



EURO-VO Facility Centre Research Initiative

EURO-VO SAC Meeting, March 11-12 2008



Research initiative

- **Extension of Aladin to support observation planning**
- **Production of an empirical Library of Galaxy integrated spectra for classification purposes of the GAIA space mission of ESA**
- **Testing and expanding the Euro-VO. The GRB case**

- **Quantifying visible and hidden star-formation in galaxies**
- **Dust Evolution as a Tracer of Environmental Changes (DETEC)**
- **Star forming regions in the LMC**
- **Triggered massive-star formation in the Galaxy**
- **Multiwavelength study of Spitzer sources with Virtual Observatories**

- **Building Galaxies from redshift 1**



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- **Quantifying visible and hidden star-formation in galaxies [ESO]**
- **Dust Evolution as a Tracer of Environmental Changes (DETEC) [ESA]**
- Star forming regions in the LMC
- **Triggered massive-star formation in the Galaxy [CDS/ESO]**
- Multiwavelength study of Spitzer sources with Virtual Observatories

- Building Galaxies from redshift 1



Triggered massive-star formation in the Galaxy

Aim: consider the bubbles detected by Spitzer at 8 microns to understand their nature and, for bubbles associated with classical HII regions, to look for triggered star formation at their borders.

“This project will result in the creation of a catalog of candidate regions for triggered massive-star formation that will be made available to the community and used for subsequent studies.”

VO requirements: an **automatic** query, on the basis of the coordinates of a list of objects, of the radio maps and the corresponding catalogs of PS IR sources, an **automatic** creation of RGB images, and an **automatic** export of the composite images; a tool to cross correlate catalogs, on the basis of the coordinates of the objects, would be useful.

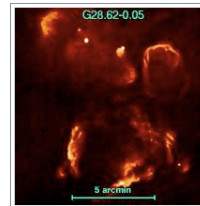
Triggered massive-star formation in the Galaxy

- leopard, topcat

MAGPIS: The Multi-Array Galactic Plane Imaging Survey

Robert H. Becker, David J. Helfand, Richard L. White

The Multi-Array Galactic Plane Imaging Survey collects, as its namesake is wont to do, bits and pieces of the Galactic sky that have been imaged at high resolution. Currently this web site includes the 6 and 20 cm VLA radio images and catalogs described in [White, Becker & Helfand \(2005, AJ, 130, 586\)](#), as well as the main MAGPIS database of high-dynamic range, high-sensitivity VLA images for the region $5^\circ < l < 32^\circ$, $|b| < 0.8^\circ$ ([Helfand et al., 2006, AJ, 131, 2525](#)). Much of this latter area is being imaged with [XMM-Newton](#) at hard-X-ray wavelengths and by the [GLIMPSE Spitzer](#) legacy project at $8\mu\text{m}$, and all of it has been mapped at mid-infrared wavelengths by [MSX](#). Mosaics of both the GLIMPSE and MSX infrared data, gridded onto the same coordinate system as the radio images, are included at this site, as will be the X-ray data as they become available.



Data Currently Available

Survey	Area Covered	Description
<i>New GPS 20cm</i>	$ b < 0.8^\circ$ $5^\circ < l < 32^\circ$	1.4 GHz Multi-configuration (B,C,D) VLA images
<i>GPS 6cm</i>	$ b < 0.4^\circ$ $350^\circ < l < 42^\circ$	5 GHz C-configuration VLA images & catalogs
<i>Old GPS 20cm</i>	$ b < 0.8^\circ$ $340^\circ < l < 120^\circ$	1.4 GHz B-configuration VLA images & catalogs
	$ b < 1.7^\circ$ $350^\circ < l < 40^\circ$	
	$ b < 2.2^\circ$ $100^\circ < l < 105^\circ$	
<i>GPS 90cm</i>	$ b < 2^\circ$ $3.6^\circ < l < 33.2^\circ$	0.325 GHz Multi-configuration (B,C) VLA images
<i>MSX IR</i>	Same as old GPS 20cm	21 μm infrared images
<i>GLIMPSE IR</i>	$ b < 1.0^\circ$ $9.95^\circ < l < 28.05^\circ$	8 μm Spitzer infrared images

Using the MAGPIS web site:

- The [GPS cutout page](#) allows you to extract a section of an image from the VLA Galactic Plane Surveys at multiple frequencies.
- The [publications page](#) lists our current and past papers that describe the various surveys and catalogs in detail.

- python script to create cutouts of images retrieved from the MAGPIS page
- Aladin .glu to access the MAGPIS page, one object at a time; then a script would be needed to run the query for a list of objects



Research initiative

Triggered massive-star formation in the Galaxy

"Is the Euro VO the correct context to realize such a project? How far can you go in the software development to concatenate the existing tools?"

- Aladin script to download images from the MAGPIS web pages, to then overlay DSS and NVSS with contours and overlay the IRAS point source catalogue points; and then to generate an RGB image with R:NVSS, G:spitzer, B:DSS and save it as a .png

No news since September 2007 but presumably they have all the info needed to finalise the project



Quantifying visible and hidden star-formation in galaxies

Aim: study the effects of dust extinction on star formation rate estimates, collecting multi-wavelength data for a sample of relatively nearby galaxies. Ideally, two rather different samples could be targeted:

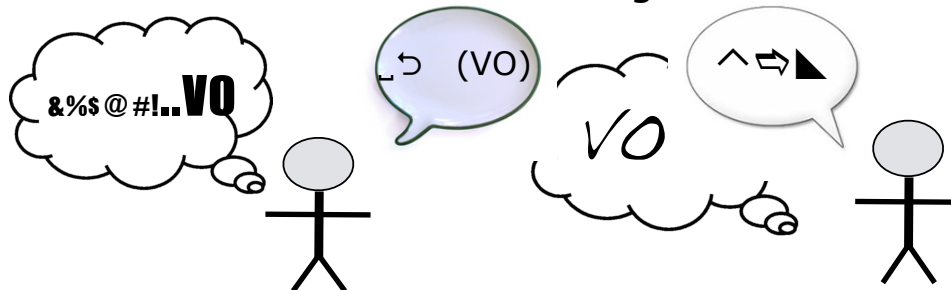
- very local galaxies from the Virgo and Coma cluster
- a small subsample of the SDSS galaxies ($z < 0.1$)

- **Optical spectrum** in the range 3000-8000 Angstrom to measure [OII]3727 and Balmer lines to estimate the galaxies star formation rate (SFR), and internal dust extinction from the Balmer decrement
- **Optical and NIR magnitudes** to perform SED fitting, estimate galaxies stellar mass, star formation activity and star formation history
- **UV data** to measure the intensity of the UV continuum, to derive independent estimates of the galaxies SFR and internal dust extinction (from the slope of the UV continuum)
- **FIR data** to estimate the FIR emission, and therefore the total dust content of each galaxy, and of the SFR which is not affected by dust extinction
- **Radio data** to derive a second estimate of the SFR which is not affected by dust extinction
- **X ray data** to remove any AGN contamination from the analysis

Quantifying visible and hidden star-formation in galaxies

VO (initial) requirements:

- the optimal way to build the sample
- where to look for the data
- filters DB
- direct VO access to the galactic extinction
- retrieve SDSS spectra and emission line information
- VizieR to access multi-wavelength data



"Our final conclusion is that presently it is really impossible to carry out this work with the VO available tools, at least for an astronomer without programming skills"

Suggestions:

- Queries "a la" SkyNode but without limitations
- VO access to filter response curves



Research initiative

Dust Evolution as a Tracer of Environmental Changes (DETEC)

Aim: understanding how the global emission of building blocks of galaxies (regions that include all the major constituents of a galaxy) is related to their mean properties.

VO requirements: Data-mining; cross-correlation; SED building

Outcome: ?