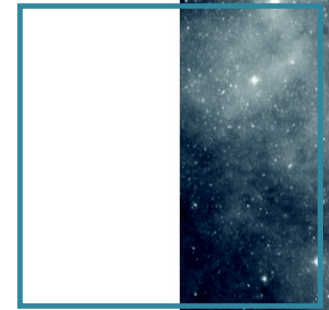


Table Combination with MIVOT =
An Asteroid catalog use case
Inspired from VizieR



F.Bonnarel, L.Michel, M.Louys



Asteroid catalog in VizieR

Photometry of 3 main belt asteroids : J/A+A/498/313

Access to



FTP

ReadMe



Authors : Marciniak A. , Michalowski T., Hirsch R. et..al

VizieR DOI : [10.26093/cds/vizier.34980313](https://doi.org/10.26093/cds/vizier.34980313) Cite

Bibcode : [2009A&A...498..313M](https://ui.adsabs.org/2009A&A...498..313M) (ADS)

UAT : Asteroids, Photometry

Observation (OC)

Inserted into VizieR : 30-Apr-2009

Last modification : 26-Jun-2017

Article Origin

Description

See also

Prov

FTP

VizieR

Photometry and models of selected main belt asteroids. VI. 160 Una, 747 Winchester, and 849 Ara. (2009)

[Go to the original article \(10.1051/0004-6361/200811078\)](https://ui.adsabs.org/10.1051/0004-6361/200811078)

Keywords : techniques photometric - minor planets: asteroids

Abstract:We present a set of new photometric observations of three main belt asteroids: 160 Una, 747 Winchester, and 849 Ara. This, combined with the available data, allowed us to construct their physical models. The lightcurve inversion method was used to obtain their spins and shapes. We have resolved problems with the rotation period of 160 Una, and found it to be 11.033176 ± 0.000011 h, almost twice the value given in the literature.

[Astronomy and Astrophysics policies](#)

5 different tables – connection not that simple



Asteroid catalog in Vizier

```
-<VOTABLE version="1.4" xsi:schemaLocation="http://www.ivoa.net/xml/VOTable/v1.3 http://www.ivoa.net/xml/VOTable/v1.3">
-<DESCRIPTION>
  Vizier Astronomical Server vizier.cfa.harvard.edu Date: 2023-05-06T11:13:45 [V7.296] Explanations and Statistics of UCDs: See LINK below In case of problem
  NULL integer columns are written as an empty string <TD></TD>, explicitly possible from VOTable-1.3
</DESCRIPTION>
-<!--
  VOTable description at http://www.ivoa.net/Documents/latest/VOT.html
-->
<INFO ID="VERSION" name="version" value="7.296"/>
<INFO ID="Ref" name="-ref" value="VIZ645622a7b887"/>
<INFO ID="MaxTuples" name="-out.max" value="unlimited"/>
+<INFO name="queryParameters" value="31"></INFO>
-<INFO name="CatalogsExamined" value="5">
  5 catalogues with potential matches were examined.
</INFO>
-<RESOURCE ID="yCat_34980313" name="J/A+A/498/313">
-<DESCRIPTION>
  Photometry of 3 main belt asteroids (Marciniak+, 2009)
</DESCRIPTION>
+<TABLE ID="J_A_A_498_313_objects" name="J/A+A/498/313/objects"></TABLE>
<!--
  Execution Reports
-->
+<TABLE ID="J_A_A_498_313_aspdat" name="J/A+A/498/313/aspdat"></TABLE>
<!--
  Execution Reports
-->
+<TABLE ID="J_A_A_498_313_160lcs" name="J/A+A/498/313/160lcs"></TABLE>
<!--
  Execution Reports
-->
+<TABLE ID="J_A_A_498_313_747lcs" name="J/A+A/498/313/747lcs"></TABLE>
<!--
  Execution Reports
-->
+<TABLE ID="J_A_A_498_313_849lcs" name="J/A+A/498/313/849lcs"></TABLE>
<INFO name="matches" value="3650">matching records</INFO>
<INFO name="Warning" value="Column 'Obs' unknown in 'J/A+A/498/313/objects'"/>
<INFO name="Warning" value="Column 'r' unknown in 'J/A+A/498/313/objects'"/>
```

1 generic parameter table, 1 secular variation table, 3 time series (light + position)

Asteroid catalog in Vizier

General parameter catalog :

```
+<FIELD name="Ast" ucd="meta.id" datatype="short" width="3"></FIELD>
+<FIELD name="Name" ucd="meta.id;meta.main" datatype="char" arraysize="10*"></FIELD>
+<FIELD name="H" ucd="phys.magAbs" datatype="float" width="5" precision="2" unit="mag"></FIELD>
+<FIELD name="Diam" ucd="phys.size.diameter" datatype="float" width="5" precision="1" unit="km"></FIELD>
+<FIELD name="i" ucd="src.orbital.inclination" datatype="double" width="9" precision="6" unit="deg"></FIELD>
+<FIELD name="e" ucd="src.orbital.eccentricity" datatype="double" width="11" precision="8"></FIELD>
+<FIELD name="a" ucd="phys.size.smajAxis" datatype="double" width="11" precision="8" unit="AU"></FIELD>
+<FIELD name="FileName" ucd="meta.id;meta.file" datatype="char" arraysize="10*"></FIELD>
+<FIELD name="Orb" ucd="meta.ref.url" datatype="char" arraysize="3"></FIELD>
+<FIELD name="LC" ucd="meta.ref.url" datatype="char" arraysize="2"></FIELD>
+<FIELD name="recno" ucd="meta.record" datatype="int" width="8" type="hidden"></FIELD>
-<DATA>
  -<TABLEDATA>
    -<TR>
      <TD>160</TD>
      <TD>Una</TD>
      <TD>9.08</TD>
      <TD>81.2</TD>
      <TD>3.823835</TD>
      <TD>0.06490120</TD>
      <TD>2.72908023</TD>
      <TD>160lcs.dat</TD>
      <TD>Orb</TD>
      <TD>LC</TD>
      <TD>1</TD>
    </TR>
  -<TR>
```


Asteroid catalog in Vizier

Secular variation catalog :

```
--<TABLE ID="J_A_A 498 313_aspdatt" name="J/A+A/498/313/aspdatt">
  <DESCRIPTION>Aspect data of 160 Una, 747 Winchester and 849 Ara</DESCRIPTION>
  <!-- Definitions of GROUPs and FIELDs -->
  +<FIELD name="Ast" ucd="meta.id" datatype="short" width="3"></FIELD>
  +<FIELD name="Name" ucd="meta.id;meta.main" datatype="char" arraysize="10*"></FIELD>
  +<FIELD name="Obs" ucd="time.epoch" datatype="char" arraysize="13" unit="s"></FIELD>
  +<FIELD name="r" ucd="pos.distance;src.orbital" datatype="float" width="7" precision="4" unit="AU"></FIELD>
  +<FIELD name="delta" ucd="pos.distance" datatype="float" width="7" precision="4" unit="AU"></FIELD>
  +<FIELD name="phAngle" ucd="src.orbital" datatype="float" width="5" precision="2" unit="deg"></FIELD>
  +<FIELD name="Elon" ucd="pos.ecliptic.lon" datatype="float" width="6" precision="2" unit="deg"></FIELD>
  +<FIELD name="Elat" ucd="pos.ecliptic.lat" datatype="float" width="6" precision="2" unit="deg"></FIELD>
  +<FIELD name="Site" ucd="meta.id;instr.obsty" datatype="char" arraysize="4"></FIELD>
  +<FIELD name="recno" ucd="meta.record" datatype="int" width="8" type="hidden"></FIELD>
--<DATA>
  --<TABLEDATA>
    --<TR>
      <TD>160</TD>
      <TD>Una</TD>
      <TD>2000-09-25T02</TD>
      <TD>2.5936</TD>
      <TD>1.6284</TD>
      <TD>7.60</TD>
      <TD>22.25</TD>
      <TD>0.60</TD>
      <TD>Bor</TD>
      <TD>1</TD>
    </TR>
    --<TR>
      <TD>160</TD>
      <TD>Una</TD>
      <TD>2000-09-27T21</TD>
      <TD>2.5922</TD>
      <TD>1.6160</TD>
      <TD>6.34</TD>
      <TD>21.68</TD>
      <TD>0.68</TD>
      <TD>Bor</TD>
      <TD>2</TD>
    </TR>
    --<TR>
      <TD>160</TD>
      <TD>Una</TD>
      <TD>2000-09-30T02</TD>
      <TD>2.5911</TD>
```

Asteroid catalog in Vizier

Brightness + position time series for Una asteroid:

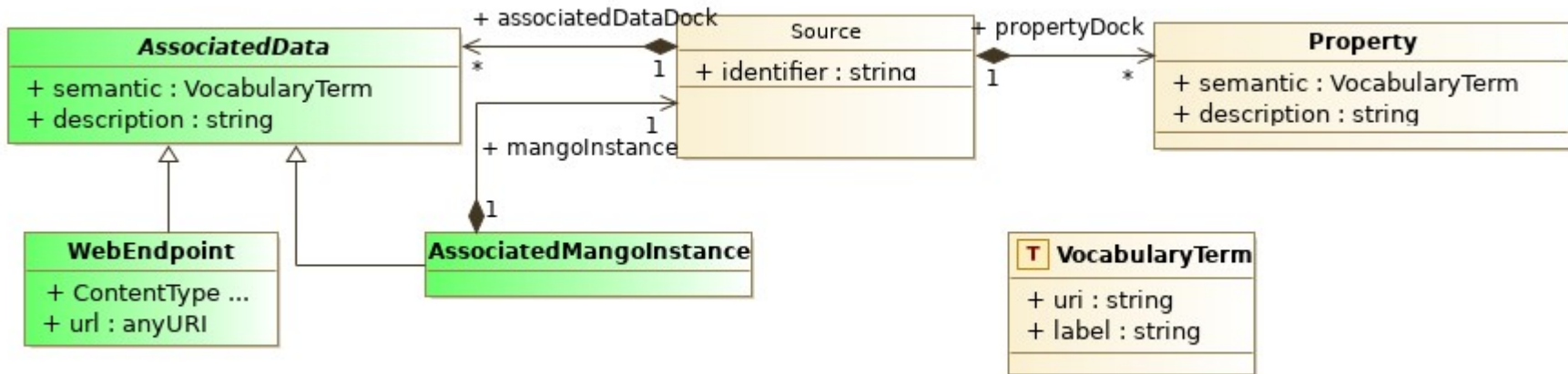
```
+<TABLE ID="J_A_A_498_313_aspdat" name="J/A+A/498/313/aspdat"></TABLE>
<!--
Execution Reports
-->
-<TABLE ID="J_A_A_498_313_160lcs" name="J/A+A/498/313/160lcs">
  <DESCRIPTION>Asteroid 160 Una individual lightcurves</DESCRIPTION>
  <!--
    Asteroid 160 Una individual lightcurves \vizContent{timeSerie}{\vExec{Vgraph}{J/A+A/498/313/.160lcs}}{Light curve}
  -->
  <!-- Definitions of GROUPs and FIELDs -->
  <!--
    +++No column could be found to attach a LINK in table: J/A+A/498/313/160lcs
  -->
  +<FIELD name="JD" ucd="time.epoch" datatype="double" width="14" precision="6" unit="d"></FIELD>
  +<FIELD name="br" ucd="meta.note" datatype="float" width="6" precision="4"></FIELD>
  +<FIELD name="Sx" ucd="pos.cartesian.x" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  +<FIELD name="Sy" ucd="pos.dirCos" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  +<FIELD name="Sz" ucd="pos.cartesian.z" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  +<FIELD name="Ex" ucd="pos.cartesian.x" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  +<FIELD name="Ey" ucd="pos.dirCos" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  +<FIELD name="Ez" ucd="pos.cartesian.z" datatype="double" width="9" precision="6" unit="AU"></FIELD>
  <DATA>
  -<TABLEDATA>
  -<TR>
    <TD>2445254.691110</TD>
    <TD>1.0218</TD>
    <TD>-2.411595</TD>
    <TD>-0.916291</TD>
    <TD>-0.034912</TD>
    <TD>-1.467316</TD>
    <TD>-0.593324</TD>
    <TD>-0.034899</TD>
  </TR>
  -<TR>
    <TD>2445254.708700</TD>
    <TD>1.0115</TD>
    <TD>-2.411595</TD>
    <TD>-0.916291</TD>
    <TD>-0.034912</TD>
    <TD>-1.467316</TD>
```

Asteroid catalog in Vizier issues

- General to secular table joins could be done using TAP interface + ADQL
- But a join from any of those tables to the TimeSeries tables is not possible
- The user knows from DESCRIPTIONS how to make the connection
- But what if we had thousands of objects ?
- Can MIVOT help ?
- → Yes !!!



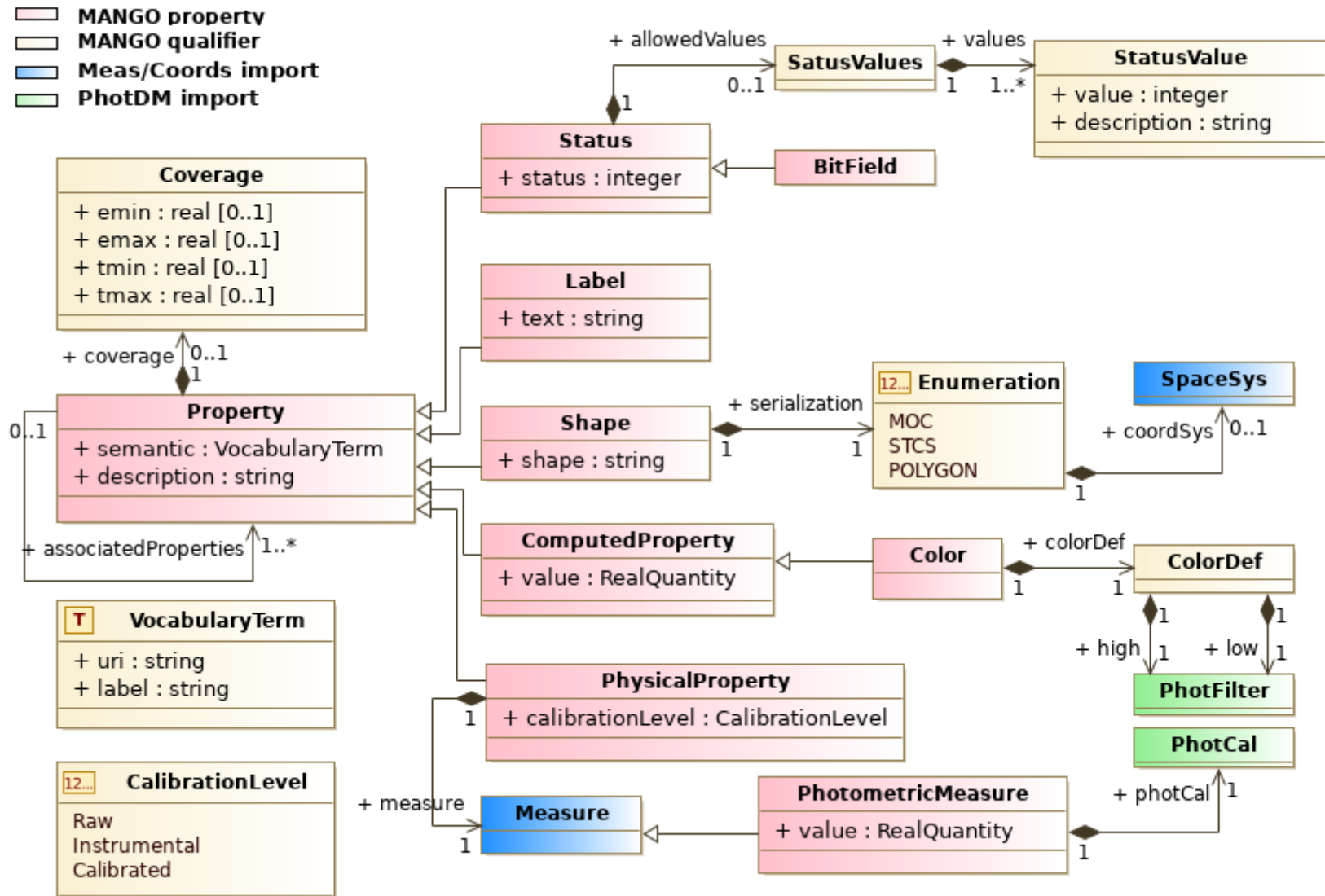
Try the mango datamodel to help relate informations



- Mango source and properties used for generic catalog
- Mango source, property and associated property proposed used for TimeSeries
- Related via AssociatedMangoInstance



Try the mango datamodel to help relate informations



JOINING TABLES - 1

- We create a collection of static mango:Sources in GLOBALS

```
-<COLLECTION dmid="_Asteroids" dmrole="mango:Source">
-<INSTANCE dmid="una" dmrole="" dmtype="mango:Source">
  <PRIMARY_KEY dmtype="ivoa:string" value="una"/>
  <ATTRIBUTE dmrole="mango:Source.identifier" dmtype="ivoa:string" value="una"/>
</INSTANCE>
-<INSTANCE dmid="winchester" dmrole="" dmtype="mango:Source">
  <PRIMARY_KEY dmtype="ivoa:string" value="winchester"/>
  <ATTRIBUTE dmrole="mango:Source.identifier" dmtype="ivoa:string" value="winchester"/>
</INSTANCE>
-<INSTANCE dmid="ara" dmrole="" dmtype="mango:Source">
  <PRIMARY_KEY dmtype="ivoa:string" value="ara"/>
  <ATTRIBUTE dmrole="mango:Source.identifier" dmtype="ivoa:string" value="ara"/>
</INSTANCE>
</COLLECTION>
```



JOINING TABLES - 2

- For the two tables which contain a FIELD with the Asteroid name we use a REFERENCE to the corresponding mango source object in GLOBALS

```
--<TEMPLATES dmid="genericparms" tableref="J_A_A_498_313_objects">
--<COLLECTION>
--<REFERENCE dmrole="mango:Source" sourceref="_Asteroids">
  <FOREIGN_KEY ref="_Name"/>
</REFERENCE>
--<COLLECTION dmrole="mango:Property">
  +<INSTANCE dmrole="" dmtype="mango:Label"></INSTANCE>
  +<INSTANCE dmrole="" dmtype="mango:PhysicalProperty"></INSTANCE>
  +<INSTANCE dmrole="" dmtype="mango:PhysicalProperty"></INSTANCE>
  +<INSTANCE dmrole="" dmtype="mango:PhysicalProperty"></INSTANCE>
  +<INSTANCE dmrole="" dmtype="mango:PhysicalProperty"></INSTANCE>
  +<INSTANCE dmrole="" dmtype="mango:PhysicalProperty"></INSTANCE>
</COLLECTION>
</COLLECTION>
</TEMPLATES>
```



JOINING TABLES - 3

- For the 3 tables which do not contain explicitly the name of the asteroid we use a Static REFERENCE to the corresponding mango source object in GLOBALS

```
<TEMPLATES dmid="_una" tableref="J_A_A_498_313_160ics">
-<INSTANCE dmid="" dmrole="mango:AssociatedMangoInstance" dmtype="mango:Source">
+<INSTANCE dmrole="mango:AssociatedMangoInstance.semantic" dmtype="mango:VocabularyTerm"></INSTANCE>
  <ATTRIBUTE dmrole="mango:AssociatedMangoInstance.description" dmtype="ivoa:string" value="asteroid light curve"/>
  <REFERENCE dmrole="mango:Source" dmref="una"/>
-<COLLECTION dmrole="mango:Property">
  -<INSTANCE dmrole="" dmtype="mango:PhysicalProperty">
    +<INSTANCE dmrole="mango:Property.semantic" dmtype="mango:VocabularyTerm"></INSTANCE>
      <ATTRIBUTE dmrole="mango:Property.description" dmtype="ivoa:string" value="time of observation"/>
      <ATTRIBUTE dmrole="mango:PhysicalProperty.calibrationLevel" dmtype="mango:CalibrationLevel" value="Calibrated"/>
    +<INSTANCE dmrole="mango:PhysicalProperty.measure" dmtype="meas:Time"></INSTANCE>
    +<COLLECTION dmrole="mango:associatedProperties"></COLLECTION>
  </INSTANCE>
</COLLECTION>
</INSTANCE>
</TEMPLATES>
```

