Science with the Virtual Observatory

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Quasar candidates selection in the Virtual Observatory era

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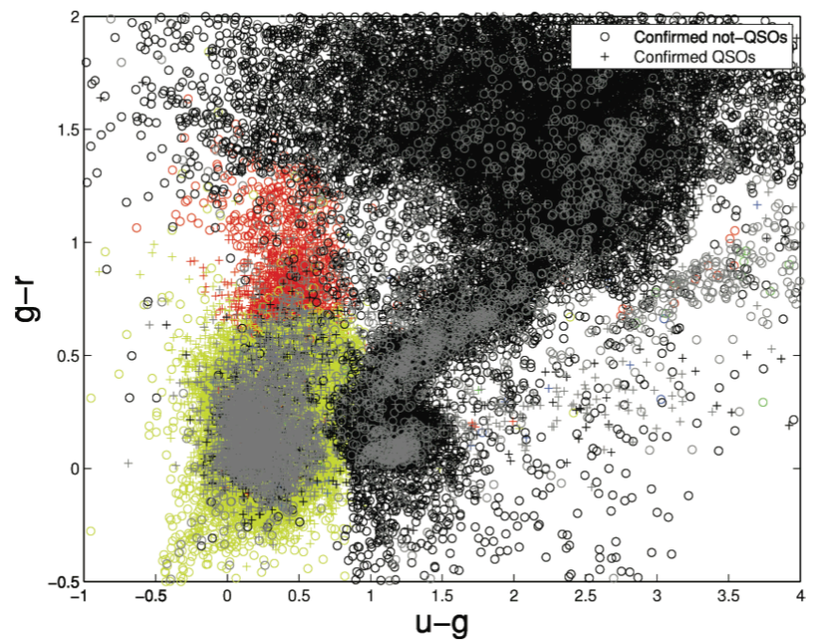

ABSTRACT

We present a method for the photometric selection of candidate quasars in multiband surveys. The method makes use of a priori knowledge derived from a subsample of spectroscopic confirmed quasi-stellar objects (QSOs) to map the parameter space. The disentanglement of QSOs candidates and stars is performed in the colour space through the combined use of two algorithms, the probabilistic principal surfaces and the negative entropy clustering, which are for the first time used in an astronomical context. Both methods have been implemented in the VONEURAL package on the Astrogrid Virtual Observatory platform. Even though they belong to the class of the unsupervised clustering tools, the performances of the method are optimized by using the available sample of confirmed quasars and it is therefore possible to learn from any improvement in the available 'base of knowledge'. The method has been applied and tested on both optical and optical plus near-infrared data extracted from the visible Sloan Digital Sky Survey (SDSS) and infrared United Kingdom Infrared Deep Sky Survey-Large Area Survey public data bases. In all cases, the experiments lead to high values of both efficiency and completeness, comparable if not better than the methods already known in the literature. A catalogue of optical candidate QSOs extracted from the SDSS Data Release 7 Legacy photometric data set has been produced and is publicly available at the URL http://voneural.na.infn.it/qso.html.

VO as platform for data mining

EXO-DAT: AN INFORMATION SYSTEM IN SUPPORT OF THE *CoRoT*/EXOPLANET SCIENCE*

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ABSTRACT

Exo-Dat is a database and an informa
the COnvection ROtation & planetary
provides a united interface to several
data obtained during the mission prep
several mission-specific technical paran
give consistent 4-color photometry of
It covers several zones in the galactic
Dat information system provides esse
ground-based follow-up by supplying
the star's fundamental parameters or i
database is fully interfaced with VO to
TOPCAT or ALADIN. It is accessible
to the public. It is the ideal tool to pre
systems. As a VO-compliant system, su

Key words: astronomical data bases: mi
general

Online-only material: color figures

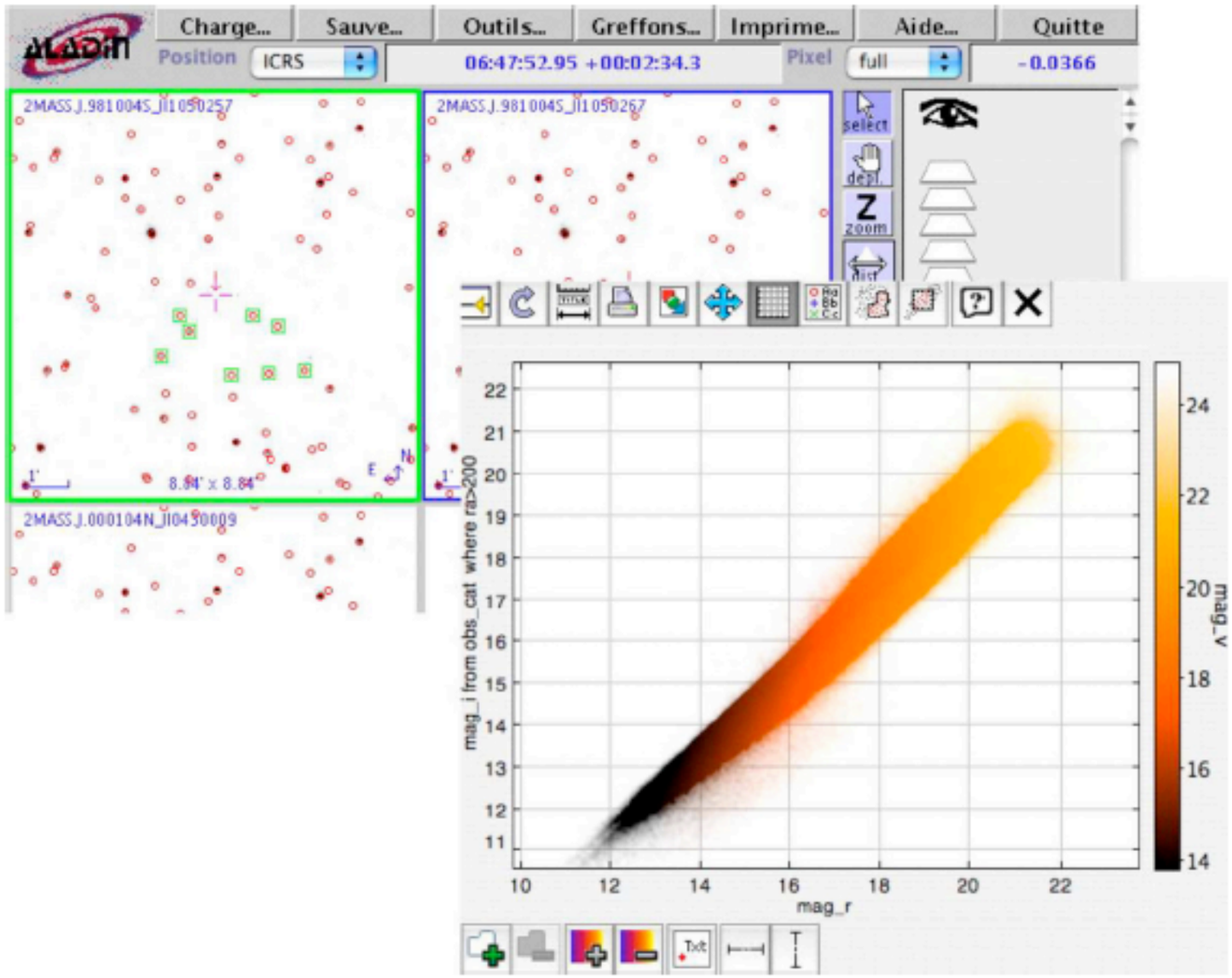

Figure 12. *Exo-Dat* visualization of data using VO tools such as *Aladin* and *TOPCAT*.
(A color version of this figure is available in the online journal.)

VO for visualisation

VOSA: virt

An applicati

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Context. The physical properties of almost a
extracted from theoretical models to observat
Aims. We want to develop an automatic proc
association and apply this methodology to th
Methods. We combine the multiwavelength
sources. The key step of the work-flow is
environment.
Results. We present this new tool, and provi
of Collinder 69, and an upper-limit for the ag
Conclusions. This kind of study of star form
the traditional methodology. Thus, they are e

Key words. astronomical data bases: miscell
stars: Hertzsprung-Russell (HR) and C-M di

VO as a ready to use tool-kit

Appendix B: work-flow

```
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
    http://sdc.laeff.inta.es/vosed/jsp/form_search.jsp
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
   http://sdc.laeff.inta.es/vosed/jsp/res_search.jsp?obj_id=&ra=83.446596&de=9.9273633
   &rad=0.01&ssap_services=all&src_uvkybeta=0&src_2mass=0&src_hip=0&teo_dalessio
   =on&submit=Submit+Query
wget --save-cookies cookies.txt --load-cookies cookies.txt --keep-session-cookies
   http://sdc.laeff.inta.es/vosed/jsp/res_search.jsp?submitGetData=Retrieve+Marked+Data
   &filas_ssap=all&filas_stromgren=0&filas_2mass=0 -O object1.zip
```

Fig. B.1. Example of the three lines per object to include in the script. With the first line, the user access the VOSED form; with the second one, a query is performed (to the services available in the VOSED form) around the position written in the fields *ra* and *de* within the radius *rad* (in degrees). Finally with the third line the available data for those coordinates is retrieved. All the information in saved in one zip-file.

Fig. B.2. Part of the input data in the web interface of the SVO SED fitting tool.

Fig. B.3. Photometrical catalogs to be queried with the respective search radii.

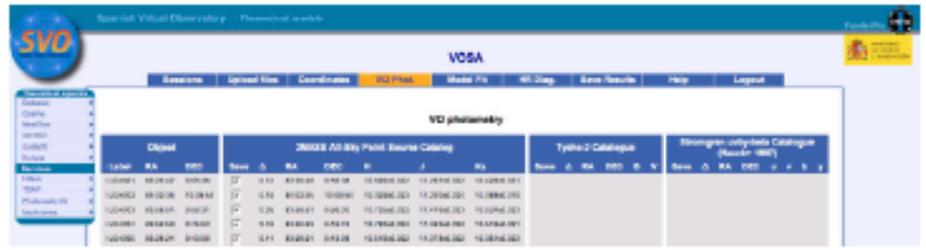

Fig. B.4. 2MASS photometry found. We will use these JHKs measurements in those objects for which we do not have our own photometrical data.

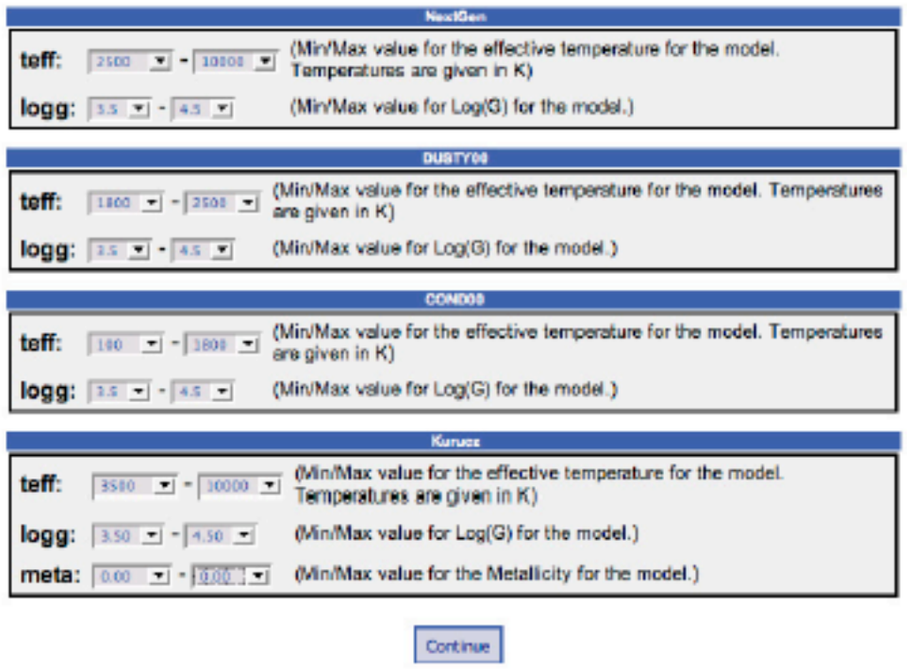

Fig. B.5. Range of parameters queried for each collection of synthetic spectra.

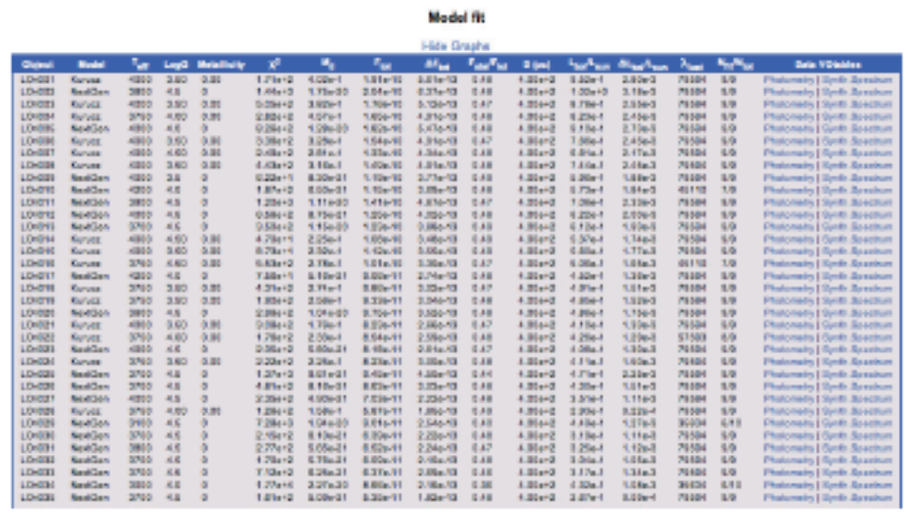

Fig. B.6. Several rows of the "master-table" with all the fittings.

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Scale Lengths of Disk Galaxies

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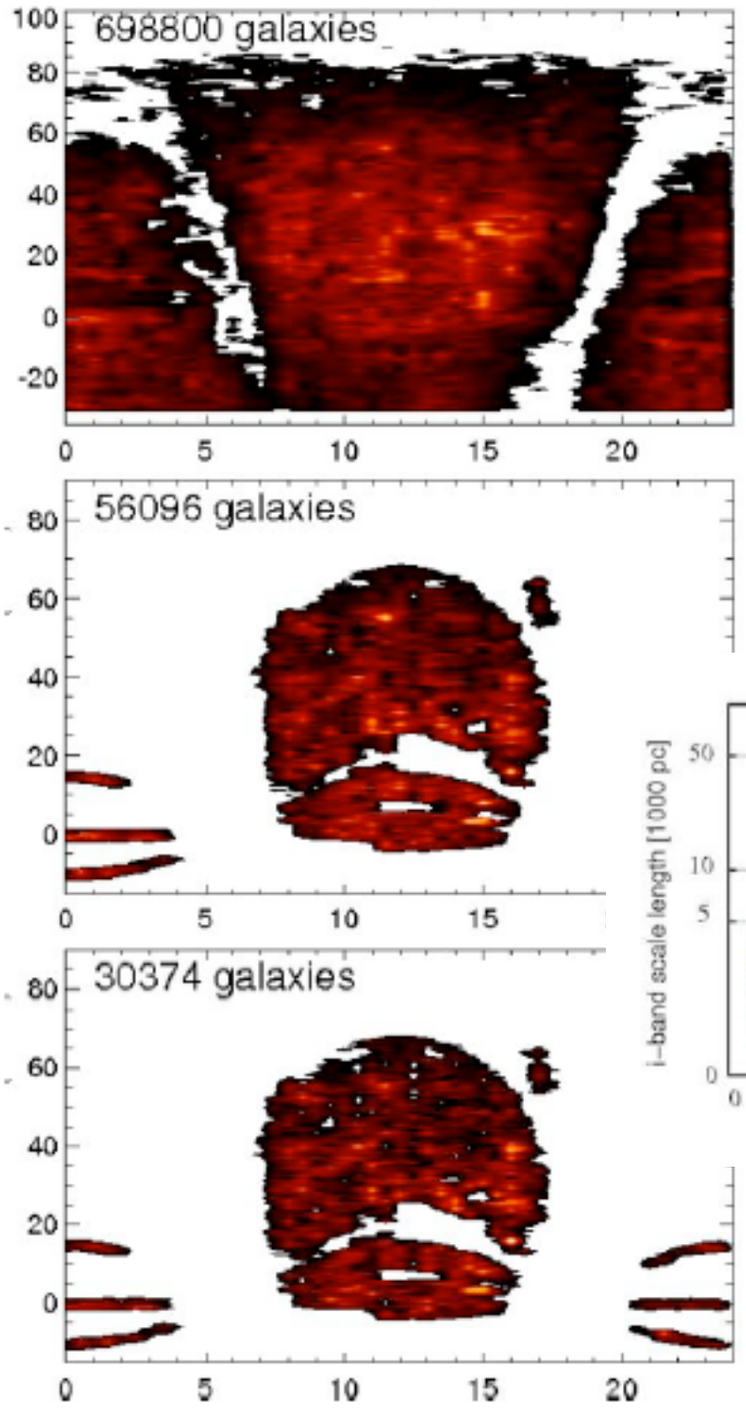
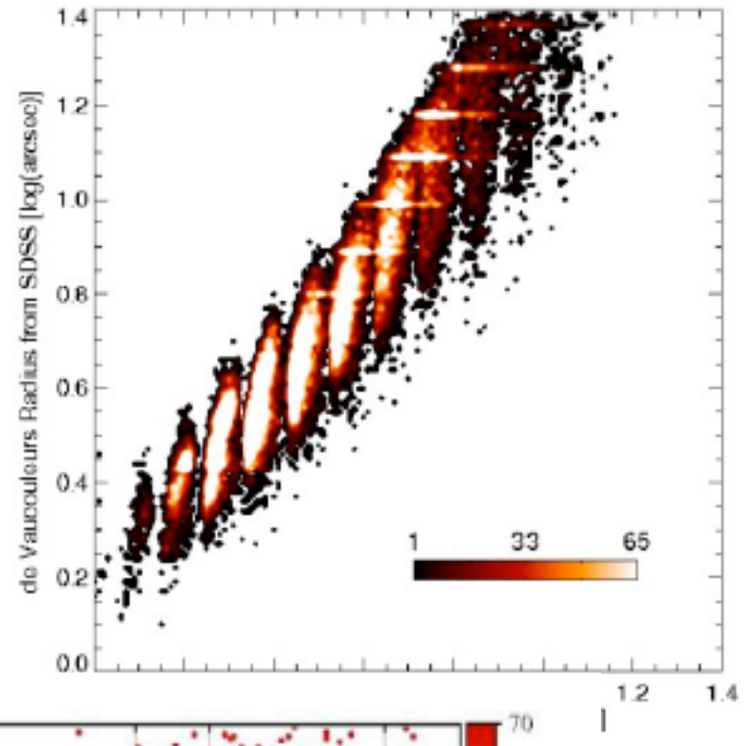
Draft 12 April 2010

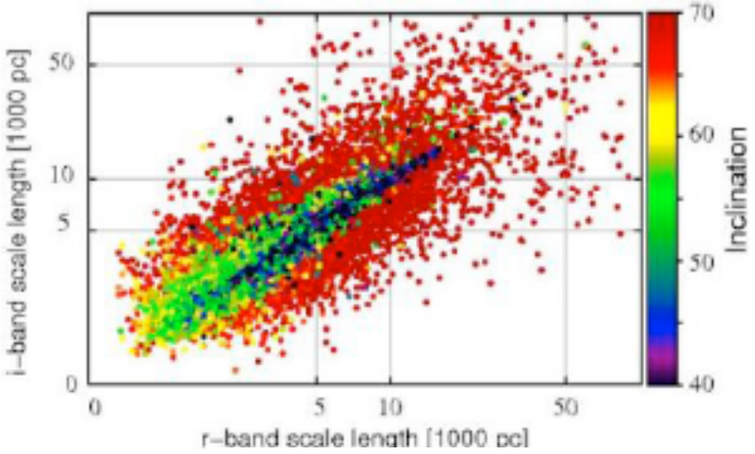
ABSTRACT

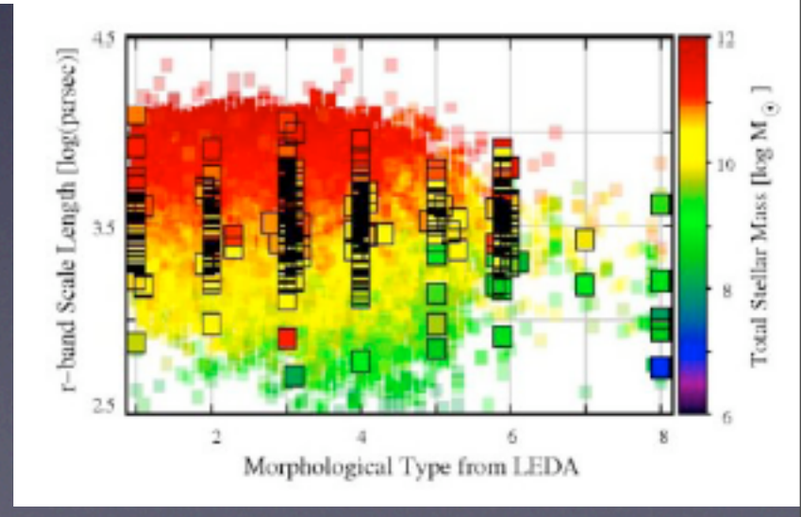
We have derived disk scale length
SDSS bands. Virtual Observatory
and analyse the images for this un
galaxies in the LEDA catalogue. C
catalogue allowed us to investigate
of disk/spiral galaxies. We further
velocity dispersion as indicators of
scale length varies with respect to
tion and asymmetry parameters ha
dependence of structural paramet
derivation method and numerous t
liability of our results. The average
dispersion of 2.05 kpc, and this is
morphology, concentration, and as
are representative for a typical gala
is larger for more massive galaxies
galaxy masses, the r-band scale len
mass 10^9–10^{10} $M_\odot$ and 5.73 ± 1.9
10^{11} and 10^{12} $M_\odot$. Distributions
derived in all the other SDSS ban
that connect scale lengths in one p
used to test the results of forthco
and evolution of the Hubble seque

Key words: Galaxies: Structure









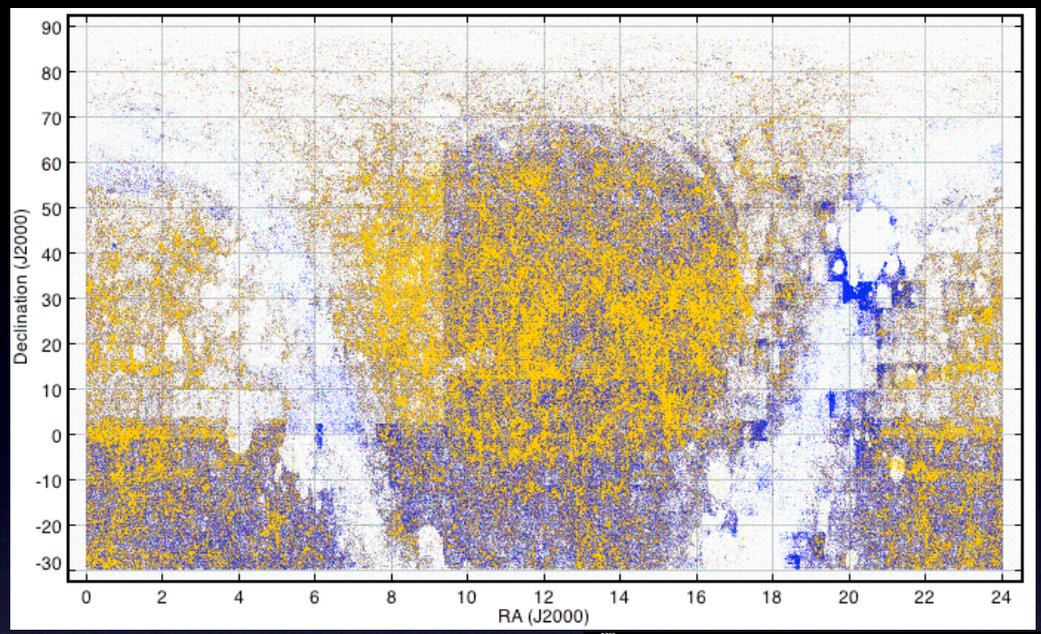
Fathi et al., Is galaxy scale length Universal?

Defining the Sample
Using the Sloan interface;
X-correlate with LEDA &
filter

TOPCAT

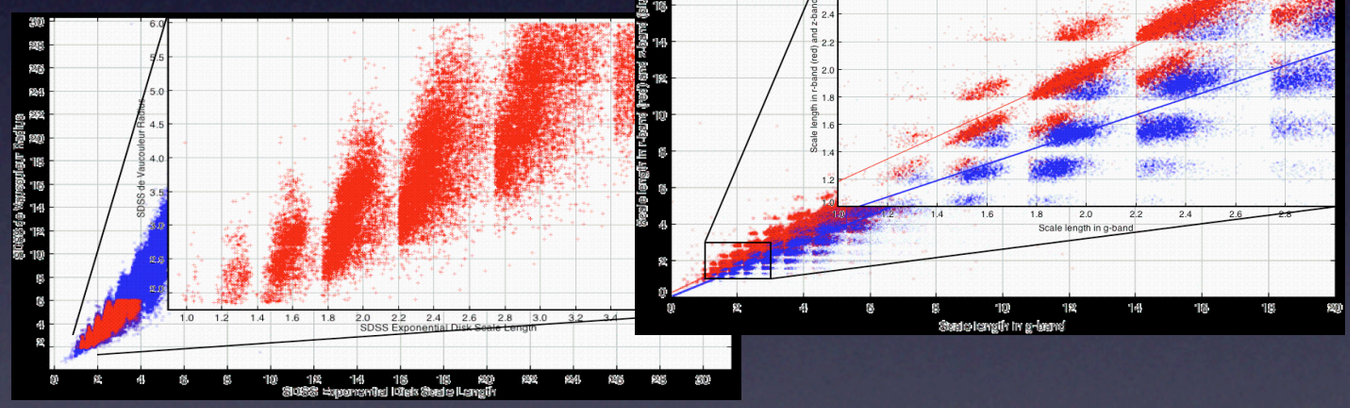
STILTS

Aladin



Investigating the SDSS
scale length

TOPCAT



Querying and Storing

SkyView

VOSpace

50000 objects * 5 images
each ~300 GB of data

VO-enabled papers

EURO VO FACILITY CENTRE

The EURO-VO projects: VOTECH EuroVO-DCA EuroVO-AIDA

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  - Vacancies

VO-enabled Scientific Papers

Selected scientific publications mainly enabled by VO tools or about VO tools and methods.

For conference proceedings and other non-refereed publications, see here

REFEREED PUBLICATIONS

The GalMer database: Galaxy Mergers in the Virtual Observatory
Chilingarian I., Di Matteo P., Combes F., Melchior A.-L., Semelin B., A&A, in press

Scale Lengths of Disk Galaxies
Fathi K., Allen M., Boch Th., Hatziminaoglou E., Peletier R., MNRAS, in press

SDSSJ150634.27+013331.6: the second compact elliptical galaxy in the NGC5846 group
Chilingarian I & Bergond G., MNRAS Letters, in press

VisIVO-Integrated Tools and Services for Large-Scale Astrophysical Visualization
Becciani et al., 2010, PASP, 122, 119

The SPECFIND V2.0 catalogue of radio cross-identifications and spectra. SPECFIND meets the Virtual Observatory
Vollmer et al., 2010, A&A, 511, 53

Montage: a grid portal and software toolkit for science-grade astronomical image mosaicking
Jacob J.C. et al., Int. J. Computational Science and Engineering, 2009, vol 4, No. 2

A Population of Compact Elliptical Galaxies Detected with the Virtual Observatory
Chilingarian I. et al., 2009, Science, 326, 1379

Properties of dusty tori in active galactic nuclei - II. Type 2 AGN
Hatziminaoglou E., Fritz J., Jarrett T., 2009, MNRAS, 399, 1206

Projects in progress

(1) Reconstructing the SED of spiral galaxies in the WINGS survey

Aim: construct the SEDs of a sample of ~17000 spiral galaxies - cluster members, analyse them as a function of galaxy position inside the cluster, galaxy masses and luminosities

VO requirements: collect and retrieve photometry and **spectra** from large catalogues (GALEX, SDSS, 2MASS, UKIDSS, 6dF) **automatically; SED building**

(2) Probing the ambient gas around compact radio galaxies through optical and X-ray spectroscopy

Aim: collect the spectra of all young radio sources available in the VO, as well as a representative sample of large sources, to study the ionized gas properties, the different ionization mechanisms, interaction with the host ISM, AGN feedback, and the morphological and luminosity properties of both the host and radio source

VO requirements: retrieve **spectra** and photometry; **SED building**

Projects in progress

(3) A common scale for the spectroscopic metallicity determination of field and open cluster stars

Aim: retrieve high resolution spectra of field and open clusters stars observed with different instruments to study the metallicity distribution of the galactic disk and its evolution with time in an accurate way

VO requirements: retrieve high resolution **spectra** from the available SSAs (e.g. ELODIE, NARVAL)

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