

# Metadonnées pour les catalogues astronomiques: les UCD

# Sommaire:

- Les données en astronomie
- Metadonnées usuelles
- UCD et Observatoire Virtuel
- Applications et perspectives

# Les données en astronomie

- Origines variées (images, spectres, catalogues)
- Volumes importants (Go, To)

**VizieR** (F. Ochsenbein)

Plus de 3000 catalogues astronomiques, 100000 colonnes.

Description standardisée des catalogues ([ReadMe](#)).

**NEW** The **GSC-II** is now accessible

[Browsing through Catalogues](#) · [Output Preferences](#)

[FAQ](#) · [More about VizieR](#)

Direct access to Catalogues from Name or Designation ([tips and examples](#))

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Find catalogues or Data ([tips and examples](#))

Find catalogues among 3405 available

Words matching author's name, word(s) from title, description, etc.

Use [LIST OF TARGETS](#)

Select from **Wavelength**, **Mission**, and controlled **Astronomical** keywords:

Radio	ANS	AGN
IR	ASCA	Abundances
optical	BeppoSAX	Ages
UV	CGRO	Associations
EUV	COBE	Atomic_Data
X-ray	Chandra	BL_Lac_objects
Gamma-ray	Copernicus	Binaries:cataclysmic

Target Name (resolved by [SIMBAD](#)) or Position:  J2000   10  arcmin

Position in  Sexagesimal, or  Decimal °  Radius or  Box size

around Target

# ReadMe

Nom du catalogue (id)

Auteur, titre, description

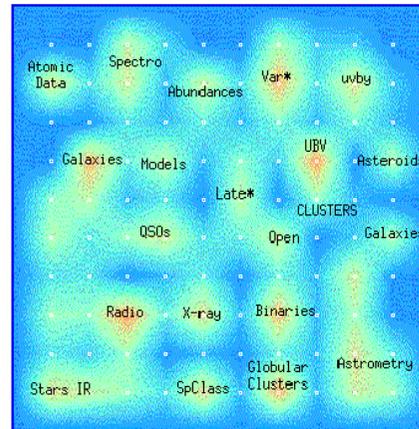
- Domaine Spectral
- Mission
- Mot-clé

## Browsing through Catalogues

Browsing modes via: [Designations](#) · [Acronyms](#) · [Favorites](#) · [Date](#) · [Images/Spectra](#)

This **Kohonen Self-Organizing Map** is based on a neural network analysis of the keywords associated to the catalogues (see Poinçot et al., [1998A&AS...130..183P](#); and Lesteven et al., [1996VA.....40..395L](#))

Each dot marks a map area: colour denotes the *density* or the *clustering tendency* of the documents; deep blue areas have the lowest density. Just click any area on the map to get the corresponding list of catalogues found in that area.



Carte de Kohonen (mots-clés)

## Other Installations of VizieR

Some other installation of VizieR could be closer to you, and answer faster:

[NASA/ADC, USA](#) · [Tokyo, Japan](#) · [IUCAA, India](#) · [CADC, Canada](#) · [Cambridge, UK](#) · [INASAN, Russia](#) · [Beijing Obs., China](#)

# Metadonnées usuelles

Importance des **ReadMe** de VizieR: description homogène des catalogues.

Cependant, certaines questions nécessitent une information supplémentaire:

- . Quels catalogues contiennent une mesure de distance?*
- . Quels catalogues contiennent une magnitude  $V$  ?*

Besoin d'une description **sémantique** du contenu des colonnes d'un catalogue !

Les **noms de colonnes** (labels) fournissent une indication, mais ils sont ambigus...

Ex: magnitude  $V$

+ de 120 labels différents ( $V_{\text{mag}}$ ,  $\text{mag}V$ ,  $\langle V \rangle$ ,  $V$ ,  $V_1$ ,  $V_2$ , ...) pour une même grandeur physique

Et un même nom de colonne peut désigner des grandeurs complètement différentes:

- $V$  pour une magnitude dans le visible
- $V$  pour une vitesse
- ...

# Les UCD

## UCD: Unified Content Descriptor

Description au niveau sémantique du contenu des colonnes des catalogues.

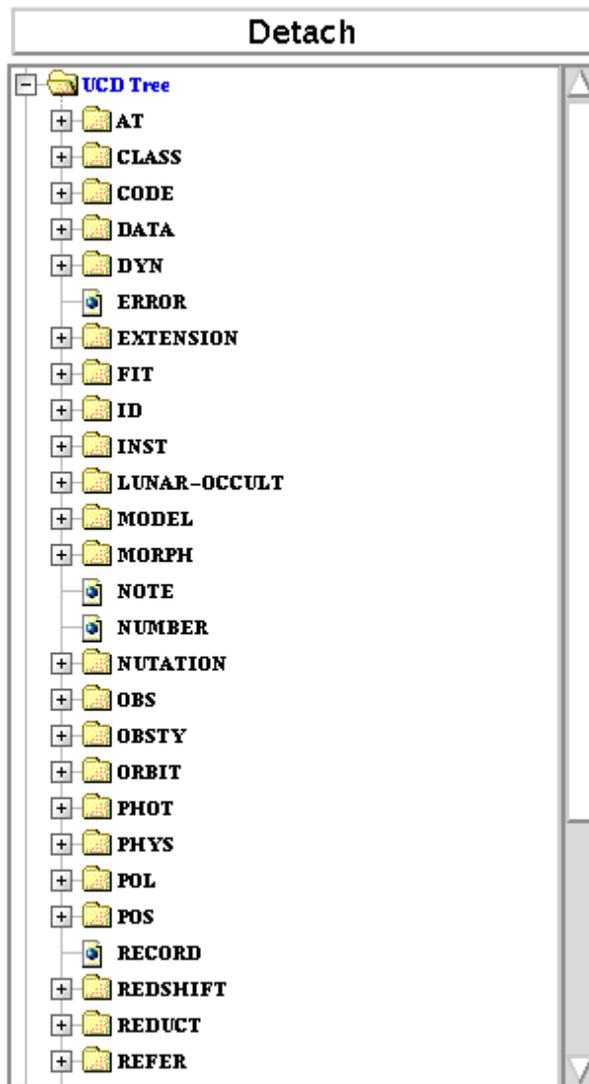
Environ 1500 UCD pour les 100,000 colonnes de VizieR.

Structure arborescente, hiérarchisée (4 niveaux), élaborée à partir des contenus trouvés dans les catalogues.

### Exemples d'UCD:

PHOT\_EXTINCTION\_ISM Interstellar extinction.  
POS\_GAL\_LAT Galactic latitude

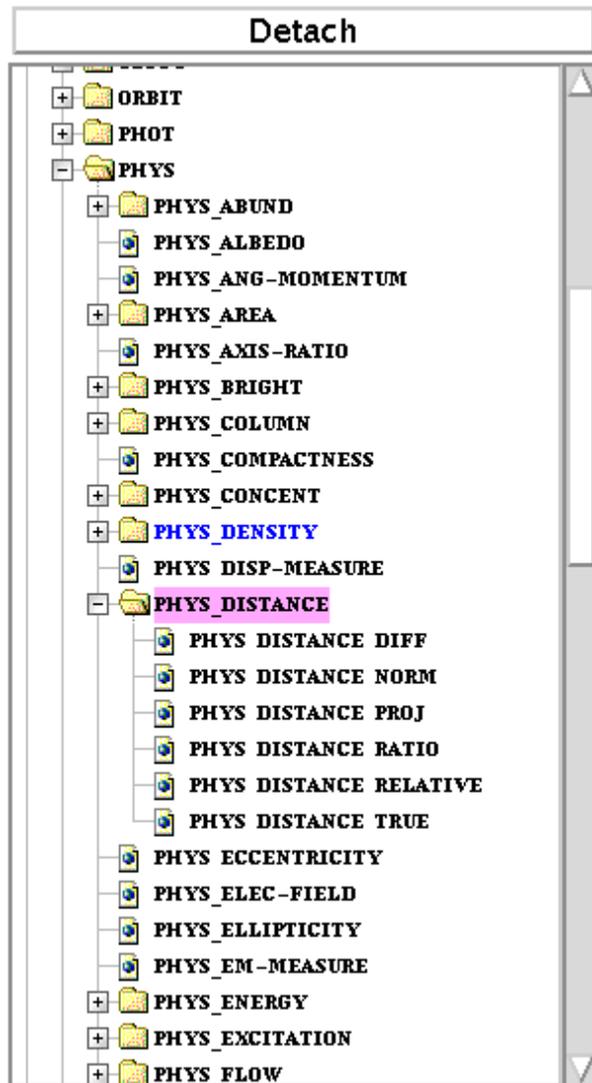
# L'arbre des UCD



## UCD Browser

The left frame displays the UCD tree. Clicking on a leaf will display some informations about it in the right frame.

# L'arbre des UCD



## UCD information

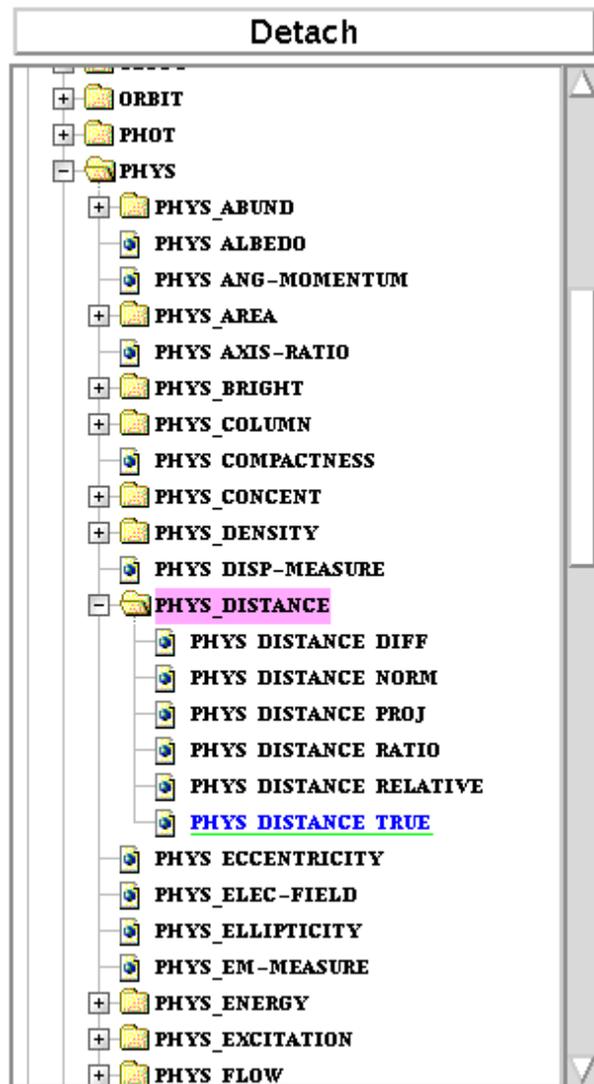


[AVO](#) · [ESO](#) · [ST-ECF](#) · [AstroGrid](#) · [CDS](#) · [Terapix](#) · [Jodrell Bank](#)

UCD **PHYS\_DISTANCE** represents: **Distance and related quantities**

PHYS\_DISTANCE is node #945 at level 1 in the UCD tree (roots are level 0).  
There are 6 elements under this node.

# L'arbre des UCD



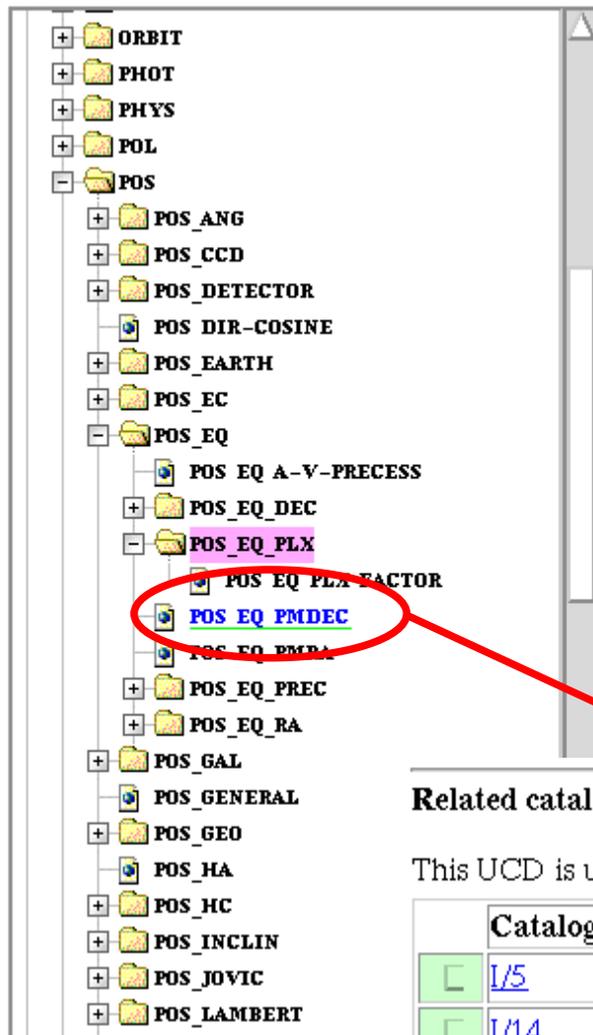
UCD **PHYS\_DISTANCE\_TRUE** represents: **Distance (true, linear distance)**

PHYS\_DISTANCE\_TRUE is leaf #951 at level 2 in the UCD tree (roots are level 0).

## Statistics for this UCD:

Column names and units associated to UCD: **PHYS\_DISTANCE\_TRUE**  
(there are 127 different column names and 11 different units).

Frequency:	column name	Frequency:	unit
137	<u>Dist</u>	192	<u>kpc</u>
18	<u>R</u>	141	<u>pc</u>
18	<u>r</u>	65	<u>Mpc</u>
17	<u>D</u>	13	<u>AU</u>
12	<u>dist</u>	2	<u>100pc</u>
12	<u>d</u>	2	<u>10+6km</u>
9	<u>Z</u>	2	<u>---</u>
8	<u>z</u>	1	<u>km</u>
7	<u>Dhel</u>	1	<u>km/s</u>
6	<u>Dist2</u>	1	<u>10-4</u>
6	<u>Dgal</u>	1	<u>al</u>
5	<u>zDist</u>		
4	<u>Y</u>		
4	<u>xDist</u>		
4	<u>yDist</u>		
4	<u>CODIST</u>		
4	<u>HDist</u>		
3	<u>Rg</u>		
3	<u>Distance</u>		
3	<u>Rdist</u>		
3	<u>Xdist</u>		
3	<u>Vdist</u>		



Trouver les catalogues associés à un UCD.

#### Related catalogues in VizieR:

This UCD is used in 209 columns, in 134 different catalogues (187 tables) of VizieR.

	Catalogue	Title	Bibcode
<input type="checkbox"/>	<a href="#">I/5</a>	Proper Motions in Cape Zone Catalogue -40/-52 (Spencer Jones H. + 1936)	
<input type="checkbox"/>	<a href="#">I/14</a>	Proper Motions of 1160 Late-Type Stars (Fogh Olsen, 1970)	<a href="#">1970A&amp;AS....2...69O</a>
<input type="checkbox"/>	<a href="#">I/40</a>	WASHINGTON 20 Catalog (Morgan, 1933)	
<input type="checkbox"/>	<a href="#">I/61B</a>	AGK3 Catalogue (Dieckvoss, Heckmann 1975)	<a href="#">1975QB6..A15.....D</a>
<input type="checkbox"/>	<a href="#">I/62C</a>	Perth 70: Positions of 24900 Stars (Hog+ 1976)	<a href="#">1976AAHam...9....1H</a>
<input type="checkbox"/>	<a href="#">I/68A</a>	Positions and Proper Motions in alpha Per cluster (Fresneau, 1980)	<a href="#">1980BICDS..18...81F</a>

# Recherche d'UCD

Ex: magnitude B

Netscape: Content search

File Edit View Go Communicator Help

Google Dico CDS seb DMF Mail TC rezo.net Train CASPAM

Bookmarks Location:

 **Content search** 

[AVO](#) · [ESO](#) · [ST-ECF](#) · [AstroGrid](#) · [CDS](#) · [Terapix](#) · [Jodrell Bank](#)

Enter some keywords corresponding to your search.  
Examples : **johnson b-i**  
For a *one-keyword-search*, a *minimum of 3 letters* is required.

The result will display the UCDs matching your search.

< OR < AND

## Results for the search **B MAGNITUDE** :

- [UCD Leaves](#)
- [Related categories](#)

### *Suggested UCD leaves*

UCD	Description	Relevance	Associated catalogues (limited to 5)
<b>PHOT_MAG_B</b>	Blue B magnitude	 66 %	<a href="#">I/121</a> <a href="#">I/125A</a> <a href="#">I/209A</a> <a href="#">I/219</a> <a href="#">I/222</a>
<b>PHOT_JHN_B</b>	Johnson magnitude B (JHN)	 50 %	<a href="#">I/197A</a> <a href="#">I/207</a> <a href="#">II/7A</a> <a href="#">II/117</a> <a href="#">II/207</a>
<b>PHOT_STR_B</b>	Stroemgren Magnitude b (STR)	 50 %	<a href="#">II/170</a> <a href="#">II/188</a> <a href="#">II/200</a> <a href="#">J/A+A/294/135</a> <a href="#">J/A+A/304/415</a>
<b>PHOT_PHG_B</b>	Photographic blue magnitude B (includes the O magnitude of POSS)	 50 %	<a href="#">I/80</a> <a href="#">I/129</a> <a href="#">I/199</a> <a href="#">I/200</a>

Permet une sélection de catalogues sur la base de leur contenu.

# Comparaisons automatiques

<b>Table1</b>	I/146/ppm1
<b>Table 2</b>	I/239/tyc_main
<b>Object name or position</b>	17 57 24 +04 36 09

Selection des catalogues et d'une position.

Go !

Choose the columns which will be converted

Jonction sur les UCD :

I/146/ppm1		UCD	I/239/tyc_main	
Mag	mag	PHOT_MAG_V	<input type="checkbox"/> VTmax	mag
			<input type="checkbox"/> VTmin	mag
RAJ2000	"h:m:s"	POS_EQ_RA_MAIN	<input type="checkbox"/> RA(ICRS)	deg
DEJ2000	"d:m:s"	POS_EQ_DEC_MAIN	<input type="checkbox"/> DE(ICRS)	deg
pmRA	s/yr	POS_EQ_PMRA	<input type="checkbox"/> pmRA	mas/yr
pmDE	arcsec/yr	POS_EQ_PMDEC	<input type="checkbox"/> pmDE	mas/yr

[AVO](#) · [ESO](#) · [ST-ECF](#) · [AstroGrid](#) · [CDS](#) · [Terapix](#) · [Jodrell Bank](#)

**I/146/ppm1** Positions and Proper Motions – North (Roeser+, 1988)  
Catalogue PPM–North

_r	recno	PPM	DM	Mag	Sp	RAJ2000	DEJ2000	pmRA	pmDE	Npos	e_RA	e_DE	pmRA	e_pmRA	pmDE	e_pmDE	EpRA-1900
arcmin			mag	"h:m:s"	"d:m:s"	s/yr	arcsec/yr	mas/yr	mas/yr	10mas	10mas	10mas	mas/yr	mas/yr	mas/yr	mas/yr	yr
0.0930	164887	164887	+04 3559	10.6	F8	17 57 24.373	+04 36 09.20	-0.0014	0.032	4	10	10	4.7	4.8	4.8	25.67	

**I/239/tyc\_main** The Hipparcos and Tycho Catalogues (ESA 1997)  
The main part of Tycho Catalogue

_r	recno	TYC	Proxy	RAhms	DEdms	Vmag	r_Vmag	RA(ICRS)	DE(ICRS)	AstroRef	Pix	pmRA	pmDE	e_RAdeg	e_DE
arcmin				mag	mag	deg	deg	mas/yr	mas/yr	mas	mas	mas/yr	mas/yr	mas	m:
0.1046	35715	1844		17 57 24.42	+04 36 09.0	10.43		269.35174824	4.60249678		27.50	41.60	37.50	32.20	2
7.3676	35741	2502		17 57 48.97	+04 40 05.8	9.54		269.45402305	4.66828815	X					

I/239/tyc\_main converted columns :

recno	pmDE
35715	0.0375
35741	

The following conversions have not been performed :

Column name	From	To	Reason
VTmax	mag	mag	Useless

# UCD photometriques

Netscape: Search by wavelength

File Edit View Go Communicator Help

Google Dico CDS seb DMF Mail TC rezo.net Train CASPAM

Bookmarks Location:

### Select a wavelength range

Min Wavelength :  Angstrom

Max Wavelength :  Angstrom

### Select a region of the sky

Target Name (resolved by [SIMBAD](#)) or Position:  J2000   
Target radius:  arcmin

Position in  Sexagesimal, or  Decimal °  Radius or  Box size

### Search in

VizieR  EIS  HST

# L'Observatoire Virtuel

2 grands projets:

- AVO - Astrophysical Virtual Observatory (Europe)
- NVO – National Virtual Observatory (USA)
  - Outils et méthodes
  - Standards
  - Interopérabilité

Une étape importante: **VOTable**. Standard d'échange pour les catalogues au format XML.

votable.xml

```
<RESOURCE ID="yCat_1239" name="I/239">
<DESCRIPTION>The Hipparcos and Tycho Catalogues (ESA 1997)</DESCRIPTION>
<COOSYS ID="J2000_1991.250" system="eq_FK5" equinox="J2000" epoch="1991.250"/>
<TABLE ID="I_239_hip_main" name="I/239/hip_main">
<DESCRIPTION>The Hipparcos Main Catalogue</DESCRIPTION>
<!-- RowName: ${HIP} -->
<!-- MatchedRows: 50 (upper limit) -->

<!-- Now comes the definition of each field -->
<FIELD name="_RAJ2000" ucd="POS_EQ_RA_MAIN" ref="J2000" datatype="char" arraysize="12" unit="&quot;h:m:s&quot;">
<DESCRIPTION>Right ascension (FK5) Equinox=J2000.0 Epoch=J2000, proper motions taken into account (computed by Vizier
, not part of the original data)</DESCRIPTION>
</FIELD>
<FIELD name="_DEJ2000" ucd="POS_EQ_DEC_MAIN" ref="J2000" datatype="char" arraysize="12" unit="&quot;d:m:s&quot;">
<DESCRIPTION>Declination (FK5) Equinox=J2000.0 Epoch=J2000, proper motions taken into account (computed by Vizier, no
t part of the original data)</DESCRIPTION>
</FIELD>
<FIELD name="ID" ucd="ID_MAIN" datatype="int" width="6">
<DESCRIPTION>Identification (Auto number) (H1)</DESCRIPTION>
<LINK href="http://vizir.u-strasbg.fr/local/cgi-bin/Vizier-5?-info=XML&out.addr=&out.source=I/239/hip_main&ecno=${ecno}"/>
</FIELD>
<FIELD name="RAhms" ucd="POS_EQ_RA_MAIN" datatype="char" arraysize="11">
<DESCRIPTION>Right ascension in h:m:s, ICRS (J1991.25) (H3)</DESCRIPTION>
</FIELD>
<FIELD name="DEdms" ucd="POS_EQ_DEC_MAIN" datatype="char" arraysize="11">
<DESCRIPTION>Declination in deg ' " , ICRS (J1991.25) (H4)</DESCRIPTION>
</FIELD>
<FIELD name="vmag" ucd="PHOT_JHN_V" datatype="float" width="5" precision="2" unit="mag">
<DESCRIPTION>? Magnitude in Johnson V (H5)</DESCRIPTION>
</FIELD>
<FIELD name="RA(ICRS)" ucd="POS_EQ_RA_MAIN" ref="J2000_1991.250" datatype="double" width="12" precision="8" unit="deg">
<DESCRIPTION>?* alpha, degrees (ICRS, Epoch=J1991.25) (H8)</DESCRIPTION>
</FIELD>
<FIELD name="DE(ICRS)" ucd="POS_EQ_DEC_MAIN" ref="J2000_1991.250" datatype="double" width="12" precision="8" unit="deg">
<DESCRIPTION>?* delta, degrees (ICRS, Epoch=J1991.25) (H9)</DESCRIPTION>
</FIELD>
<FIELD name="Plx" ucd="POS_PARLX_TRIG" datatype="float" width="7" precision="2" unit="mas">
<DESCRIPTION>? Trigonometric parallax (H11)</DESCRIPTION>
</FIELD>
```

# Applications des UCD

Cone search :

- UCD= "ID\_MAIN"
- UCD= "POS\_EQ\_RA\_MAIN"
- UCD= "POS\_EQ\_DEC\_MAIN"

Extension à d'autres services que VizieR:

- SIMBAD (CDS)
- Filtres dans Aladin
- Archives ESO
- SDSS (1300 colonnes!)

Ontologie, vocabulaire standardisé pour l'astronomie...

Lien avec les modèles de données (cf. M. Louys).

# Conclusions

- UCD: Unified content descriptor
- Recherche de contenu dans les catalogues
- UCD+unités = comparaisons/conversions automatiques du contenu des tables
- Utilisation dans standard XML
- Lien avec les modèles de données
- Ontologie, sémantique standardisée