

ALADIN, VO STANDARDS, SPECTRA AND DATA CUBES

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ABSTRACT

Aladin can be used as a VO portal for 3D spectroscopy DAL services. The new release is able to ingest data cubes and display them in movie mode. Lambda maps and spectra at one position can be excerpted. SIA services retrieving data cubes allow to describe in the metadata tree several access modes to the same dataset via DAL query response extensions. Interaction with tools like VOSPEC and SPLAT via PLASTIC protocol is emphasized.

Key words: Technique: spectroscopic.

1. INTRODUCTION

Aladin the interactive sky atlas Bonnarel et al. (2000), has become now one of the main VO portals. It is able to access, display, manipulate and cross-correlate a very large amount of data such as images and catalogues and to request VO services of all kinds including also spectra services Tody et al. (2007) In this latter case Aladin displays the position of the spectrum on top of a preview of the area and to send the spectrum to a dedicated tool such as VOSPEC (Fig. 1). 3D spectroscopy is an emerging new field which allow to study physics and kinematics of extended objects. It is mixing characteristics of spectra and images and is a real challenge for the VO. The Aladin group experimented several new features based on stabilized or emerging VO standards to allow its users to take benefit of these kind of data.

2. DISPLAYING DATA CUBES INTO ALADIN

Optical Fabry Perot Interferometers, Radio Interferometry and some IFU instruments provide datasets in the form of Image cubes, where the data are regularly sampled in lambda (or velocity) as well as in spatial dimensions These datacubes can be considered as images with a succession of 2D planes

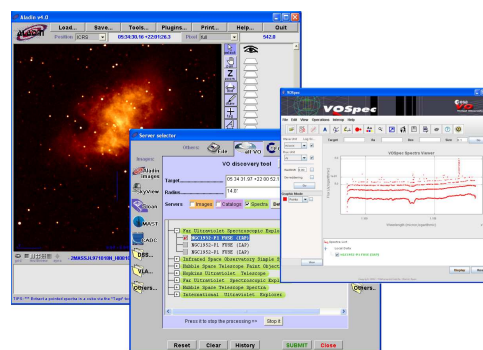


Figure 1. A spectrum of M1 discovered with the help of Aladin metadata tree is sent to VOSpec

Aladin version 4 allows to load such datacubes in movie mode in such a way that it is possible to stop the movie at some point restart it, slow it down or speed it up, extract some lambda cuts as 2D image planes. It is also possible to visualize in a service window the 1D spectrum at some position in the field. Fig. 2 gives some insight to those functionalities.

3. DATA DISCOVERY AND NEW ACCESS MODES FOR DATA CUBE SERVERS

CGPS and VGPS are radio surveys of the Galactic plane with good spatial resolution, including continuum maps at various wavelengths and polarimeters and radio cubes for HI 21 cm and CO lines. These surveys are put on line by CADC. The server provides SIA query responses with Extensions Boch et al. (2005) which provides several access modes for each cube dataset including:

- full retrieval of the dataset
- 2D mid plane preview
- slice "selector" allowing to select one single wavelength plane produced by the server.

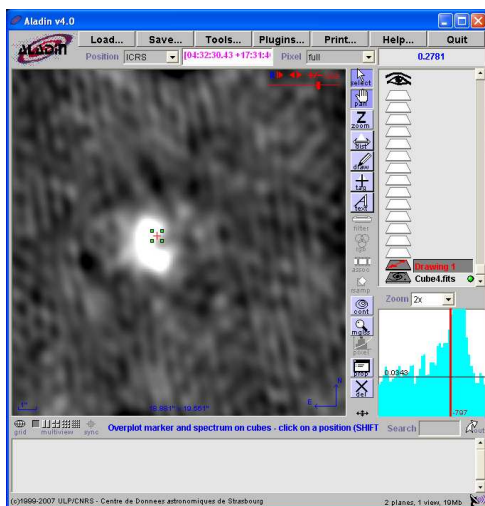


Figure 2. Cubes in Aladin

- cubic preview mode allowing the retrieval of a sub-sampled datacube (with reasonable size) also produced by the server.

This SIA query response with extension is displayed as a metadata tree by Aladin in a very convenient way for data discovery. (Fig. 3) In addition it should be possible to add a fifth access modes for extracted spectra at a given position. This is not yet on line and will require communication between Aladin and a spectral tool such as VOSPEC, SpecView or SPLAT.

4. ACCESS TO IFU DATA DISTRIBUTED IN EURO3D FORMAT

IFU data are not always available in cube format, due to intrinsic complexity of the spectral ranges across the field and to spatial distortions. The Euro3D format is a FITS file gathering the IFU data as a set of individual spectra with some common metadata, and specific metadata for each spectrum. VO Paris Euro3D VO client is able to read IFU datasets in such format and to extract the positional information for each spectrum as well as to provide integrated 1D spectra in VO format in a given area of the field. PLASTIC communication Boch et al. (2006) allows Aladin to display the position of the spectra on top of a 2D preview of the area and to send a selection of those back to Euro3D VO client. this latter can then integrate the selected spectra and send the result to VOSPEC (Fig. 4)

5. CONCLUSION

Internal developments as well as implementation of emerging standards such as PLASTIC or DAL extension mechanisms allow ALADIN to be a very useful tool for

3D spectroscopy data discovery and access in collaboration with other VO tools.

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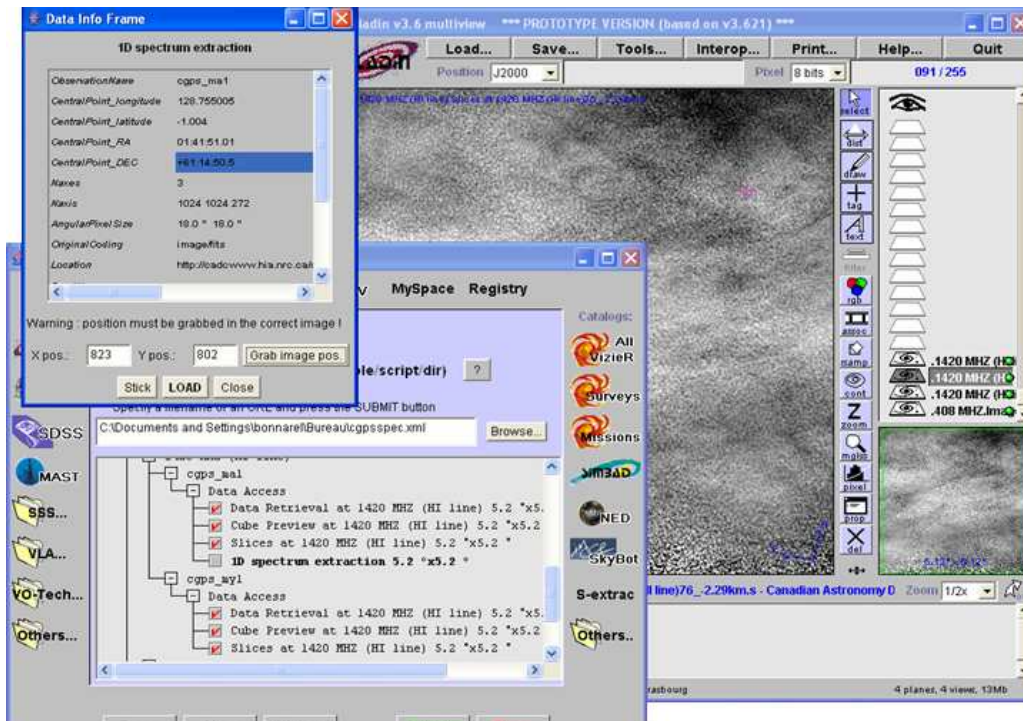


Figure 3. CGPS metadata tree in Aladin

#	Proposer	Target	RA	DEC	Exp. Time	Instrument	Observational Mode	Chart	Like	Star ID
1	BL Lvl	AMR 0714	07h 23m 57.14s	1999-11-19	3400	MPPS	1*(16*15*1034)	Chart	Like	101
2	Spectroscopy	CSCM	09h 48m -22d 04m 06.1s	2000-09-15	1800	MPPS	1*(16*15*1034)	Chart	Like	101
3	LBV Spectroscopy	HOLMBERG2	08h 19m 32.46s	2002-03-14	1800	MPPS	1*(16*15*1034)	Chart	Like	101
4	LBV Spectroscopy	HOLMBERG2	08h 19m 32.46s	2002-03-14	3400	MPPS	1*(16*15*1034)	Chart	Like	101
5	unknown	WS33	01h 50m 43d 04m 05.1s	1999-09-18	2400	MPPS	10*(15*16*1034)	Chart	Like	101
6	Spectra GRB	GRB020313	00h 52m 30.52s	2000-08-13	5400	MPPS	1*(16*15*1034)	Chart	Like	101

Figure 4. Euro3D VO client, Aladin and VOSPEC in PLASTIC communication for displaying an ASPID-SR IFU

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