

# SIMBAD : the bibliographic database

A meta-compilation of astronomical objects of interest that have been studied in the literature

## SIMBAD Overview

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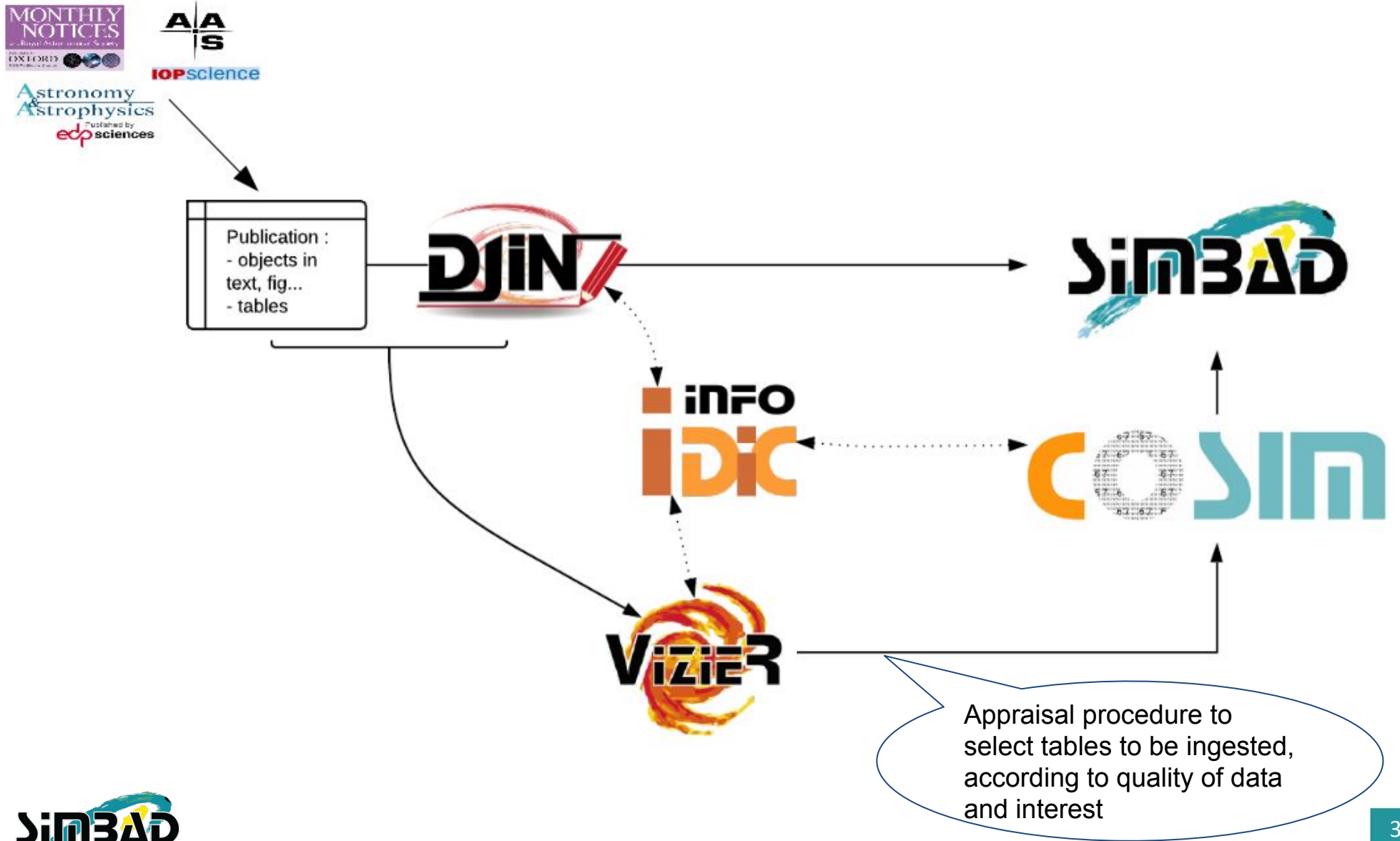




# The Team

- Bibliography & human resources : Lesteven Soizick
- Scientific content : Loup Cécile
- Database & softwares : Oberto Anaïs, Mantelet Grégory
- Nomenclature : Vollmer Bernd
  
- Documentalists
  - Nomenclature (1.5) : Brouty Marianne, Marquis Fabienne
  - Ingestion of references via DJIN (3.5) : Eisele Aline, Neuville Magali, Son Evelyne, Vonflie Philippe
  - Ingestion of lists of objects via COSIM (2.5) : Brunet Catherine, (Buga Mihaela), Collas Esther, Marquis Fabienne, Perret Emmanuelle, van der Woerd Katia
- Astronomers involved in scientific content : Bot Caroline, Cambresy Laurent, Derrière Sébastien, Genova Françoise, Monari Giacomo, Nebot Ada, Ocvirk Pierre, Siebert Arnaud, Vollmer Bernd

# Workflow

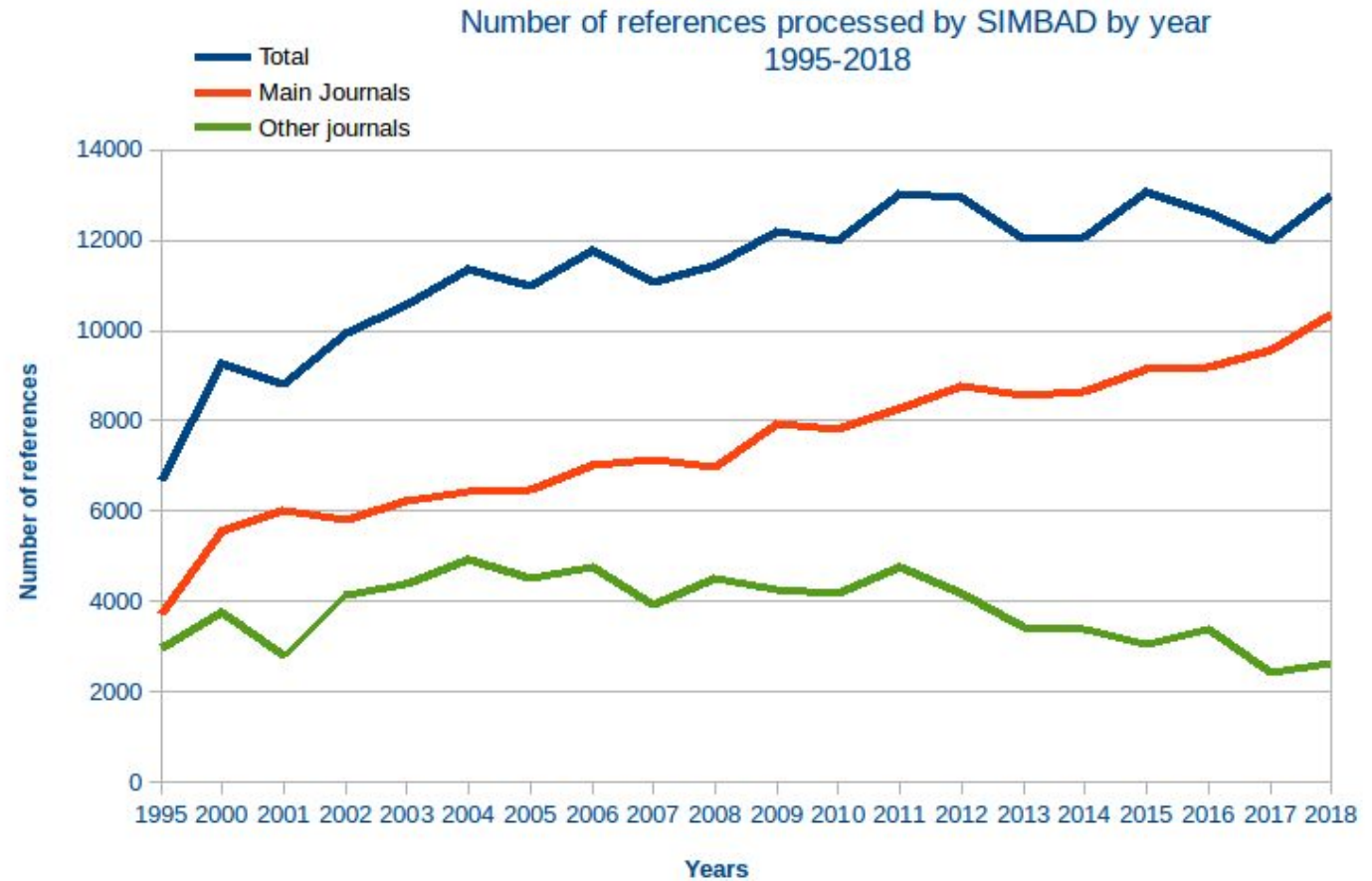






# Bibliography

- Around 13,000 references processed per year  
-> 50 per day
- Priority 1 journals : A&A, AJ, ApJ, ApJS, Natur, MNRAS, PASJ, PASP, Sci
- Priority 2 journals : AcA, Raa, ARep, AstL, BaltA, AN, NewA, NewAR, ATel, CBET, IAUC, IBVS, RMxAA





# Nomenclature

## The Keystone of SIMBAD

- Fundamental principle : **unicity**, a name corresponds to a unique object
- Building an identifier : **acronym** + **format**
  - e.g. **HD** 247377 or **2MASS** J05465186+3136536 or **Gaia** DR2 3445087280664517504
- Acronyms and formats are **encoded** in the database, and **controlled**
- An object type is linked automatically to the acronym
- Nomenclature follows the acceptance of an acronym by the community
- Dictionary of nomenclature contains more entries than SIMBAD
- Total number of acronyms in SIMBAD = 14,500

Challenge at the era of big data : minimize the number of new acronyms

- Encourage astronomers to follow IAU recommendations
- Avoid to rename sub-samples of objects that already have names.
- The nature of an object lies in its object type(s) and measurements, not in its name.



# Cross-identifications

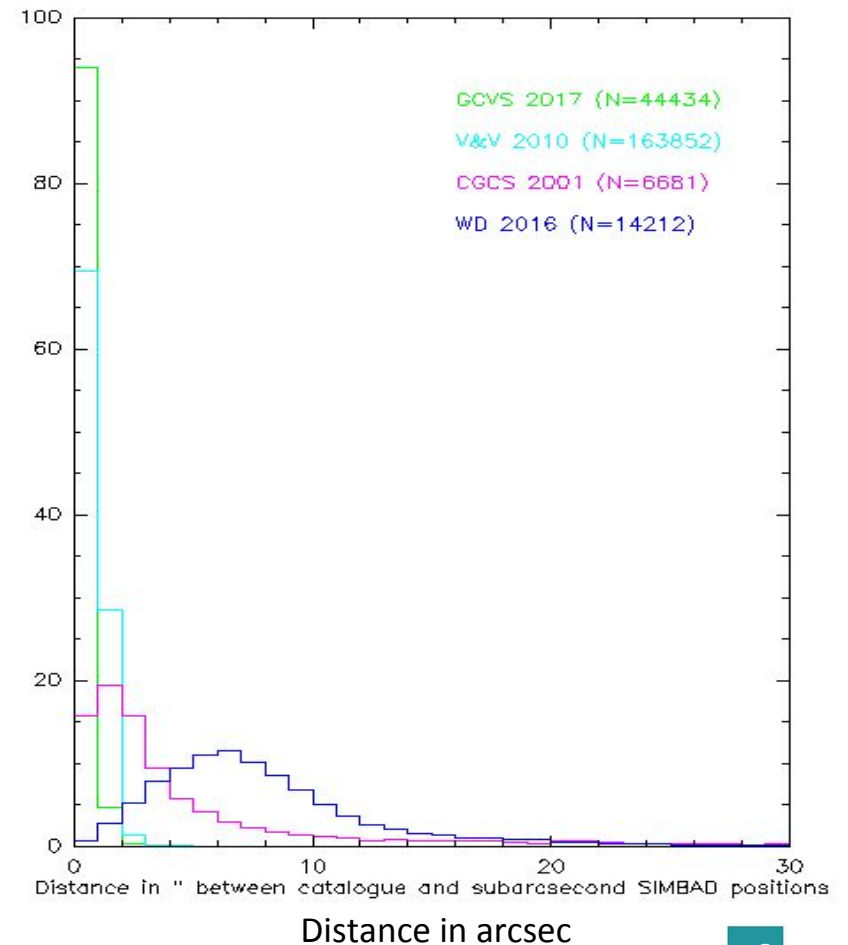
## One the highest added-value of SIMBAD

### Cross-identifications with COSIM : → documentalists

- Multi-parameter software :  
coords, mags, HRV/z, PM, plx, size

### Special operations :

- astronomers, engineers, or/and documentalists
- Xid SIMBAD - Gaia DR2, June 2018 : → 4,500,000  
(no neighbour within 3'', astrometry < 1'')
- More in 2018-2019 : → 700,000  
(HPM stars, crowded regions, astrometry ~ 1-3'')
- Historical objects with poor astrometry

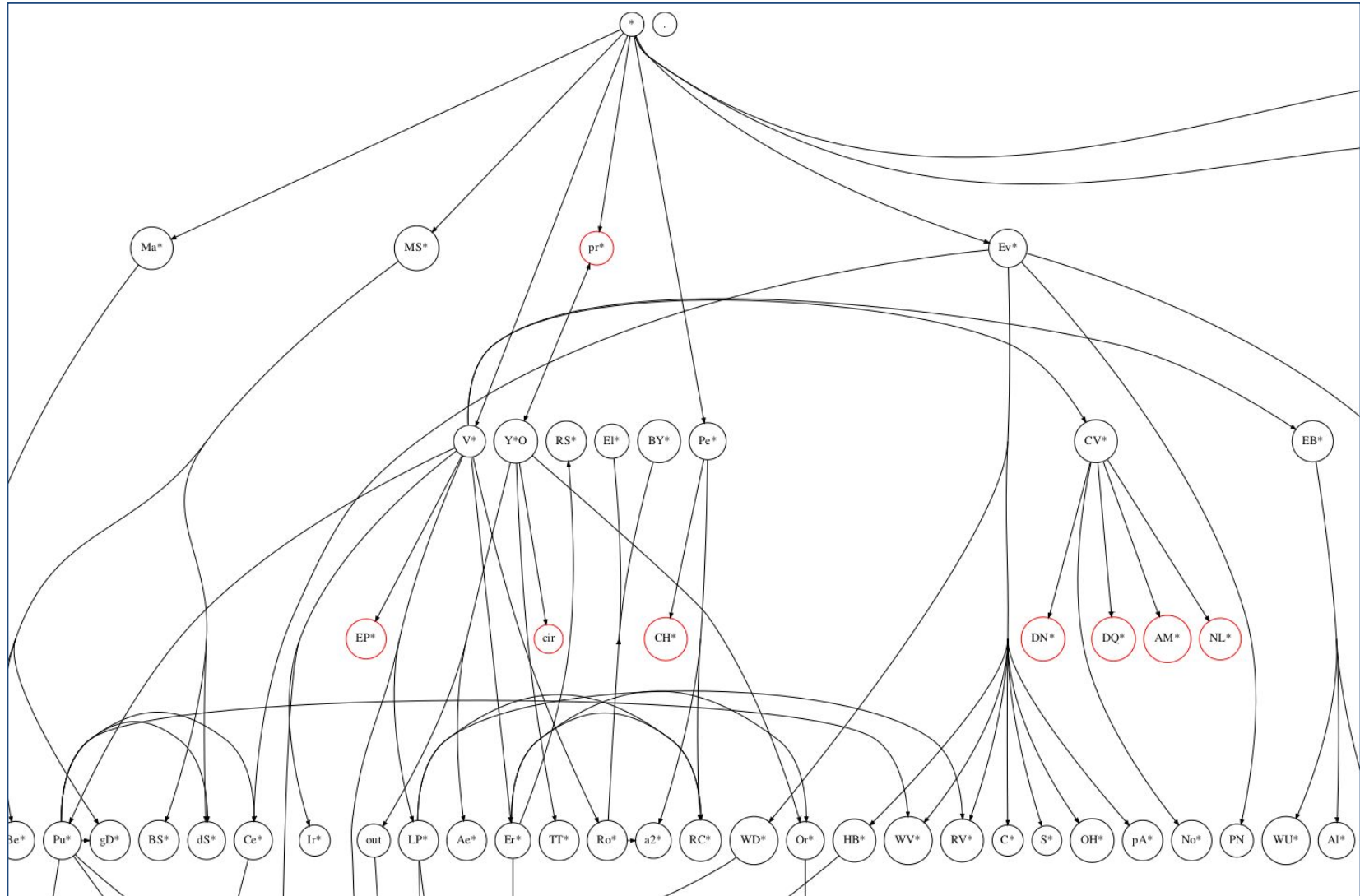


# □ Statistics on the content

	Total
Objects	<b>10,979,000</b>
Identifiers	35,548,000
References	364,900
Acronyms	15,000
All stars	5,580,000
YSOs	57,400
Eclipsing Binaries	539,000
White dwarfs	39,000
All galaxies	3,880,000
QSOs	419,000
AGNs	102,000



# Object types hierarchy

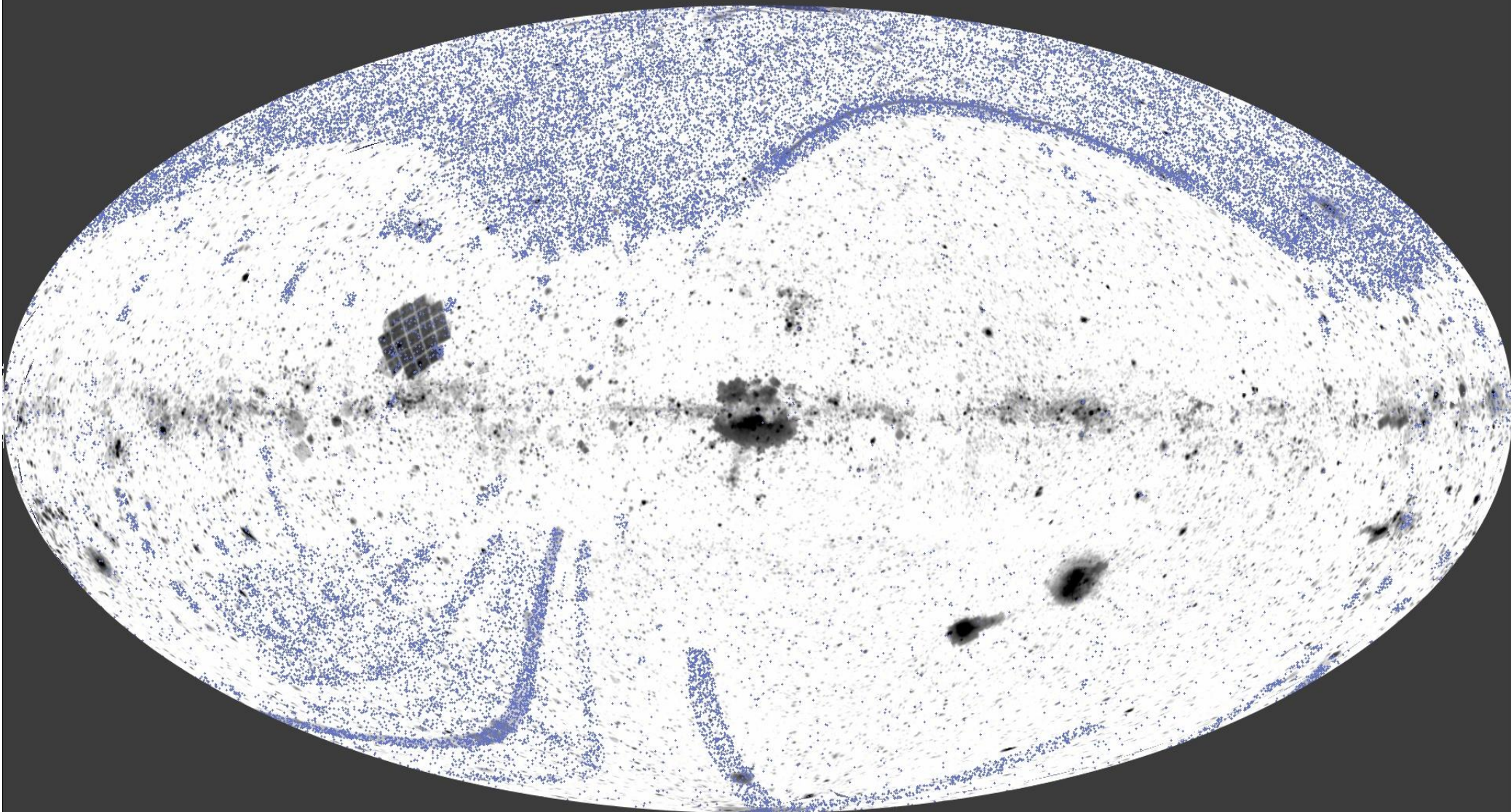






# White Dwarfs on the Sky

DM simbad-biblio otypes Star



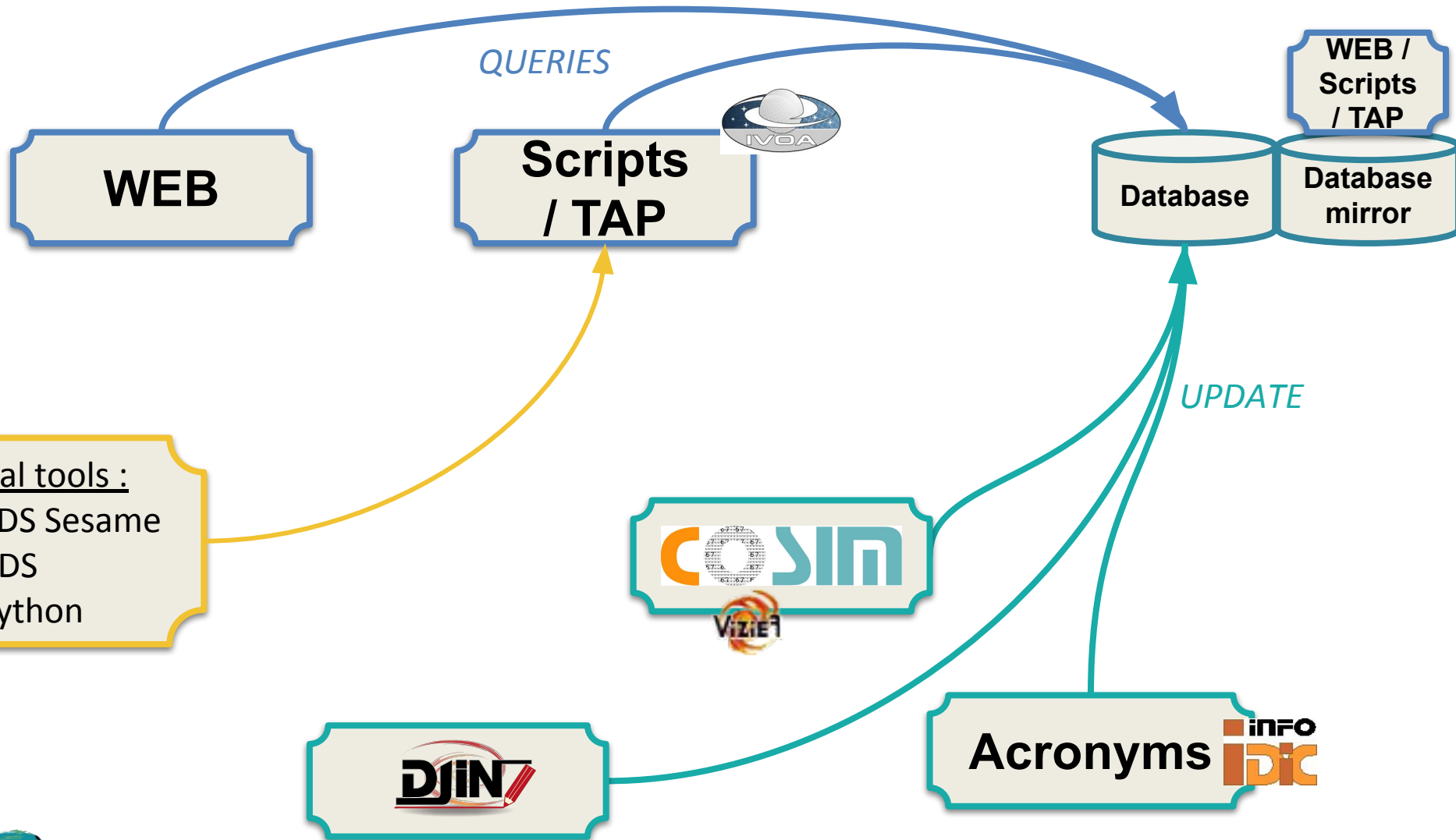




# Technical infrastructure

Anaïs Oberto, Grégory Mantelet

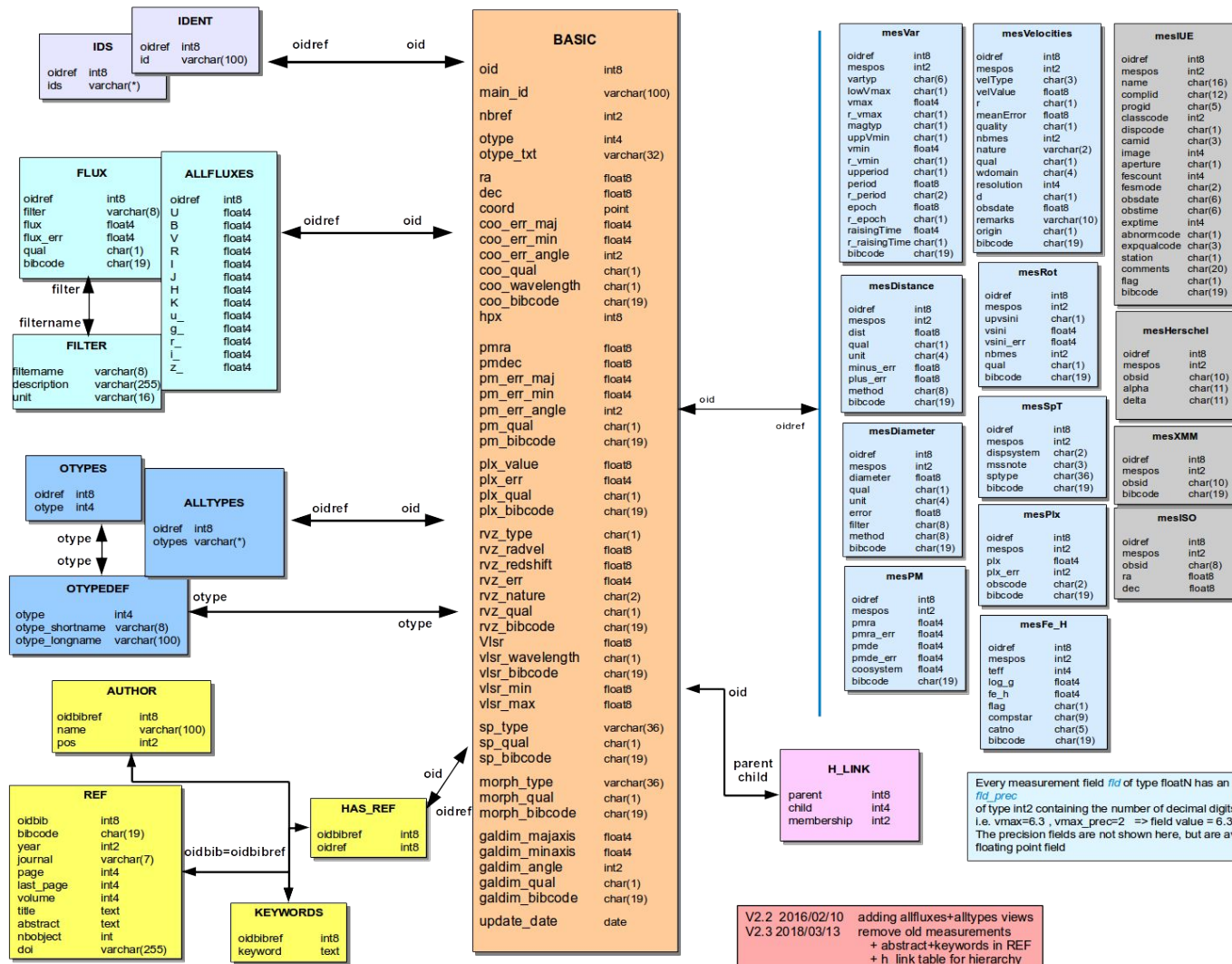
# Overview of SIMBAD tools





# Database (PostgreSQL)



Volume : 24GB



# Internal tools still in progress

2019ApJ...883...56R ApJ, volume 883, article 56, pages 1-6 published on the 20th of ... by The American Astronomical Society, doi:10.3847/1538-4357/ab3725

## The Next Generation Fornax Survey (NGFS). VI. The Alignment of Dwarf Galaxies in the Fornax Cluster

Rong Yu <sup>1</sup> , Puzia Thomas H. <sup>1</sup>, Eigenthaler Paul <sup>1</sup> , Ordenes-Briceño Yasna <sup>1,2</sup>, Taylor Matthew A. <sup>3</sup>, Muñoz Roberto P. <sup>1</sup>, Zhang Hongxin <sup>4,5</sup>, Galaz Gaspar <sup>1</sup>, Alamo-Martínez Karla <sup>1</sup>, Ribbeck Karen X. <sup>1</sup>, ... (9 more authors)

**Abstract**

Using the photometric data from the Next Generation Fornax Survey, we find a significant radial alignment among the Fornax dwarf galaxies. For the first time, we report that the radial alignment signal of is stronger than that of non-nucleated ones at the  $2.4\sigma$  confidence level, and the dwarfs located in the region ( $R > R_{\text{vir}}/3$ ;  $R_{\text{vir}}$  is the Fornax virial radius) show a slightly stronger radial alignment signal than the region ( $R < R_{\text{vir}}/3$ ) at the  $1.5\sigma$  level. We also find that the significance of the radial alignment signal is independent of the luminosities or sizes of the dwarfs.

**Keywords:** galaxies: clusters: individual (Fornax), galaxies: dwarf, galaxies: elliptical and lenticular, galaxies: nuclei, galaxies: stellar content, surveys

**TABLE OF CONTENTS**

- 1. Introduction
- 2. Alignments of the Fornax Dwarfs
  - 2.1. Photometry
  - 2.2. Radial Alignment Test
- 3. Discussion

[Acknowledgments](#)  
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[Footnotes](#)

DJIN TEST - 2019ApJ...883...56R

File Name Identifier Search Configuration Help

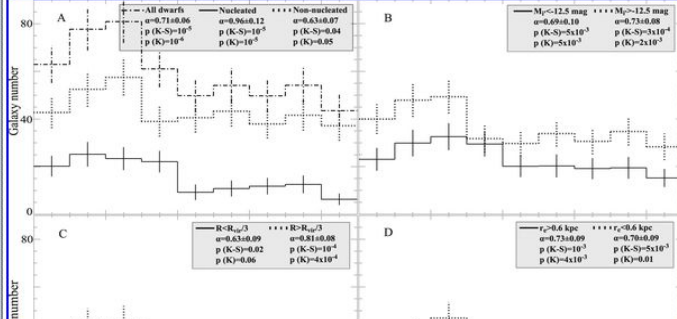
Journal: ApJ Volume: 883 Bibcode: 2019ApJ...883...56R

4 object names (8)  
Coma cluster (1)  
Fornax Cluster (5)  
Fornax dwarf galaxies (1)  
NGC 1399 (1)  
Text (1)

The two-dimensional surface brightness profile for each dwarf is studied with GALFIT (Peng et al. 2002), implementing a Sérsic profile by taking advantage of the iterative fitting method described in Eigenthaler et al. (2018); the best-fitting parameters, e.g., the magnitude, effective radius  $r_e$ , position (PA) and its error PA\_error, etc., are obtained. PAs in the  $g'$  and  $i'$  bands coincide with each other very well, yet the  $u'$ -band PAs of several dwarfs significantly deviate from their  $g'$ - and  $i'$ -band PAs. Since the  $g'$  and  $i'$  bands are more likely to indicate the stellar mass distribution while the  $u'$  band is probably affected by gas and current star formation, we prefer to use the  $i'$ -band PAs to test the alignments. The radial angles and PAs  $\theta$  of the dwarfs, used to quantitatively test the radial and primordial alignments, are then calculated from the  $i'$ -band PAs and locations of the dwarfs, as well as the PA of the BCG of Fornax, [Wiese & Keesen \(2010\)](#) (with axis ratio of  $b/a = 0.85$  and  $PA = 110^\circ$ ; Schubert et al. 2010).

### 2.2. Radial Alignment Test

We investigate the possible radial alignment signal for the Fornax dwarfs, abandoning the 94 with  $b/a \geq 0.85$  or large  $PA\_error > 10^\circ$ . The distribution of the radial angles  $\phi$  (RAD) of the dwarfs is shown as the dashed dotted histogram in panel (A) of Figure 1. We use the  $p$  values returned from the Kolmogorov-Smirnov (denoted as  $p(K-S)$ ) and the Kuiper test (denoted as  $p(K)$ ) to detect the deviation of RAD from a uniform distribution; analogous to the work of Niederste-Ostholt et al. (2010), we also utilize the ratio  $\alpha = 14$  between the numbers of galaxies with  $\phi < 30^\circ$  and  $\phi > 30^\circ$  to quantitatively assess the significance of the alignment signal (a uniform distribution corresponding to  $\alpha = 0.5$ , while the radial alignment corresponds to  $\alpha \gg 0.5$ ). We find that, for the entire Fornax dwarf sample,  $p(K-S) \sim 10^{-5}$ ,  $p(K) \sim 10^{-6}$ , and  $\alpha = 0.71 \pm 0.06$ , suggesting a radial alignment of the Fornax dwarfs. We also test the alignment of the seven Fornax UDGs; the ratio  $\alpha = 0.75 \pm 0.57$  indicates no significant radial alignment among the Fornax UDGs due to the large uncertainty. This result is inconsistent with the findings of Venhola et al. (2017), but different from that of UDGs in the Coma cluster (Yagi et al. 2018), where the member UDGs are found to be tidally stretched toward the BCG.



- DJIN (Java) parse publication in XML and extract object names to insert in SIMBAD



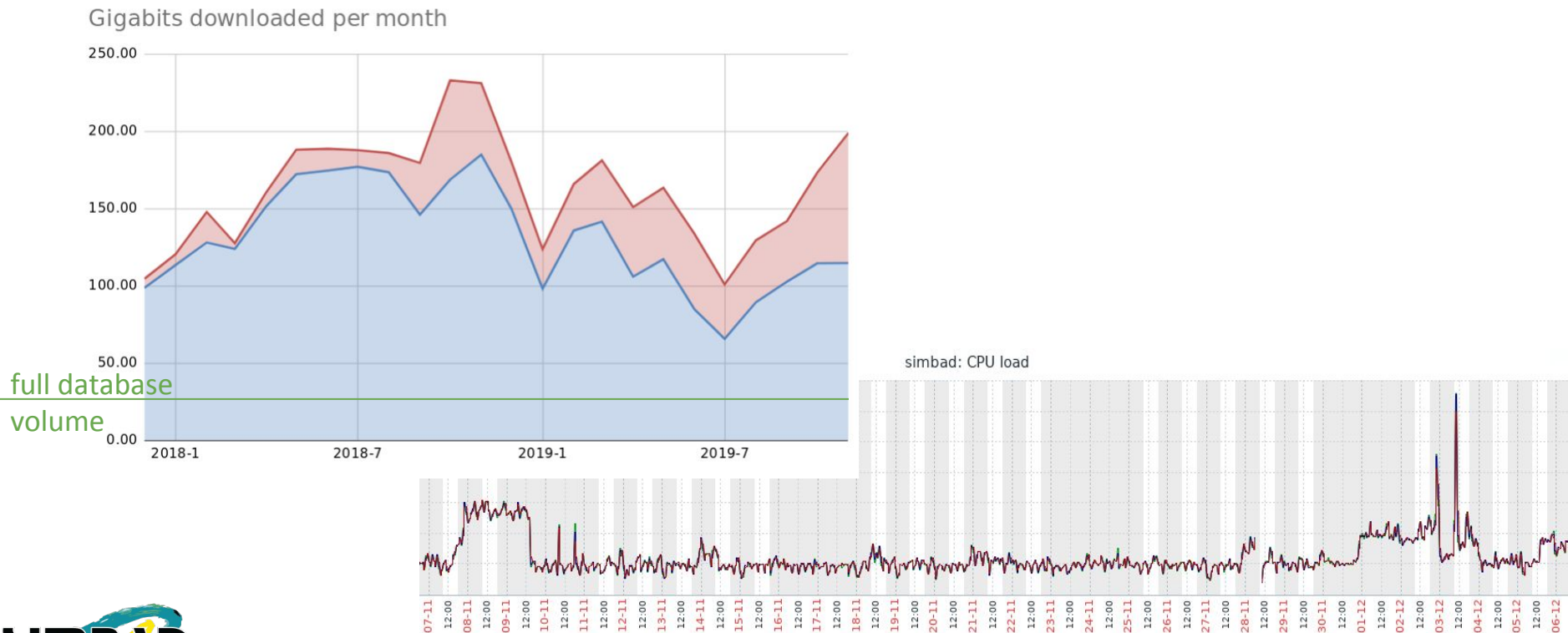
# □ Internal tools still in progress

- **COSIM** (Java) search all objects from a list to match in SIMBAD, and select data to insert.
- **Dictionary** (Java) to prepare new acronyms



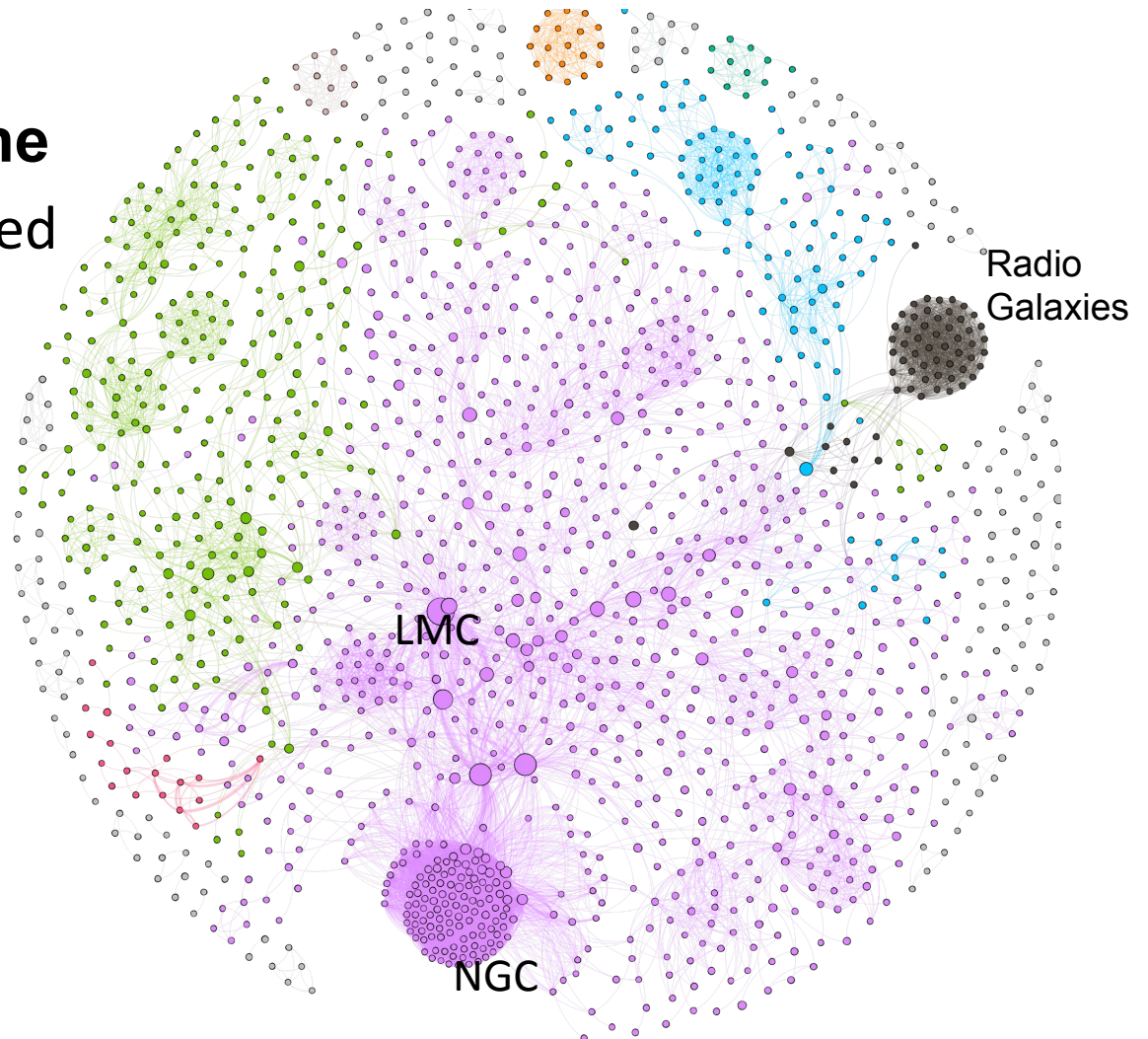
# ☐ Infrastructure still in progress

- Duplication of SIMBAD service on a Virtual Machine to sustain instant high loading.
- ~ 500K queries / day



# □ Data mining visualisations (R&D)

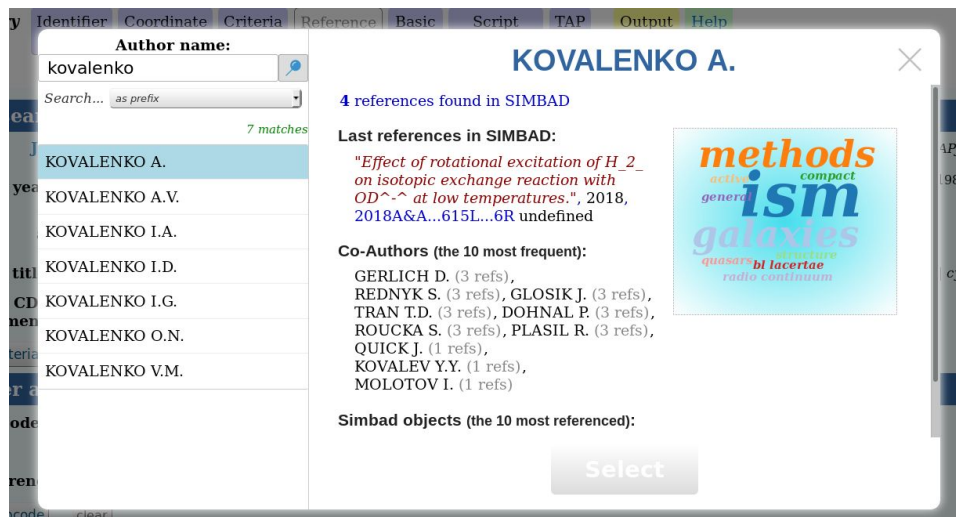
**The Universe as seen by the MNRAS in 2018:** objects linked by common publications.



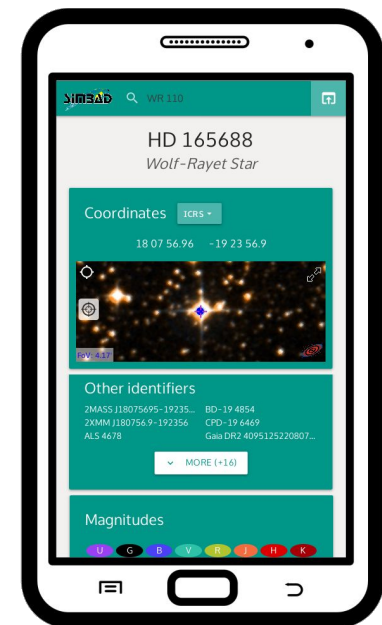


# □ Web interfaces still in progress

- Fast and flexible search authors interface to find linked objects.



- SIMBAD Mobile in beta test (R&D).





# □ Web interfaces still in progress

- **TAP** service need more user friendly interface to help people to use it:
  - VO Module in R&D
  - More integrated in SIMBAD web site

