

# VO Services in the framework of Consolider-GTC

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> > www.iac.es/consolider-ingenio-gtc CSD2006-00070



### **SVO** participation in the Consolider-GTC

The Spanish-VO group (SVO) is part of this consortium participating in the research activities identified by the Consolider-GTC scientific groups, in particular in those that benefit from the use of VO services and tools.

Collaboration steps:

- 1. Evaluation
- 2. Design and development of a VO methodology
- 3. Design and development of *new tools*
- 4. Ingestion of data into the VO



#### Procedures

- III Encuentro-Consolider in Cádiz
  - Spitzer/Taurus
    - Data deliveries from the Spitzer Galactic Programs are offered in a wide range of formats, none of them VOcompliant.
    - Solution: development of a system to overcome the situation

- After last Encuentro Consolider in Cádiz: new scientific case
  - ≻ ASK



# **ASK Description**

- J. Sánchez Almeida et al.
- ASK: Automatic Spectroscopic K-means-based
- Unsupervised classification of all galaxy spectra in SDSS/DR7 using the k-means cluster analysis algorithm
- The algorithm guarantees that galaxies with similar spectra belong to the same class.
- 99% of the galaxies can be assigned to only 17 major classes (11 additional including the remaining 1%)
- Each class is characterized by a template spectrum, varying along a sequence labeled from 0 to 27 (reddest to bluest)
- Publicly accessible through various websites

## **ASK Description**

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ASK:

#### AUTOMATIC UNSUPERVISED CLASSIFICATION OF ALL SDSS/DR7 GALAXY SPECTRA

J. SÁNCHEZ ALMEIDA<sup>1,2</sup>, J. A. L. AGUERRI<sup>1,2</sup>, C. MUÑOZ-TUÑÓN<sup>1,2</sup>, AND A. DE VICENTE<sup>1,2</sup> ver 1

#### ABSTRACT

Using the k-means cluster analysis algorithm, we carry out an unsupervised classification of all galaxy spectra in the seventh and final Sloan Digital Sky Survey data release (SDSS/DR7). Except for the normalization to the q-band flux, and the shift to restframe wavelengths, no manipulation is applied to the original spectra. The algorithm guarantees that galaxies with similar spectra belong to the same class. We find that 99% of the galaxies can be assigned to only 17 major classes, with 11 additional minor classes including the remaining 1%. The classification is not unique since many galaxies appear in between classes, however, our rendering of the algorithm overcomes this weakness with a tool to identify borderline galaxies. Each class is characterized by a template spectrum, which is the average of all the spectra of the galaxies in the class. These low noise template spectra vary smoothly and continuously along a sequence labeled from 0 to 27, from the reddest class to the bluest class. Our Automatic Spectroscopic K-means-based (ASK) classification separates galaxies in colors, with classes characteristic of the red sequence, the blue cloud, as well as the green valley. When red sequence galaxies and green valley galaxies present emission lines, they are characteristic of AGN activity. Blue galaxy classes have emission lines corresponding to star formation regions. We find the expected correlation between spectroscopic class and Hubble type, but this relationship exhibits a high intrinsic scatter. Several potential uses of the ASK classification are identified and sketched, including fast determination of physical properties by interpolation, classes as templates in redshift determinations, and target selection in follow-up works (we find classes of Seyfert galaxies, green valley galaxies, as well as a significant number of outliers). The ASK classification is publicly accessible through various websites.

Subject headings: catalogs – methods: statistical – galaxies: evolution – galaxies: fundamental parameters – galaxies: statistics

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1. INTRODUCTION

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- Publicly accessible through various websites



#### ASK + SVO

- Requirements
  - WEB Interface:
    - Search form
    - Table Results HTML
    - Download Data
  - ASK in VO: Why?
    - Data visibility
    - Easy matching with other tables already in VO
- Solution: **ASK System**



#### **ASK System overview**





#### **ASK System overview**



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#### **ASK System: WEB Interface**



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## **ASK System: Results (II)**

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# ASK System: ConeSearch

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- **RA** 
  - Right-Ascension in the ICRS coordinate system for the position of the center of the cone to search
- DEC
  - Declination in the ICRS coordinate system for the position of the center of the cone to search
- S R
  - Radius of the cone to search





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#### **ASK ConeSearch: VOTable**

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## VO in action: ASK in Aladin

- Start Aladin
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- Optionally select some Image server to superimpose images to the ASK Catalog
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#### **VO in action: ASK in Aladin**

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# Thank you for your attention

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