B0DEGA 3D VO Archive
A prototype service for a catalog of galaxy datacubes

Jose Enrique Ruiz
IAA - CSIC

IVOA Nara Fall Interop 07/12/2010

SUMMARY

Context

- AMIGA
- B0DEGA

3D Archive

- discovery
- queryData
- accessData
- getCapabilities

Workflows

- A scenario for Virtual Data

Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

Analysis of the interstellar Medium of Isolated Galaxies

PI : Lourdes Verdes-Montenegro
IAA-CSIC, IRAM
http://amiga.iaa.es

Obs. Marseille, Obs. Paris, CfA, ASIAA, MPIfA, IAC,
Univ. Alabama, Mc Donald Observatory, Arcetri, UNAM,
Kapteyn Astronomical Institute.

Need of a statistically significant sample of isolated galaxies, in order to provide a baseline to compare with the behaviour of galaxies in denser environments

Multiλ analysis ~1000 galaxias

+

Need of intensive and complex analysis of 3D data
2D spatial + 1 Velocity

AMIGA

AMIGA Catalog

- ConeSearch Service
- Web Interface

RADAMS

Radio Astronomy Data Model for Single-dish telescopes

Juan de Dios Santader-Vela

Robledo DSS-63 VO Archive

- ConeSearch Service
- SSA Service
- Web Interface

TAPAS

Telescope Archive for Public Access System

IRAM-30m VO Archive

- ConeSearch Service
- Web Interface

Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

BODEGA

Below 0 DEgrees Galaxies

PI : D. Espada

Legacy project of Submillimiter Array interferometer (SMA)

http://b0dega.iaa.es

IAA-CSIC

CfA (Harvard-Smithsonian Center for Astrophysics)

ASIAA (Institute of Academia Sinica Astronomy and Astrophysics)

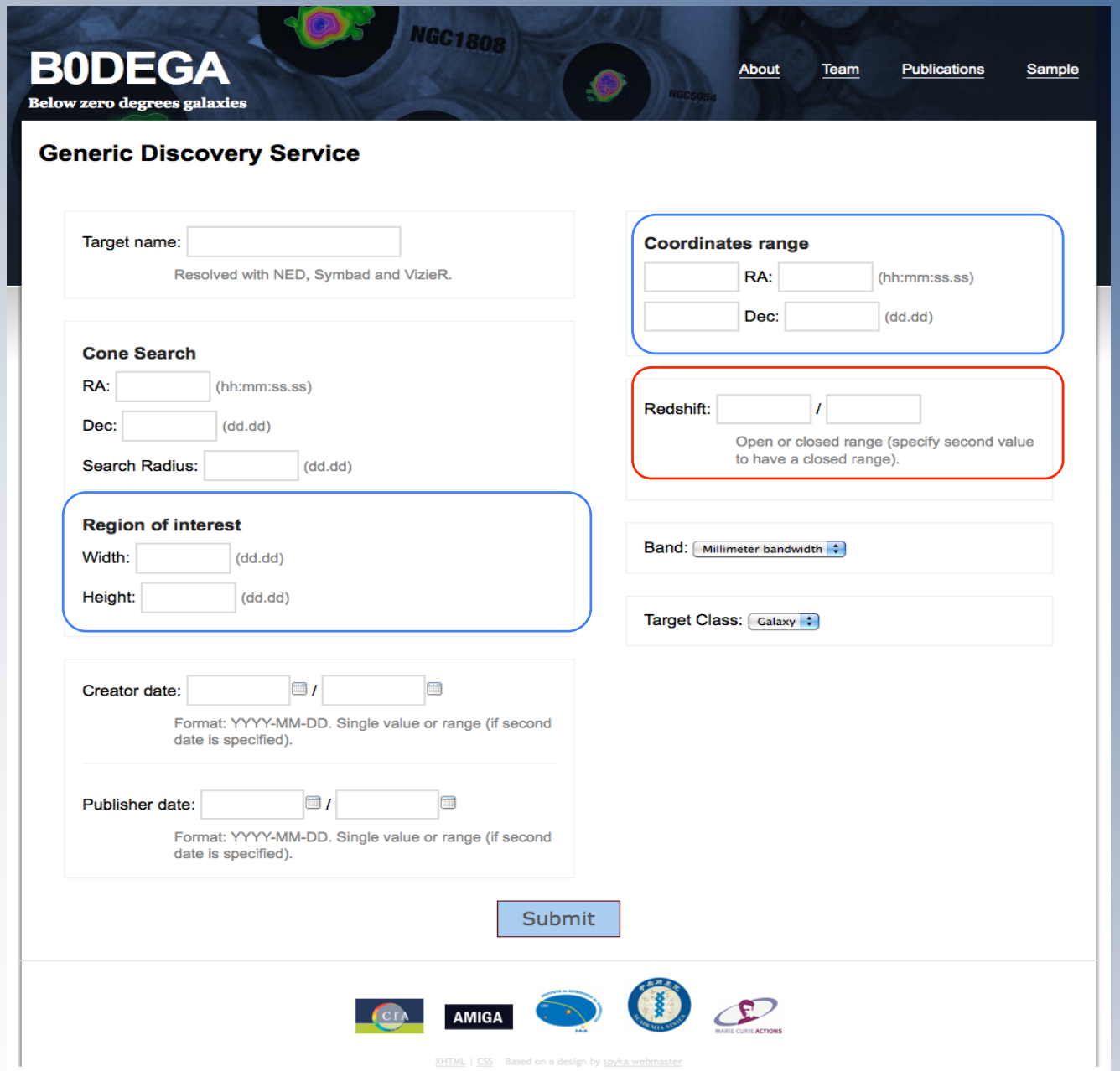
Molecular gas properties in circumnuclear regions of a large survey of nearby galaxies. Spiral galaxies that have undergone recent interactions. Many of them characterized by central starbursts.

30 processed and reduced datacubes of galaxies

Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

DISCOVERY



Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

queryData

B0DEGA
Below zero degrees galaxies

About Team Publications Sample

Generic Discovery Service Results

« Back to the Search form Format HTML Return 25 rows

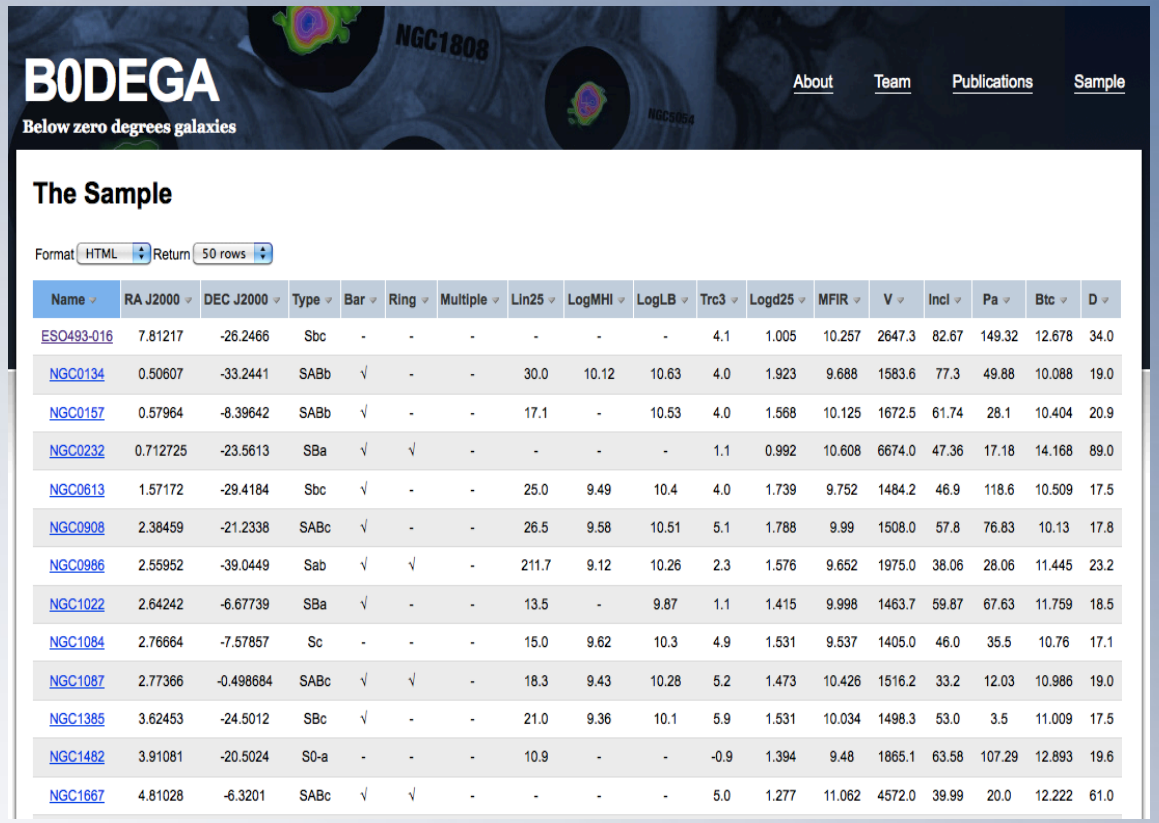
Name	RA 2000 (hh:mm:ss.ss)	DEC 2000 (deg)	Velocity (Km/s)	Redshift	Type	Flux Max (Jy/Beam)	Flux Min (Jy/Beam)	Spectral Start (Km/s)	Spectral Stop (Km/s)
NGC986	02:33:34.30	-39.04	1920.06	0.006405	Cube	3.65	0.02	1180.04	2180.07
NGC908	02:23:4.60	-21.23	1460.04	0.004870	Cube	0.64	0.02	720.02	1720.05
NGC613	01:34:18.20	-29.42	1470.08	0.004904	Cube	2.20	0.02	730.04	1730.09
NGC5937	15:30:46.10	-2.83	2759.83	0.009206	Cube	0.42	0.03	2019.87	3019.81
NGC5861	15:09:16.10	-11.32	1819.84	0.006070	Cube	1.02	0.02	1079.90	2079.81
NGC5792	14:58:22.70	-1.09	1879.88	0.006271	Cube	0.90	0.02	1139.93	2139.86
NGC5713	14:40:11.50	-0.29	1819.86	0.006070	Cube	1.29	0.01	1079.92	2079.84
NGC5247	13:38:3.00	-17.88	1319.98	0.004403	Cube	0.72	0.02	579.99	1579.98
NGC5054	13:16:58.50	-16.63	1660.00	0.005537	Cube	1.20	0.02	920.00	1920.00
NGC4984	13:08:57.30	-15.52	1219.87	0.004069	Cube	0.57	0.03	479.95	1479.85
NGC4691	12:48:13.60	-3.33	1070.02	0.003569	Cube	1.36	0.02	330.01	1330.02
NGC4666	12:45:8.60	-0.46	1520.03	0.005070	Cube	1.06	0.02	780.02	1780.04
NGC4433	12:27:38.60	-8.28	2920.14	0.009741	Cube	1.32	0.02	2180.11	3180.15
NGC4418	12:26:54.60	-0.88	2070.10	0.006905	Cube	1.94	0.02	1330.07	2330.11
NGC4030	12:00:23.60	-1.10	1420.03	0.004737	Cube	0.39	0.01	680.02	1680.04
NGC3672	11:25:2.50	-9.80	1820.12	0.006071	Cube	0.72	0.01	1080.07	2080.14
NGC3175	10:14:42.30	-28.87	1020.03	0.003402	Cube	1.40	0.02	280.01	1280.04
NGC3110	10:04:2.20	-6.48	4969.95	0.016578	Cube	0.84	0.01	4229.96	5229.95
NGC2559	08:17:6.10	-27.46	1520.04	0.005070	Cube	2.25	0.02	780.02	1780.05
NGC232	00:42:45.80	-23.56	6624.71	0.022098	Cube	0.46	0.01	5699.75	6949.70
NGC1808	05:07:42.30	-37.51	1000.03	0.003336	Cube	2.35	0.02	260.01	1260.03
NGC1667	04:48:37.00	-6.32	4459.96	0.014877	Cube	0.35	0.02	3719.97	4719.96
NGC157	00:34:46.60	-8.40	1620.09	0.005404	Cube	0.32	0.02	880.05	1880.10
NGC1482	03:54:38.90	-20.50	1820.05	0.006071	Cube	1.82	0.01	1080.03	2080.06
NGC1385	03:37:28.30	-24.50	1460.10	0.004870	Cube	0.28	0.02	720.05	1720.12

30 results | page 1 of 2 next »

XHTML | CSS Based on a design by soyka webmaster

Data needed by the Astronomer

- Decoupled coordinates
- Distances
- Morphological Type
- Bar
- Ring
- Multiple
- Linear diameter
- Masses
- Luminosities
- Inclination
- Position Angle



Name	RA J2000	DEC J2000	Type	Bar	Ring	Multiple	Lin25	LogMHI	LogLB	Trc3	Logd25	MFIR	V	Incl	Pa	Btc	D
ESO493-016	7.81217	-26.2466	Sbc	-	-	-	-	-	-	4.1	1.005	10.257	2647.3	82.67	149.32	12.678	34.0
NGC0134	0.50607	-33.2441	SABb	√	-	-	30.0	10.12	10.63	4.0	1.923	9.688	1583.6	77.3	49.88	10.088	19.0
NGC0157	0.57964	-8.39642	SABb	√	-	-	17.1	-	10.53	4.0	1.568	10.125	1672.5	61.74	28.1	10.404	20.9
NGC0232	0.712725	-23.5613	SBa	√	√	-	-	-	-	1.1	0.992	10.608	6674.0	47.36	17.18	14.168	89.0
NGC0613	1.57172	-29.4184	Sbc	√	-	-	25.0	9.49	10.4	4.0	1.739	9.752	1484.2	46.9	118.6	10.509	17.5
NGC0908	2.38459	-21.2338	SABc	√	-	-	26.5	9.58	10.51	5.1	1.788	9.99	1508.0	57.8	76.83	10.13	17.8
NGC0986	2.55952	-39.0449	Sab	√	√	-	211.7	9.12	10.26	2.3	1.576	9.652	1975.0	38.06	28.06	11.445	23.2
NGC1022	2.64242	-6.67739	SBa	√	-	-	13.5	-	9.87	1.1	1.415	9.998	1463.7	59.87	67.63	11.759	18.5
NGC1084	2.76664	-7.57857	Sc	-	-	-	15.0	9.62	10.3	4.9	1.531	9.537	1405.0	46.0	35.5	10.76	17.1
NGC1087	2.77366	-0.498684	SABc	√	√	-	18.3	9.43	10.28	5.2	1.473	10.426	1516.2	33.2	12.03	10.986	19.0
NGC1385	3.62453	-24.5012	SBc	√	-	-	21.0	9.36	10.1	5.9	1.531	10.034	1498.3	53.0	3.5	11.009	17.5
NGC1482	3.91081	-20.5024	S0-a	-	-	-	10.9	-	-	-0.9	1.394	9.48	1865.1	63.58	107.29	12.893	19.6
NGC1667	4.81028	-6.3201	SABc	√	√	-	-	-	-	5.0	1.277	11.062	4572.0	39.99	20.0	12.222	61.0

Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

queryData

B0DEGA

Below zero degrees galaxies

Basic data

Target

- Name: **NGC5247**
- Class: **Galaxy**

Coordinates

- RA J2000: **13:38:3.00** hh:mm:ss.ss
- DEC J2000: **-17.88** deg

Velocity

- V: **1319.98** Km/s
- Redshift: **0.00440299**

Extended data

Provenance

- Telescope: **SMA**
- Bandpass: **Millimeter bandwidth**
- Beam Major Axis: **0.000982176** deg
- Beam Minor Axis: **0.000892319** deg
- Beam Position Angle: **-66.64** deg

Spatial

- Aperture angular size (width x height): **0.025** x **0.025** deg
- Spatial bin size (width x height): **8.3e-05** x **8.3e-05** deg

Spectral

- Spectral coord value: **1319.98** Km/s
- Width of spectrum: **999986.33** Km/s
- Start in spectral coordinate: **579.99** Km/s
- Stop in spectral coordinate: **1579.98** Km/s

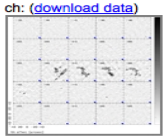
Flux

- Flux min : **0.0175** Jy/Beam
- Flux Support Extent (max): **0.7208** Jy/Beam
- Flux Support Extent (min): **0.0175** Jy/Beam

Images

12CO21

ch: (download data)



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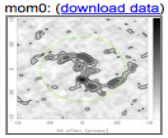

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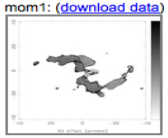

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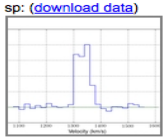

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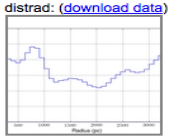

Download Fits file

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Number of points: **2250000**
Size: **9011520** Kbs
Open this with Aladdin Applet

accessData

Analysis of the Interstellar Medium of Isolated GAlaxies

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B0DEGA

Below zero degrees galaxies

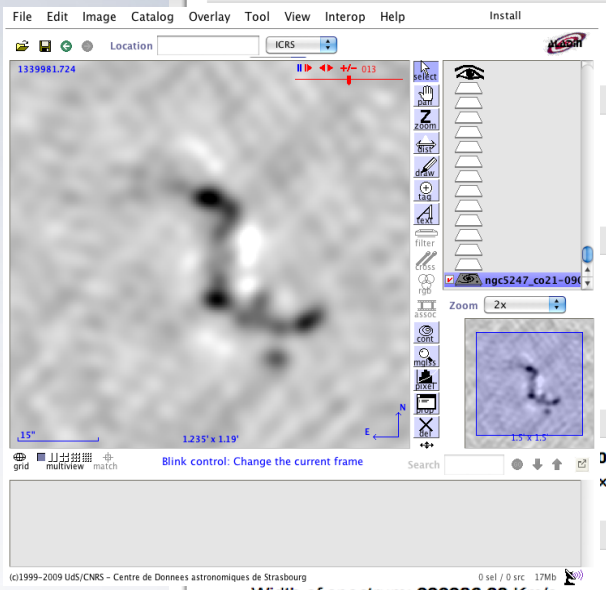
About Team Publications Sample

Basic data

Target

- Name: **NGC5247**
- Class: **Galaxy**

Coordinates



025 x 0.025 deg

x 8.3e-05 deg

- Width of spectrum: **999986.33** Km/s
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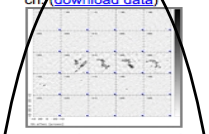

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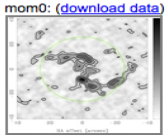

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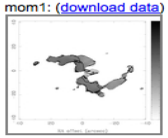

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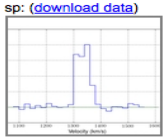

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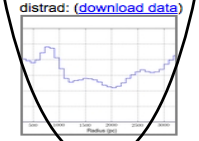

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Number of points: **2250000**
Size: **9011520** Kbs
Open this with Aladdin Applet

AMIGA

XHTML | CSS Based on a design by spyka webmaster

getCapabilities

Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

```
<VOTABLE xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="xmlns:http://www.ivoa.net/xml/VOTable/VOTable-1.2.xsd"
xmlns:sia2="http:www.ivoa.net/xml/gds/v0.1" version="1.2">
<RESOURCE type="Results">
        <DESCRIPTION>getCapabilities query response on B0DEGA Generic Data Service</DESCRIPTION>
        <INFO name="QUERY_STATUS" value="OK">Successful metadata query</INFO>
        <INFO name="SERVICE_PROTOCOL">GDS</INFO>
        <!--mandatory input parameters -->
        <PARAM name="INPUT:POS" datatype="char" arraysize="*">
                <DESCRIPTION>POS defaults to right-ascension and declination in decimal degrees in
the ICRS coordinate system. A coordinate system reference frame may optionally be specified to
specify a coordinate system such as 'GALACTIC', 'GALACTIC_I', 'GALACTIC_II', 'ECLIPTIC' but no
results will be provided; default is ICRS/FK7.</DESCRIPTION>
        </PARAM>
        <PARAM name="INPUT:SIZE" value="0.1" datatype="double" unit="deg">
                <DESCRIPTION>The width and height of the rectangular region of interest. If only a
single value is given it applies to both the width and height of the search region, otherwise the
two values may be specified separately.</DESCRIPTION>
                <VALUES>
                        <MIN value="0"/>
                        <MAX value="5.0"/>
                </VALUES>
        </PARAM>
        <PARAM name="INPUT:BAND" value="ALL" datatype="char" arraysize="*">
                <DESCRIPTION>The spectral band pass is specified in range-list format either
numerically as a wavelength value or range, or textually as a spectral band pass identifier. If a
band pass is specified as a string identifier it is assumed to be a band pass identifier such as a
standard VO band pass name.</DESCRIPTION>
                <VALUES>
                        <OPTION value="ALL"/>
                        <OPTION value="radio"/>
                        <OPTION value="millimeter"/>
                        <OPTION value="infrared"/>
                        <OPTION value="optical"/>
                        <OPTION value="ultraviolet"/>
                        <OPTION value="x-ray"/>
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                        <OPTION value="V"/>
                        <OPTION value="B"/>
                        <OPTION value="R"/>
                        <OPTION value="I"/>
                        <OPTION value="J"/>
                </VALUES>
        </PARAM>
        <PARAM name="INPUT:TIME" datatype="char" arraysize="*">
                <DESCRIPTION>The temporal coverage (epoch of observation) is specified as a single
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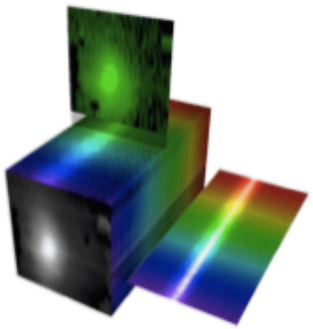
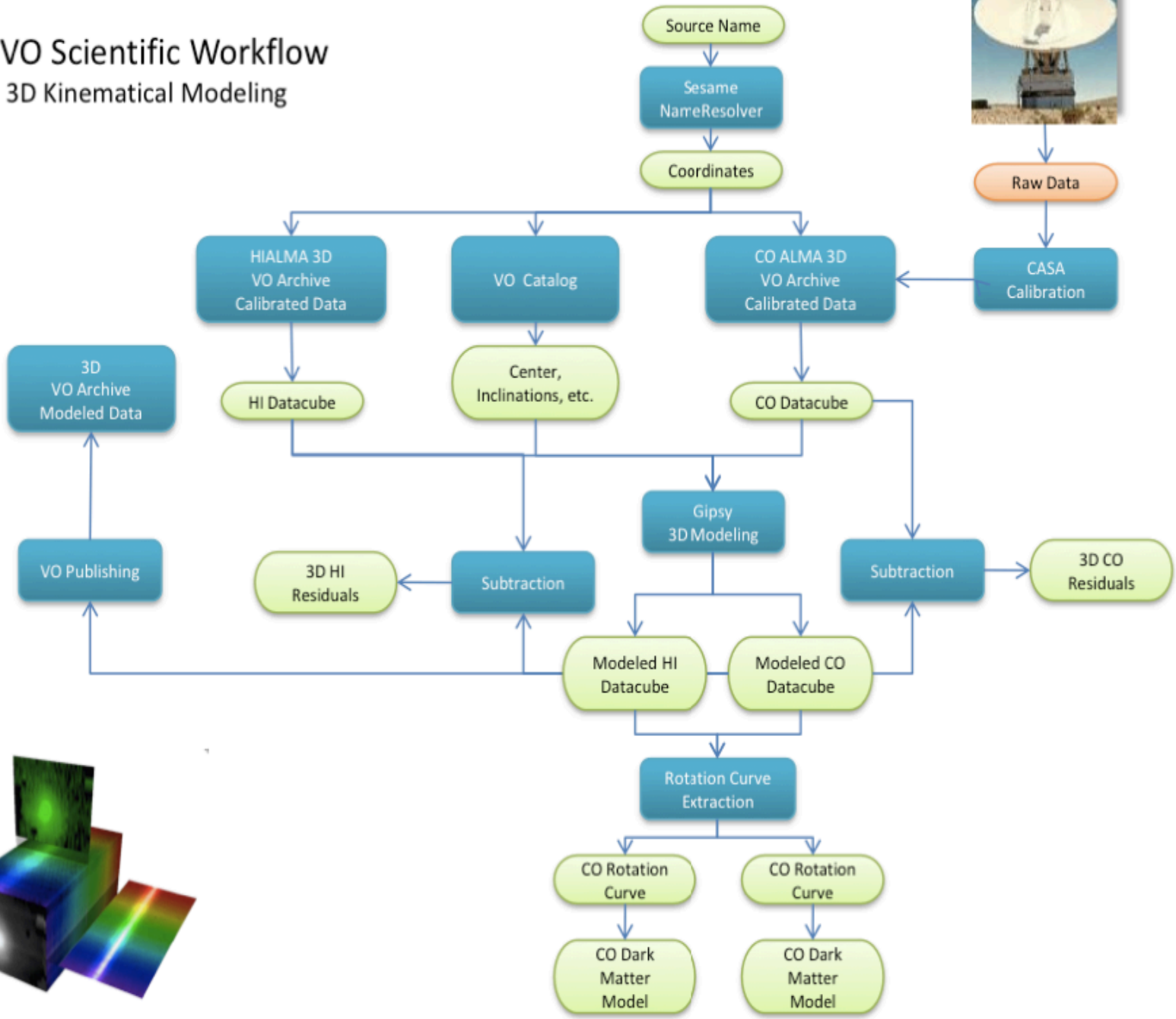
Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

VO Scientific Workflow

3D Kinematical Modeling





Analysis of the Interstellar Medium of Isolated GAlaxies

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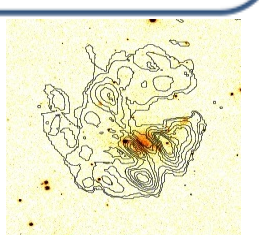
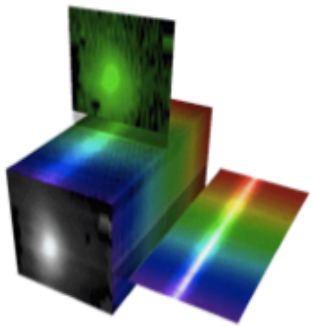
VO Scientific Workflow

3D Kinematical Modeling

Raw Data

CASA Calibration



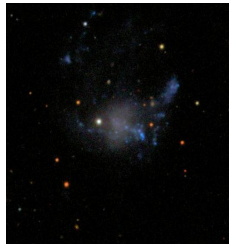


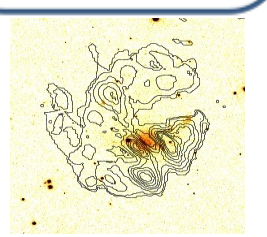
Analysis of the Interstellar Medium of Isolated GAlaxies

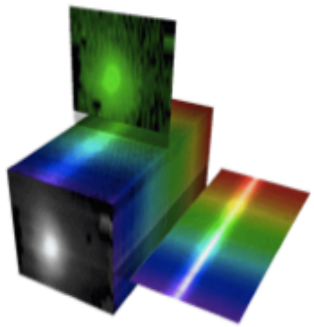
AMIGA

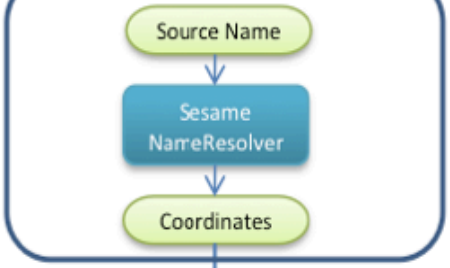
VO Scientific Workflow

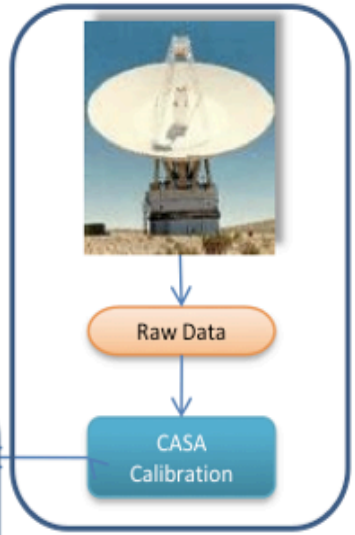
3D Kinematical Modeling











Analysis of the Interstellar Medium of Isolated GAlaxies

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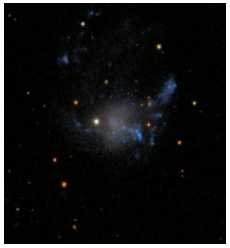
VO Scientific Workflow

3D Kinematical Modeling



Source Name

Sesame NameResolver

Coordinates

Raw Data

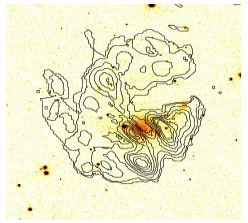
VO Catalog

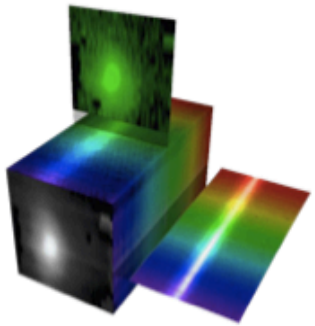
CO ALMA 3D VO Archive Calibrated Data

CASA Calibration

Center, Inclinations, etc.

CO Datacube



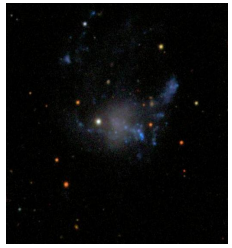


Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

VO Scientific Workflow

3D Kinematical Modeling



Source Name

Sesame NarreResolver

Coordinates

Raw Data

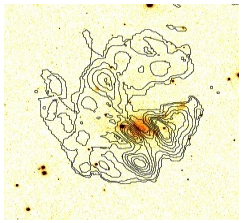
VO Catalog

CO ALMA 3D VO Archive Calibrated Data

CASA Calibration

Center, Inclinations, etc.

CO Datacube

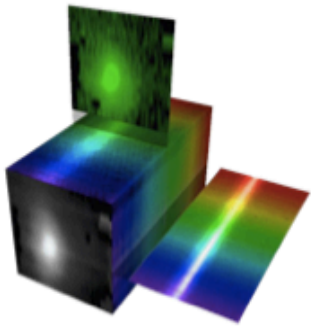


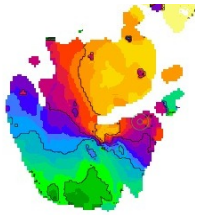
Gipsy 3D Modeling

Subtraction

3D CO Residuals

Modeled CO Datacube



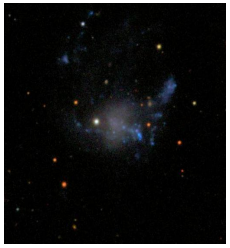


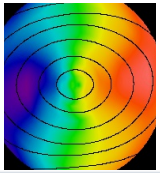
Analysis of the Interstellar Medium of Isolated GAlaxies

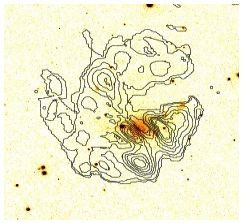
AMIGA

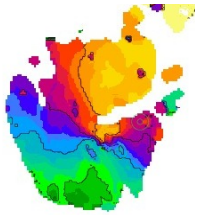
VO Scientific Workflow

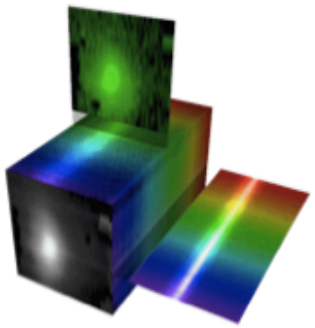
3D Kinematical Modeling

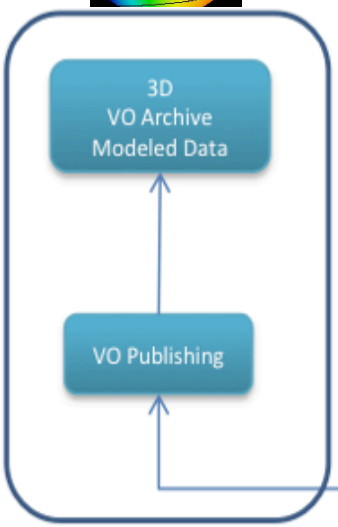


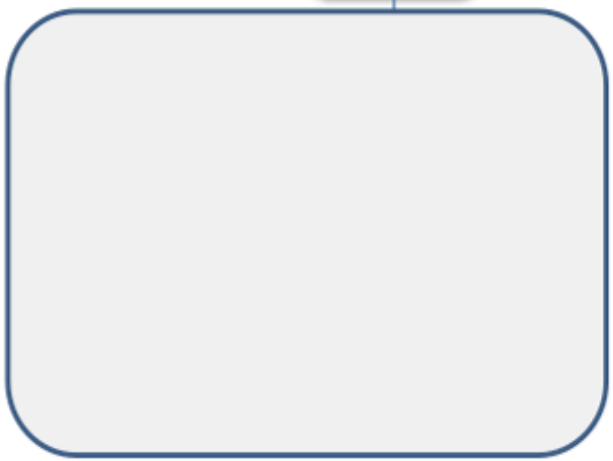












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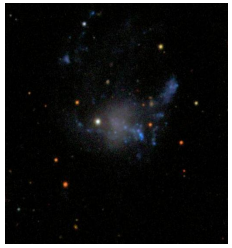

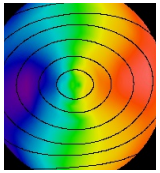

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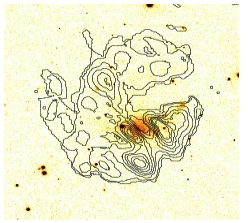

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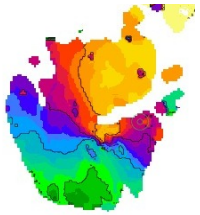

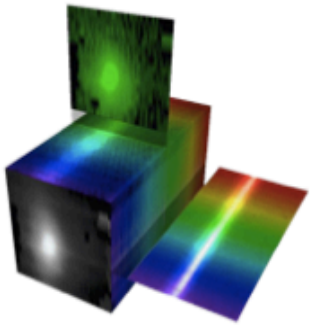

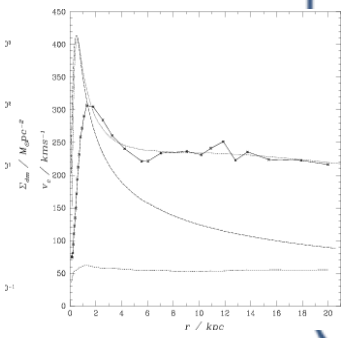

Rotation Curve Extraction

CO Rotation Curve

CO Dark Matter Model

Analysis of the Interstellar Medium of Isolated GAlaxies

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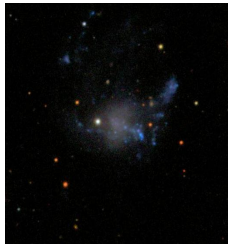

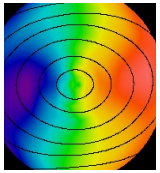

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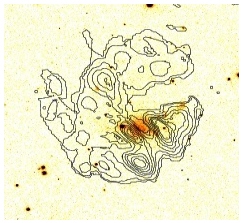

3D VO Archive Modeled Data

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Center, Inclinations, etc.

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Subtraction

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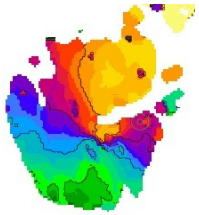
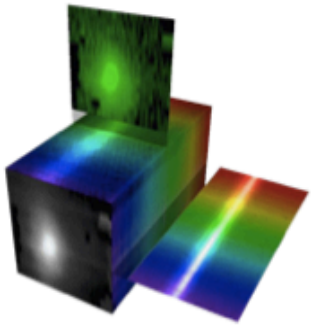
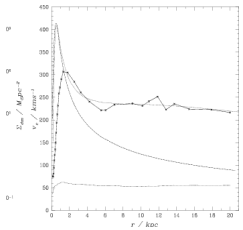
Modeled CO Datacube



Rotation Curve Extraction



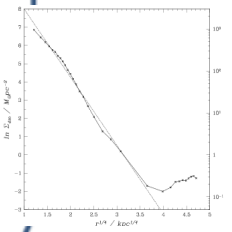


HI Rotation Curve

CO Rotation Curve

HI Dark Matter Model

CO Dark Matter Model



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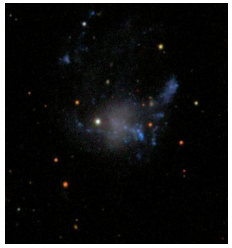

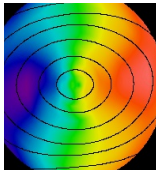

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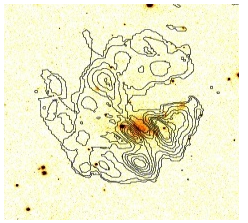

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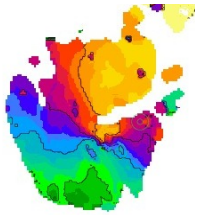
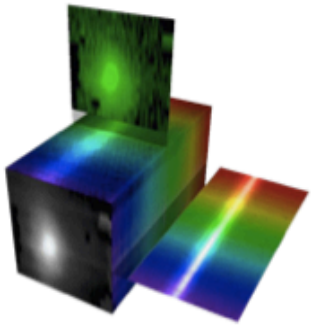
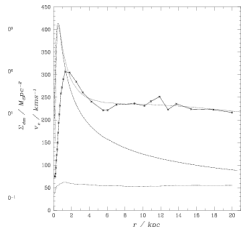
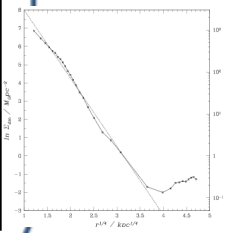






YOUR FAVOURITE MASS MODEL TOOL



CONCLUSIONS

- SIAv2 Draft + SSA answer most of the issues
- Some tabular data from catalogs also needed
- SpecDM + CharDM cover most of all metadata
- A complete generic DM is needed for UTypes
- Virtual Data generation needed for huge files
- accesData standard params needed for Virtual Data
- getCapabilities method is key for building Workflows
- Upcoming facilities will provide 3D datacubes