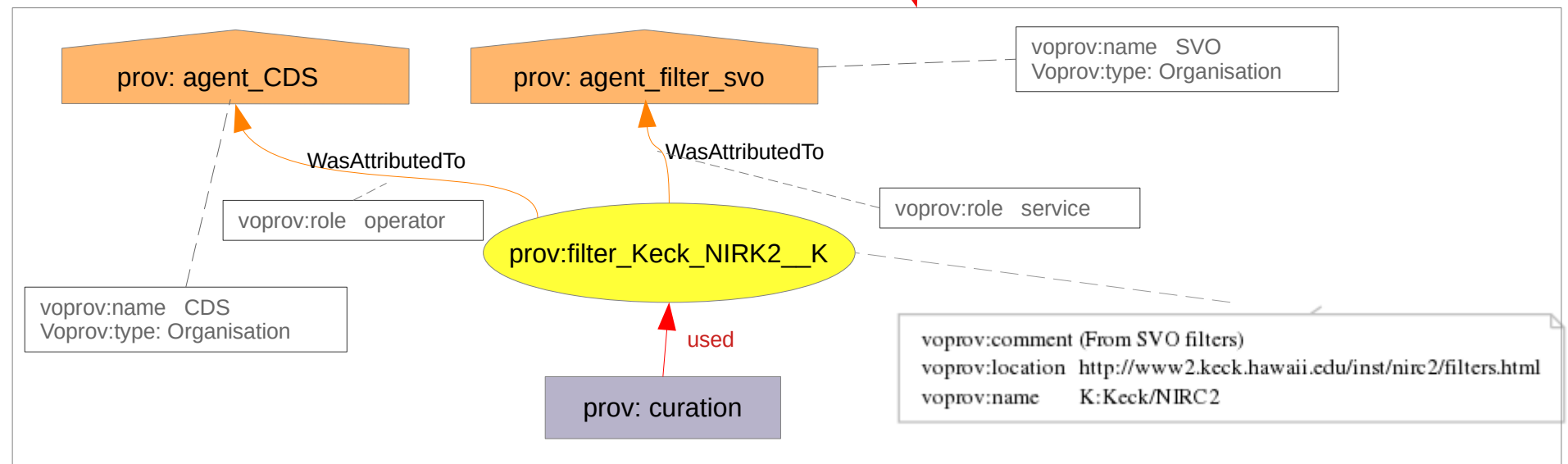
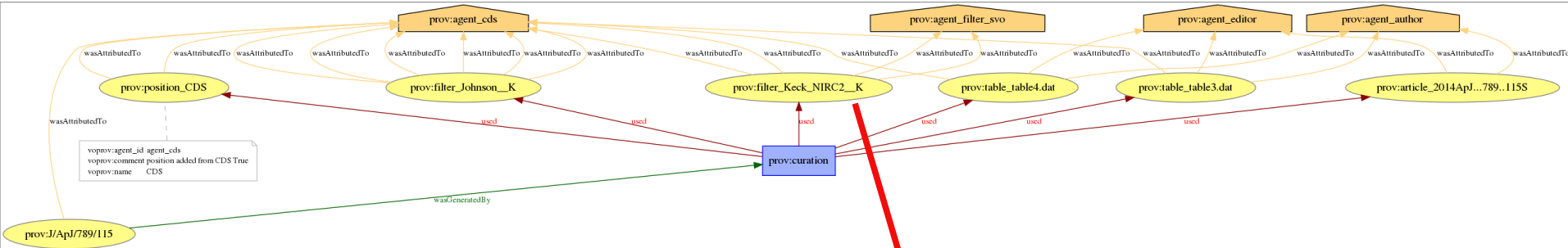


□ Provenance VizieR : les filtres



Exemple : The Quintuplet cluster astrometry and photometry (Stolte): J/ApJ/789/115

<https://cdsarc.unistra.fr/viz-bin/cat/provenance?filter=true&out=prov:png&cat=J/ApJ/789/115>

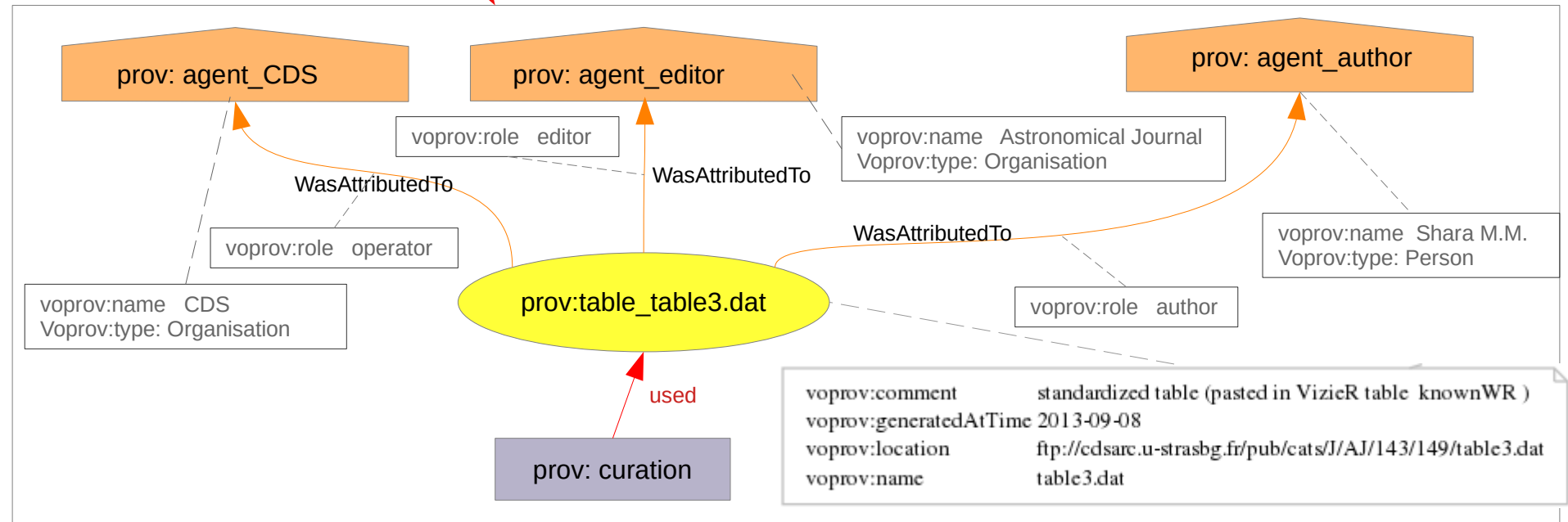
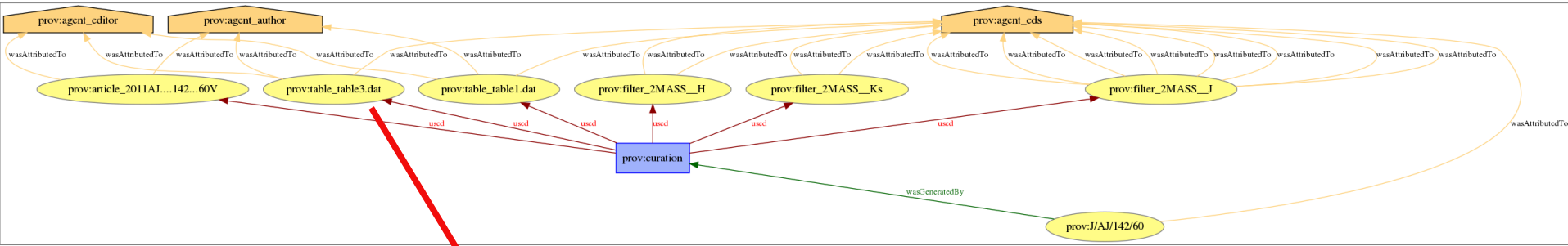


Provenance Vizier : opération de fusion de tables



Exemple: Palomar Transient Factory Orion Project (Van Eyken J.C) : J/AJ/142/60

<https://cdsarc.unistra.fr/viz-bin/cat/provenance?filter=true&out=prov.png&cat=J/ApJ/142/60>





Diffuser la Provenance

- Visualisation dans les « landing page » VizieR (graphe)
- Différents formats : RDF, PROV-JSON, Yaml (M.Servillat) ,VODmlite

Portal Simbad **VizieR** Aladin X-Match Other Help VizieR local

White Dwarfs in the SDSS : J/AJ/126/1023

Access to

Authors : Harris H.C. , Liebert J., Kleinman S.J. et.al Article Origin See also ReadMe Prov FTP **VizieR**

VizieR DOI : 10.26093/cds/vizieR.51261023
 Bibcode : 2003AJ....126.1023H (ADS) (Simbad) (Objects)

CDS Keywords : Stars, white dwarf

Observation (OC)

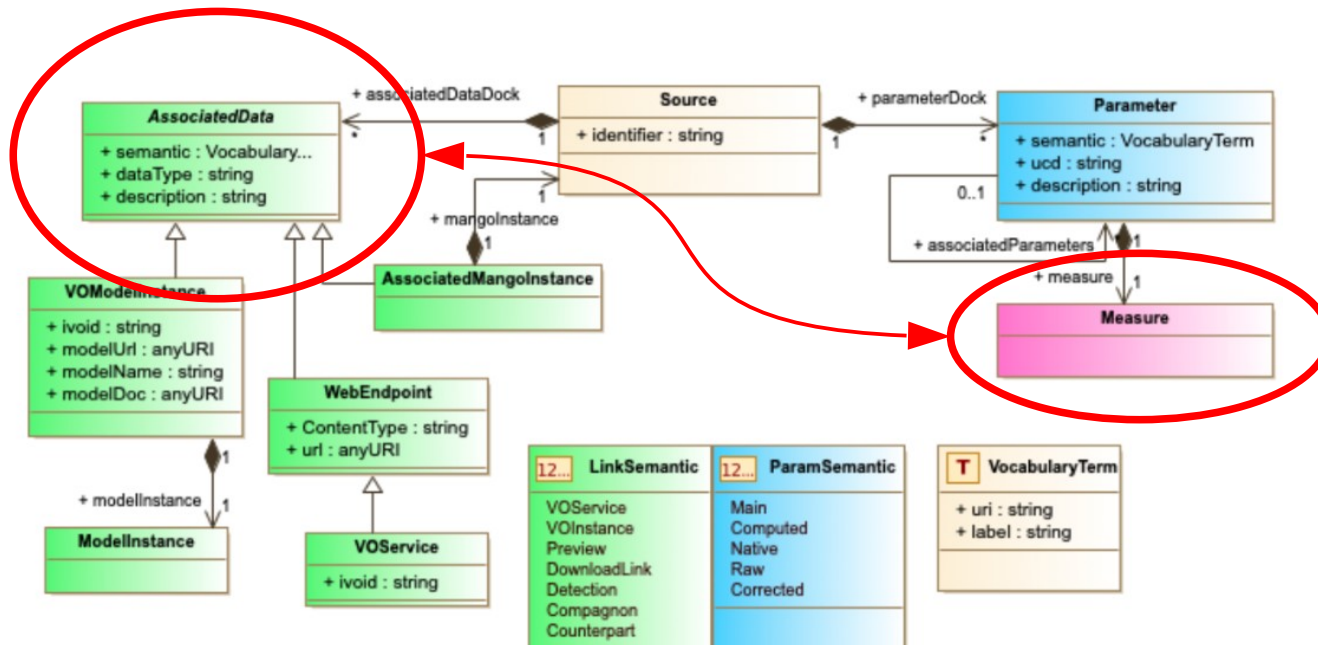
← Im galactic

RDF - Text - Json

Inserted into VizieR : 14-Jun-2004
 Last modification : 02-Aug-2004

□ ProvDM + Mango ?

- Diffuser la Provenance dan Mango
- S rialisation VOdml (lite) (L.michel)





Conclusion – Provenance - Mango



- Les modèles Provenance et Mango s'articulent bien
- Avoir un modèle de Provenance (compatible IVOA+W3C) est un + pour le renouvellement de la demande de certification CTS
- Mango en phase de R&D en tant que standard et comme sortie VizieR
→ question : le modèle intéresse il les API/logiciels clients ?
- Des projets stimulants et qui prennent vie à travers VOFrance -

Notamment pour les réflexions sur l'utilisation du modèle ProvDM de l'IVOA (Provenance)