

## Introduction

### What is the Virtual Observatory?

The virtual observatory (“VO”) consists of standardised digital archives and smart methods to use them. In most cases the database has a nice web interface. Also there is a still growing collection of helpful tools to search and visualise data, or you can connect with your own programs.

### Why do we need the Virtual Observatory?

In astrophysics the amount of observed and simulated data increases greatly every year. Much of that data is described poorly. This makes it difficult to extract information for anyone else but the primary researchers (and sometimes even for them). The virtual observatory initiative aims to properly describe all data and make it available to the community. Thus it helps you to find and extract the information you are really looking for.

### Who defines the standards and protocols? How do they improve archive use?

As a consequence of the diverse state of archives worldwide, a joint initiative was formed in 2002 which is called the *International Virtual Observatory Alliance* (IVOA). It is a collaborative body of astrophysicists and computer scientists who work together to find descriptions for all forms of astrophysical data (“metadata”). Also they develop the corresponding protocols and methods to search, exchange and process that data.

## Services & Archives

This is a list of a few example sites to give you an overview of interesting services and additional documentation.

### Euro-VO ([www.euro-vo.org](http://www.euro-vo.org))

This site is a starting point to discover the Virtual Observatory concept. It offers many pages about technical and scientific aspects, and is still growing as an ongoing project. It also runs a registry for VO archives.

### CDS ([cdsweb.u-strasbg.fr](http://cdsweb.u-strasbg.fr))

The *Centre de Données astronomiques de Strasbourg* hosts several of the most important archives and services (e.g. Simbad, VizieR).

### IVOA ([www.ivoa.net](http://www.ivoa.net))

The IVOA establishes all VO technical standard papers. Therefore this site is the source for all protocol and schema and standard definitions.

### SDSS ([cas.sdss.org/astro](http://cas.sdss.org/astro))

The Sloan survey is one of the most extensive sky surveys so far, offering images and spectra. Additionally to a web interface with direct database access it also provides VO services.

### NVO ([www.us-vo.org](http://www.us-vo.org))

The US VO project, home of many services, such as the “DataScope”, which is a search box to query VO archives around the world.

## Helpful Tools

The VO initiative published several programs to connect to VO archives and to retrieve, visualise and process data. We only mention some of the most popular here. For links to these tools, see <http://www.g-vo.org/www/External/Tools>.

If you want your own software to connect to the VO or VO tools, this is possible via the internet, assisted by Java libraries, or special VO protocols (“plastic”).

### Topcat

One of the most advanced tools to work with (VO-) Tables. Allows for visualisation, cross matching, and much more.

### Aladin

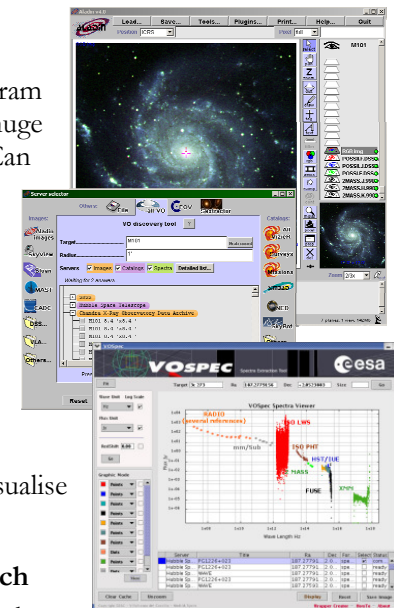
a image display program that connects to a huge list of data bases. Can be used as an interactive sky atlas that to search, retrieve and visualise all available data for a specified target.

### VOspec, SpecView, Splat

Tools to retrieve, visualise and analyse spectra.

### Astrogrid Workbench

An advanced desktop application for doing science in the Virtual Observatory, with many different applications included.



## The role of GAVO

### What is GAVO?

The *German Astrophysical Virtual Observatory* is the German participant in the IVOA and serves the same cause: to improve the Virtual Observatory and propagate its use (see *Introduction*). We specifically want to help the German astrophysical community to publish its data, to adopt the international standards and to use the available archives and tools. Also GAVO collects the feedback from the community for improvements of the standards, interfaces, protocols and software.

### How can GAVO help me?

We can assist you if you have data that you want to publish, or if you want to improve your already existing archive. GAVO can also teach you advanced methods to find and analyse data from the available archives. The details depend on the area of research. The easiest way to find out is to contact a GAVO member (see backside of this leaflet for addresses).

Also, have a look at the *GAVO data center leaflet* from the Zentrum für Astronomie Heidelberg (ZAH).

### What kind of work do I have to expect?

To set up a VO compatible archive you need to supply a detailed description of your data. GAVO can help you on how to get started on the standards or you can check the IVOA web pages (see below). For running the actual web interface, knowledge of databases and web publishing methods are helpful.

## Links and Contact

GAVO Website:

<http://www.g-vo.org>

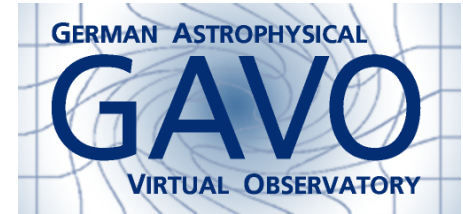
Email:

[gavo@ari.uni-heidelberg.de](mailto:gavo@ari.uni-heidelberg.de)

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GAVO is a collaboration of the following institutes: Zentrum für Astronomie Heidelberg (ZAH); Argelander-Institut für Astronomie der Universität Bonn (AIfA); Astrophysikalisches Institut Potsdam (AIP); Institut für Astronomie und Astrophysik (IAAT) der Eberhard-Karls-Universität, Tübingen; Max Planck Digital Library (MPDL); Max-Planck-Institut für extraterrestrische Physik (MPE), Garching; Technische Universität München. GAVO also cooperates with the AstroGrid-D project ([www.gac-grid.org](http://www.gac-grid.org))

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## What is GAVO?

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### An Introduction to the German Astrophysical Virtual Observatory Project

Visit the GAVO Website:

<http://www.g-vo.org>

