

# Velocity Cubes of Galaxies

Discover /Propose /Extract  
SIAv2 /DataLink /AccessData

## User Experience on Prototype Implementation

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# Public Collections

## Single Object / Single Line Emission Datasets

### SMA B0DEGA

#### Below 0 Degrees Galaxies

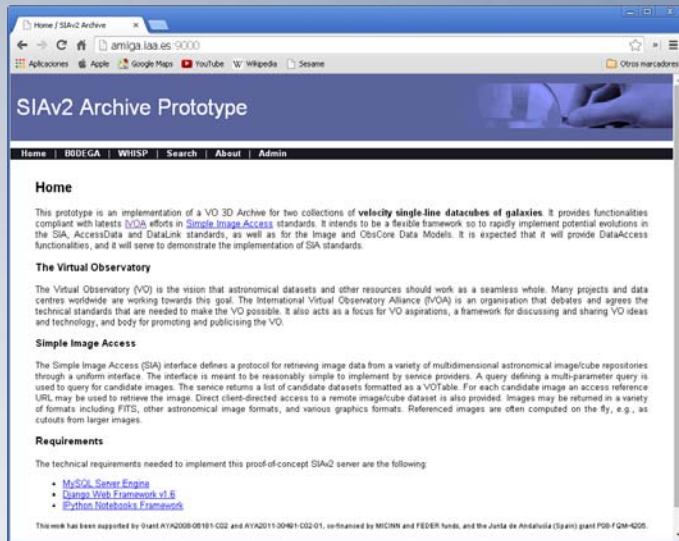
- 30 FITS Files
- Pixel Dimensions 256x256x25
- 2D Spatial + 1D Velocity + 1D Polarization
- 12 CO 21 Molecular Transition

### WSRT WHISP

#### Westerbork observations of neutral Hydrogen in Irregular and SPiral galaxies

- 33 FITS Files
- Pixel Dimensions 512x512x127
- 2D Spatial + 1D Frequency + 1D Polarization
- HI 21cm Transition

Madrid IVOA Interop



# Prototype Interfaces

## Web Interface

<http://amiga.iaa.es:9000>

- Discovery
- Display of Characterization Metadata
- FITS Access /SAMP Broadcasting

## Extraction Operations in Pixel Space

- <http://amiga.iaa.es:9000/form/accessdata>
- <http://amiga.iaa.es:9000/accessdata>

## RESTful Interfaces and Testing Web Forms

- Discovery SIAv2
  - <http://amiga.iaa.es:9000/sia>
  - <http://amiga.iaa.es:9000/form/SIA2>
- Full Characterization Metadata
  - <http://amiga.iaa.es:9000/sia/metadata>
  - <http://amiga.iaa.es:9000/form/metadata>
- DataLink
  - <http://amiga.iaa.es:9000/datalink>
  - <http://amiga.iaa.es:9000/form/datalink>

### Generic AccessData Services

Click [FILL] on the right to populate the forms with default values.

<h4>Web Forms</h4> <div style="margin-bottom: 10px;"> <p><b>Pixel Cutout</b></p> <p>ID: <input type="text" value="ivo://svo.amiga.iaa.es/#siv2.1"/></p> <p>Operation: <input type="text" value="cutout"/></p> <p>RA (pix): <input type="text" value="0"/> <input type="text" value="255"/></p> <p>DEC (pix): <input type="text" value="0"/> <input type="text" value="255"/></p> <p>Channels (pix): <input type="text" value="0"/> <input type="text" value="24"/></p> <p>Chan. step (pix): <input type="text" value="1"/></p> <p>Format: <input type="text" value="PNG"/></p> <p style="text-align: right;"><input type="button" value="Enviar"/></p> </div> <div> <p><b>Position Velocity Plane</b></p> <p>ID: <input type="text" value="ivo://svo.amiga.iaa.es/#siv2.1"/></p> <p>Operation: <input type="text" value="pv"/></p> <p>RA (pix): <input type="text" value="128"/></p> <p>DEC (pix): <input type="text" value="128"/></p> <p>Channels (pix): <input type="text" value="0"/> <input type="text" value="24"/></p> <p>PA (deg): <input type="text" value="118.6"/> <i>North Eastwards</i></p> <p>Length (pix): <input type="text" value="128"/></p> <p>Format: <input type="text" value="PNG"/></p> <p style="text-align: right;"><input type="button" value="Enviar"/></p> </div>	<h4>DataSets</h4> <ul style="list-style-type: none"> <li>• <input type="button" value="[FILL]"/> - NGC613</li> <li>• <input type="button" value="[FILL]"/> - NGC3110</li> <li>• <input type="button" value="[FILL]"/> - NGC2559</li> <li>• <input type="button" value="[FILL]"/> - NGC3175</li> <li>• <input type="button" value="[FILL]"/> - NGC5247</li> <li>• <input type="button" value="[FILL]"/> - NGC1022</li> <li>• <input type="button" value="[FILL]"/> - NGC5792</li> <li>• <input type="button" value="[FILL]"/> - NGC4691</li> <li>• <input type="button" value="[FILL]"/> - NGC3672</li> <li>• <input type="button" value="[FILL]"/> - NGC4030</li> <li>• <input type="button" value="[FILL]"/> - NGC4984</li> <li>• <input type="button" value="[FILL]"/> - NGC5054</li> <li>• <input type="button" value="[FILL]"/> - NGC232</li> <li>• <input type="button" value="[FILL]"/> - NGC134</li> <li>• <input type="button" value="[FILL]"/> - NGC4433</li> <li>• <input type="button" value="[FILL]"/> - NGC4666</li> <li>• <input type="button" value="[FILL]"/> - NGC1808</li> <li>• <input type="button" value="[FILL]"/> - NGC5937</li> <li>• <input type="button" value="[FILL]"/> - NGC5713</li> <li>• <input type="button" value="[FILL]"/> - NGC1087</li> <li>• <input type="button" value="[FILL]"/> - NGC4418</li> <li>• <input type="button" value="[FILL]"/> - NGC908</li> <li>• <input type="button" value="[FILL]"/> - NGC1084</li> <li>• <input type="button" value="[FILL]"/> - NGC5861</li> <li>• <input type="button" value="[FILL]"/> - NGC1305</li> <li>• <input type="button" value="[FILL]"/> - E493016</li> <li>• <input type="button" value="[FILL]"/> - NGC966</li> <li>• <input type="button" value="[FILL]"/> - NGC1667</li> <li>• <input type="button" value="[FILL]"/> - NGC157</li> <li>• <input type="button" value="[FILL]"/> - NGC1482</li> </ul>
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# Discover / SIAv2 Input

## Use Cases for Single-object / Single-emission-line datacubes

- Discover datasets observed with a specific **emission-line** given
- Discover datasets within a specified **range of velocity** for a specific spectral line

**Search criteria**

**Spatial Axis**  
Coordinates ("ra,dec" in degrees):

**Energy Axis**

**Frequency**

**Observed red-shifted frequency as in instrumental set-up**

Central value (Hz):  Width (Hz):

*Frequency search criteria prevail over Velocity.*

**Velocity**

Line:

Central value (km/s):  Width (km/s):

**Collection**

Data collection:

**LINE param linked to VELOCITY param**

# Discover / SIAv2 Input

## Use Cases for RadioInterferometry Observations

*2.1.5 FOV*

*2.1.6 SPATRES*



**MRS**

### **Maximum Recoverable Scale**

Instrumental Parameter

Provides the maximum angular scale structure that may be recoverable with a given instrumental set-up.

Larger structures in the sky are "resolved out" and cannot be detected.

Discover observations performed with values greater than a "**Maximum Recoverable Scale**" param, so we are sure we do not miss any small structures in the sky.

*2.1.16 SPECRP*

In spectral velocity radio datacubes, resolving power (more used in optical wavelength observations) may have its analogue in the concept of "**channel width**" usually measured in units of velocity.

## Other Input Params

### 2.1.7 EXPTIME

User translates into "Searching data with **flux/brightness** constrained in a specified range"  
In **broadcasted discovery queries** different instrumental set-up/sensitivity makes it **useless**

### 2.1.9 COLLECTION

### 2.1.10 FACILITY

### 2.1.11 INSTRUMENT

### 2.1.14 TARGET

What to do wrt. **case-sensitivity** and **strict-equality** for these string-valued params ?

These params suit well for services discovery in the **Registry**

**Target** could be translated to coordinates by a name/coords look-up service like Sesame.

### 2.1.4 POL

### 2.1.13 CALIB

Define constraints on "**atomic values**"

Range syntax could be replaced by multi-valued OR queries

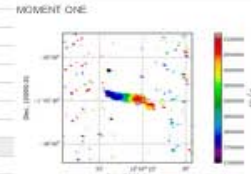
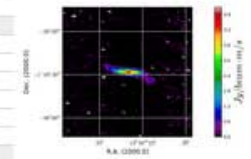
# Discover /SIAv2 Result

Name	Target									Velocity			Spectral		Collection
	RA (°)	Dec (°)	Type	Bar	Ring	Diam (")	PA (°)	Incl (°)	LogLB	Line	Central Value (km/s)	Bin (km/s)	Central Value (Hz)	Bin (Hz)	
<a href="#">NGC613</a>	23.5758	-29.4183	Sbc	1	0	17.5	118.6	46.9	10.4	12 CO 21	1490.08	20.0011			B0DEGA
<a href="#">NGC3110</a>	151.009	-6.47528	SBb	1	0	69.0	176.0	64.89		12 CO 21	4989.95	19.9998			B0DEGA
<a href="#">NGC2559</a>	124.275	-27.4558	SBbc	1	0	20.0	3.68	64.2		12 CO 21	1540.04	20.0005			B0DEGA
<a href="#">NGC3175</a>	153.676	-28.8717	Sab	1	0	14.9	55.5	76.2	10.1	12 CO 21	1040.03	20.0005			B0DEGA
<a href="#">NGC5247</a>	204.512	-17.8842	SABb	1	0	22.2	170.17	38.1	10.57	12 CO 21	1339.98	19.9997			B0DEGA
<a href="#">NGC1022</a>	39.6362	-6.6775	SBa	1	0	18.5	67.63	59.87	9.87	12 CO 21	1430.07	20.001			B0DEGA
<a href="#">NGC5792</a>	224.595	-1.09111	Sb	1	0	30.6	88.48	72.37	10.52	12 CO 21	1899.88	19.9987			B0DEGA
<a href="#">NGC4691</a>	192.057	-3.33278	S0-a	1	0	22.5	15.28	38.67	10.24	12 CO 21	1090.02	20.0004			B0DEGA
<a href="#">NGC3672</a>	171.26	-9.79528	Sc	0	0	28.4	6.5	56.16	10.66	12 CO 21	1840.12	20.0013			B0DEGA
<a href="#">NGC4030</a>	180.098	-1.1	Sbc	0	0	25.9	8.59	40.0	10.3	12 CO 21	1440.04	20.0005			B0DEGA
<a href="#">NGC4984</a>	197.239	-15.5164	S0-a	1	0	21.3	45.0	47.1	10.21	12 CO 21	1239.87	19.9979			B0DEGA
<a href="#">NGC5054</a>	199.244	-16.6347	Sbc	0	0	27.3	171.11	57.05	10.66	12 CO 21	1680.0	20.0			B0DEGA
<a href="#">NGC232</a>	10.6908	-23.5617	SBa	1	1	89.0	17.18	47.36		12 CO 21	6649.71	24.9989			B0DEGA
<a href="#">NGC134</a>	7.59083	-33.2442	SABb	1	0	19.0	49.88	77.3	10.63	12 CO 21	1540.08	20.0011			B0DEGA
<a href="#">NGC4433</a>	186.911	-8.27833	SABa	1	0	41.8	3.27	79.41	10.52	12 CO 21	2940.14	20.001			B0DEGA
<a href="#">NGC4666</a>	191.286	-0.461944	SABc	1	0	14.1	39.73	69.67	10.1	12 CO 21	1540.03	20.0004			B0DEGA
<a href="#">NGC1808</a>	76.9262	-37.5131	Sa	1	1	10.8	136.01	83.87	10.0	12 CO 21	1020.03	20.0005			B0DEGA
<a href="#">NGC5937</a>	232.692	-2.82944	SABb	1	0	41.0	175.27	57.97		12 CO 21	2779.83	19.9987			B0DEGA
<a href="#">NGC5713</a>	220.048	-0.29	SABb	1	0	30.4	11.0	48.18	10.43	12 CO 21	1839.86	19.9985			B0DEGA
<a href="#">NGC1087</a>	41.605	-0.498611	SABc	1	1	19.0	12.03	33.2	10.28	12 CO 21	1530.08	20.0011			B0DEGA
<a href="#">NGC4418</a>	186.727	-0.8775	SABa	1	0	33.0	65.36	68.19		12 CO 21	2090.1	20.001			B0DEGA
<a href="#">NGC908</a>	35.7692	-21.2339	SABc	1	0	17.8	76.83	57.8	10.51	12 CO 21	1480.04	20.0005			B0DEGA
<a href="#">NGC1084</a>	41.4996	-7.57861	Sc	0	0	17.1	35.5	46.0	10.3	12 CO 21	1390.07	20.001			B0DEGA
<a href="#">NGC5861</a>	227.317	-11.3217	SABc	1	1	28.9	149.2	69.47	10.51	12 CO 21	1839.84	19.9982			B0DEGA
<a href="#">NGC1385</a>	54.3679	-24.5014	SBc	1	0	17.5	3.5	53.0	10.1	12 CO 21	1480.1	20.0013			B0DEGA
<a href="#">E493G16</a>	117.183	-26.2464	Sbc	0	0	34.0	149.32	82.67		12 CO 21	2630.14	20.0011			B0DEGA
<a href="#">NGC986</a>	38.3929	-39.045	Sab	1	1	23.2	28.06	38.06	10.26	12 CO 21	1940.06	20.0006			B0DEGA
<a href="#">NGC1667</a>	72.1542	-6.32	SABc	1	1	61.0	20.0	39.99		12 CO 21	4479.96	19.9998			B0DEGA
<a href="#">NGC157</a>	8.69417	-8.39639	SABb	1	0	20.9	28.1	61.74	10.53	12 CO 21	1640.09	20.0011			B0DEGA
<a href="#">NGC1482</a>	58.6621	-20.5025	S0-a	0	0	19.6	107.29	63.58		12 CO 21	1840.05	20.0005			B0DEGA
<a href="#">CIG0232</a>	121.75	34.1								HI 21cm	5290.0		1395820000.0	19531.2	WHISP
<a href="#">CIG0105</a>	36.0704	33.3542								HI 21cm	553.0		1417720000.0	19531.2	WHISP
<a href="#">CIG0449</a>	162.56	73.955								HI 21cm	1262.0		1414380000.0	19531.2	WHISP
<a href="#">CIG0188</a>	109.975	61.7833								HI 21cm	1733.0		1412300000.0	9765.62	WHISP
<a href="#">CIG0235</a>	122.615	45.8972								HI 21cm	581.0		1417680000.0	19531.2	WHISP
<a href="#">CIG0724</a>	241.8	36.75								HI 21cm	9080.0		1378570000.0	78125.0	WHISP

# Discover /SIAv2 Metadata Result

SIAv2 Archive Prototype

Home	SDSSGA	WHISP	Search	About	Admin
<b>Characterization: NGC3792</b>					
Target					Condition
Target Name	NGC3792	media:sl:src			Condition Publisher
Target Description		media:sl:src			Condition PublisherID
Target Class	G	src:class			Condition PublisherOID
Target Pos	024 01 -1.03	obj	src:obj:src		Default
Target Properties					Default Title
Target Properties: OpticalAngDiameter	31.8	arcsec	phys:diameter:phys:angle:src		NGC3792
Target Properties: Velocity	3024.4	km/s	phys:veloc		Default Collection
Target Properties: Redshift			src:redshift		SDSSGA
Target Properties: Distance		Mpc	src:distance		Default Type
Target Properties: PA	88.48	deg	src:pos:Ang		code
Target Properties: Inclination	72.37	deg	src:orbital:inclination		Default SubType
Target Properties: MorphologyType	3.0		src:morph:src:morph:type		Image:Code:Code:ref:code
Target Properties: Size	1		src:morph:param		Default Call:Code
Target Properties: Ring	0		src:morph:param		Level 2
Target Properties: BTF	11.274		phys:magnitude:band		Default Length
Target Properties: MFR	10.877	[%]			225000
Target Properties: Log B	10.52	[%]			
Char: SpatialAxis					Default:Image
Char: SpatialAxis: Coverage Location Coord Position01 Value0: C1	224.80	deg	src:obj:src:media:mean		Image:Name
Char: SpatialAxis: Coverage Location Coord Position02 Value0: C2	-1.08	deg	src:obj:src:media:mean		3
Char: SpatialAxis: Coverage Bounds: Extent: Diameter	0.028	deg	src:Ang:src:ext:dir		300 300 25
Char: SpatialAxis: Coverage Bounds: Limits: L0:Lim0:Value: C1	224.58	deg	src:obj:src:sl:lim		Image:WCSAxis
Char: SpatialAxis: Coverage Bounds: Limits: L0:Lim0:Value: C2	-1.10	deg	src:obj:src:sl:lim		Image:ImageScale
Char: SpatialAxis: Coverage Bounds: Limits: H:Lim1:Value: C1	224.81	deg	src:obj:src:sl:lim		0.00000-05
Char: SpatialAxis: Coverage Bounds: Limits: H:Lim1:Value: C2	-1.08	deg	src:obj:src:sl:lim		deg:px
Char: SpatialAxis: Resolution: Ref:Val	3.47093	arcsec	src:ang:resolution		Access
Char: SpectralAxis					Access:Reference
Char: SpectralAxis: Coverage Location Coord: Spectral Value		Hz	src:sl:src:band:pos		<a href="#">FITS File</a> <a href="#">Download</a>
Char: SpectralAxis: Coverage Bounds: Extent		Hz	src:sl:src:band:width		Access:Format
Char: SpectralAxis: Coverage Bounds: Limits: L0:Lim0		Hz	src:sl:src:lim		application/fits
Char: SpectralAxis: Coverage Bounds: Limits: H:Lim1		Hz	src:sl:src:lim		8830
Char: SpectralAxis: Coverage Support: Extent		Hz	src:sl:src:band:width		Access:Sun
Char: SpectralAxis: Sampling: Sample: Extent		Hz	src:sl:src:band:width		Aladin
Char: VelocityAxis					Aladin:Appl
Char: VelocityAxis: LineName	O II 00 25		media:sl:spec:line		<a href="#">Link</a>
Char: VelocityAxis: LineRestFrequency	2.380707e+11	Hz	src:freq:spec:line		Default:Image
Char: VelocityAxis: Location	1866891.0	m/s	phys:veloc:rest		
Char: VelocityAxis: Coverage Bounds: Extent	466891.0	m/s	phys:veloc		
Char: VelocityAxis: Coverage Support: Extent: Limits: L0:Lim0	1036901.0	m/s	phys:veloc:rest		
Char: VelocityAxis: Coverage Support: Extent: Limits: H:Lim1	2136891.0	m/s	phys:veloc:rest		
Char: VelocityAxis: Coverage Support: Extent		m/s	phys:veloc		
Char: VelocityAxis: Sampling: Sample: Extent	15988.7	m/s	phys:veloc		
Char: ObservabilityAxis					
Char: ObservabilityAxis: Support: Extent		Jy/Beam	phot:flux		
Char: ObservabilityAxis: Min	-0.182559	Jy/Beam	phot:flux:sl:at:min		
Char: ObservabilityAxis: Max	0.934494	Jy/Beam	phot:flux:sl:at:max		
Char: ObservabilityAxis: Accuracy: StatErr: Ref:Val	0.017498	Jy/Beam	stat:err:phot:flux:density:err		
Char: PolarAxis					
Char: PolarAxis: StatErr		media:code:phys:polarization			
Char: TimeAxis					
Char: TimeAxis: Coverage Location Coord: Time: T0:Start:at		d	time:epoch:obs		
Instrumental: Provenance					
Provenance: ObsConf: Facility: Name	NK-SWA		media:sl:instr:sl		
Provenance: ObsConf: Instrument: Name	SWA		media:sl:instr		
Provenance: ObsConf: ObsAngScale		deg	instr:param		
Provenance: Postprocessing: Bin	3.47093	arcsec	instr:beam		
Provenance: Postprocessing: Bin	1.90251	arcsec	instr:beam		
Provenance: Postprocessing: Bp	70.7684	arcsec	instr:beam:instr:param		
Provenance: Postprocessing: Tapering			instr:param		
Provenance: Postprocessing: Convensing			instr:param		



[Display Metadata as VOTables](#)



# Discover /SIAv2 Metadata Result

Target Properties				
TargetProperties.OpticalAngDiameter	30.6	arcsec	phys.diameter;phys.angSize	
TargetProperties.Velocity	1924.4	km/s	phys.veloc	
TargetProperties.Redshift			src.redshift	
TargetProperties.Distance		Mpc	pos.distance	
TargetProperties.PA	88.48	deg	pos.posAng	
TargetProperties.Inclination	72.37	deg	src.orbital.inclination	
TargetProperties.MorphologyType	3.0		src.morph;src.morph.type	
TargetProperties.Bar	1		src.morph.param	
TargetProperties.Ring	0		src.morph.param	
TargetProperties.BTc	11.274		phys.magAbs.bol	
TargetProperties.MFIR	10.677		[?]	
TargetProperties.LogLB	10.52		[?]	

# Discover /SIAv2 Metadata Result

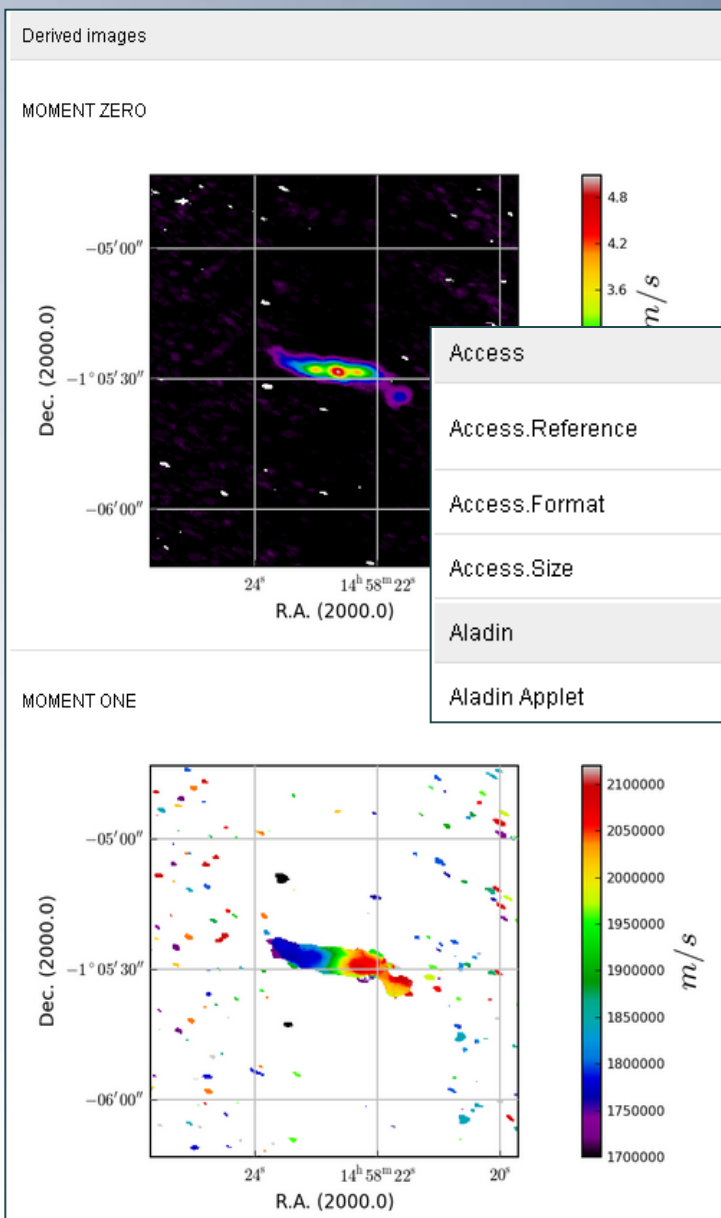
## Char.VelocityAxis

Char.VelocityAxis.LineName	12 CO 21		meta.id;spect.line
Char.VelocityAxis.LineRestfrequency	2.3053797e+11	Hz	em.freq;spect.line
Char.VelocityAxis.Location	1899880.0	m/s	phys.veloc.rotat
Char.VelocityAxis.Coverage.Bounds.Extent	499968.0	m/s	phys.veloc
Char.VelocityAxis.Coverage.Support.Extent.Limits.LoLimit	1639900.0	m/s	phys.veloc.rotat
Char.VelocityAxis.Coverage.Support.Extent.Limits.HiLimit	2139860.0	m/s	phys.veloc.rotat
Char.VelocityAxis.Coverage.Support.Extent		m/s	phys.veloc
Char.VelocityAxis.Sampling.Sample.Extent	19998.7	m/s	phys.veloc

## Instrumental Provenance

Provenance.ObsConfig.Facility.Name	MK.SMA		meta.id;instr.tel
Provenance.ObsConfig.Instrument.Name	SMA		meta.id;instr
Provenance.ObsConfig.MaxAngScale		deg	instr.param
Provenance.Postprocessing.Bmaj	3.41093	arcsec	instr.beam
Provenance.Postprocessing.Bmin	1.90051	arcsec	instr.beam
Provenance.Postprocessing.Bpa	70.7954	arcsec	instr.beam;instr.param
Provenance.Postprocessing.Tapering			instr.param
Provenance.Postprocessing.Oversampling			instr.param

# Dataset Access



Access			
Access.Reference	<a href="#">FITS File</a> - <input type="button" value="Broadcast"/>	meta.ref.url	
Access.Format	application/fits		
Access.Size	8800	kilobytes	meta.number
Aladin			
Aladin Applet	<a href="#">[Link]</a>		

WebSAMP Profile

# Propose /DataLink

## DataLink service info in Discovery and Metadata VOTables response

```
▼<RESOURCE type="meta" utype="ad hoc:service">
  <PARAM name="resourceIdentifier" datatype="char" arraysize="*" value="ivo://amiga.iaa.es/sia/datalink"/>
  <PARAM name="standardID" datatype="char" arraysize="*" value="ivo://ivoa.net/std/DataLink#links-1.0"/>
  <PARAM name="accessURL" datatype="char" arraysize="*" value="http://http://amiga.iaa.es:9000/datalink"/>
  ▼<GROUP name="inputParams">
    <PARAM name="RESPONSEFORMAT" datatype="char" arraysize="*" value=""/>
    ▼<VALUES>
      <OPTION value=""/>
      <OPTION value="votable"/>
      <OPTION value="application/x-votable+xml"/>
    </VALUES>
    <PARAM name="ID" datatype="char" arraysize="*" value="" ref="primaryID"/>
  </GROUP>
</RESOURCE>
```

## What is this DataLink service proposing as additional related links?

- The service must be invoked to answer this question
- It could be useful to add a mechanism (e.g. <GROUP name="outputParams">)
- Provide a **description** of the DataLink service as number and nature of the links given
- This may be done only if the **pack of links** is the same for all the IDs in the archive
- The same mechanism could be applied for the **description of ad-hoc services**
- DALI already offers the MAXREC=0 mechanism to provide empty VOTables responses

# Propose /DataLink

## Pack of Links proposed by DataLink Service

1. **Characterization metadata in VOTable format**
  - <http://amiga.iaa.es:9000/search/sia/metadata?ID=ivo://svo.amiga.iaa.es/#siav2:28>
  - <http://www.ivoa.net/rdf/datalink#model>
2. **Datacube in FITS format**
  1. <http://amiga.iaa.es:9000/media/data/B0DEGA/FITS/3Dngc1667.fits>
  2. <http://www.ivoa.net/rdf/datalink#preview>
3. **Pixel cutout based on specified user params / FITS or PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#cutout>
4. **Position velocity plane based on specified user params / FITS or PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#cutout>
5. **Moment zero based on specified user params / FITS or PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#moments<>
6. **Moment one based on specified user params / FITS or PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#moments>
7. **Velocity profile for a spatial aperture based on specified user params / PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#sciencedata>
8. **Azimuthally averaged radial profile of zero moment provided in PNG format**
  1. <http://amiga.iaa.es:9000/accessdata>
  2. <http://www.ivoa.net/rdf/datalink#sciencedata>



Ad-hoc  
Services

# Extract /Pixel Space Operations

## Ad-hoc services info in DataLink VOTable response

```

▼<RESOURCE type="meta" utype="adhoc:service" ID="momentzero">
  <PARAM name="accessURL" datatype="char" arraysize="*" value="http://http://amiga.iaa.es:9000/accessdata"/>
  ▼<GROUP name="inputParams">
    <PARAM name="operation" datatype="char" arraysize="*" value="moment"/>
    <PARAM name="ra_min" datatype="double" units="pix" value=""/>
    <PARAM name="ra_max" datatype="double" units="pix" value=""/>
    <PARAM name="dec_min" datatype="double" units="pix" value=""/>
    <PARAM name="dec_max" datatype="double" units="pix" value=""/>
    <PARAM name="chan_min" datatype="double" units="pix" value=""/>
    <PARAM name="chan_max" datatype="double" units="pix" value=""/>
    <PARAM name="flux_min" datatype="double" units="" value=""/>
    <PARAM name="flux_max" datatype="double" units="" value=""/>
    <PARAM name="ID" datatype="char" arraysize="*" value="" ref="primaryID"/>
    <PARAM name="order" datatype="char" arraysize="*" value="zero"/>
  ▼<PARAM name="format" datatype="char" arraysize="*" value="">
    ▼<VALUES>
      <OPTION VALUE="image/fits"/>
      <OPTION VALUE="image/png"/>
    </VALUES>
  </PARAM>
</GROUP>
</RESOURCE>

```

Which input params are mandatory ?

- <PARAM use="required"> mechanism

Are these single-valued or multi-valued params?

How to declare default values?

Which is the nature of the response?

- VOTable
- Image product

# Extract / Pixel Cutout

**Pixel Cutout**

ID

Operation

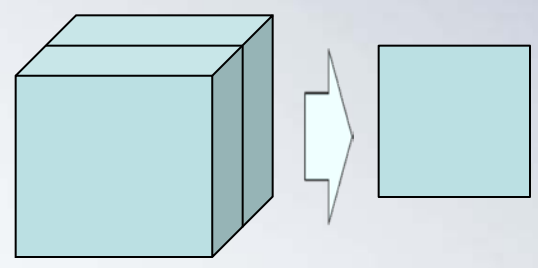
RA (pix)

DEC (pix)

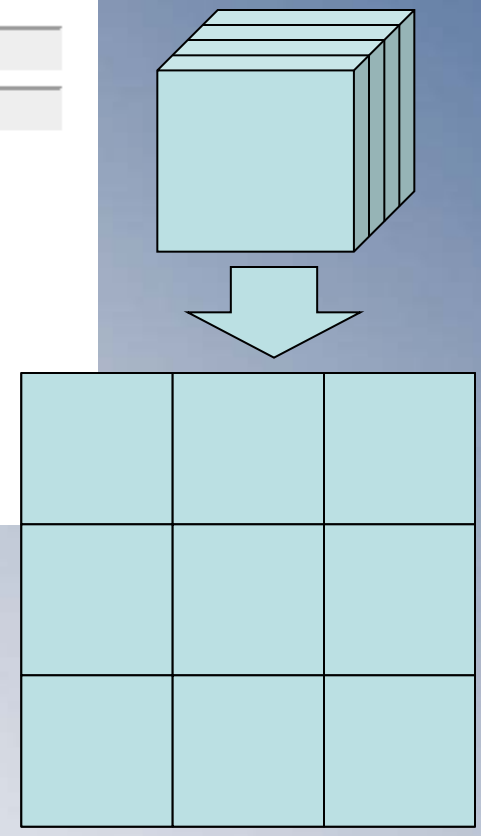
Channels (pix)

Chan. step (pix)

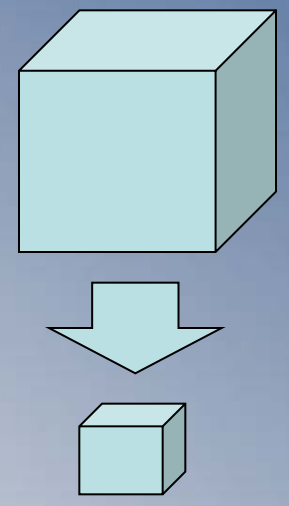
Format



SingleChannel Slicing



MultiChannel Slicing



Subcube Extraction

# Extract /Position velocity Plane

**Position Velocity Plane**

ID:

Operation:

RA (pix):

DEC (pix):

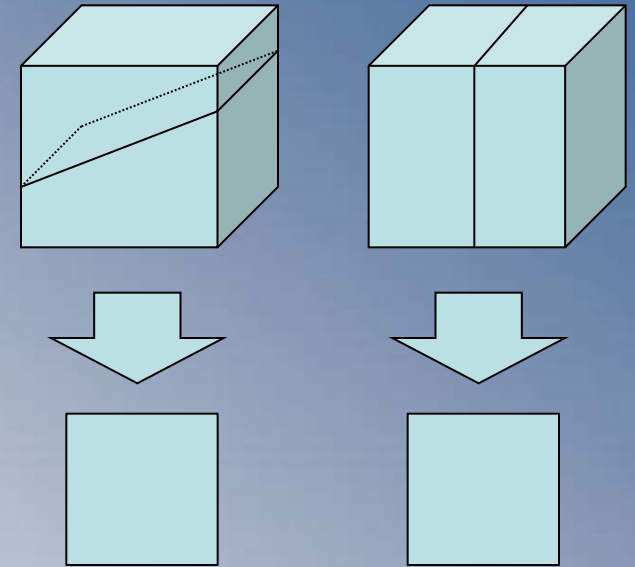
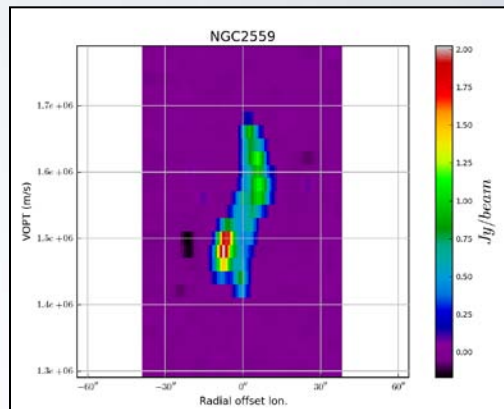
Channels (pix):

PA (deg):  *North Eastwards*

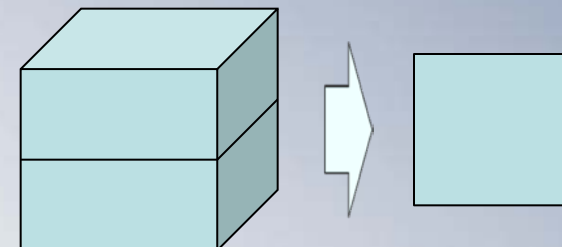
Length (pix):

Format:

Form is pre-filled with galaxy PA value



Cutting along arbitrary angles in velocity axis





# Extract / Moments

**Moments**

Order:

ID:

Operation:

RA (pix):

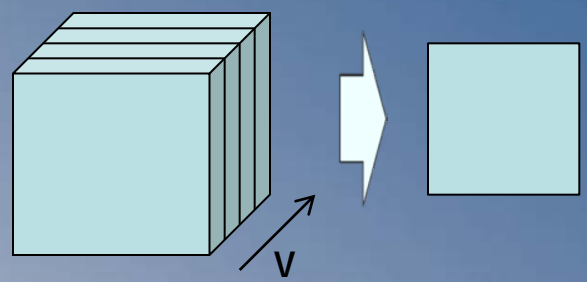
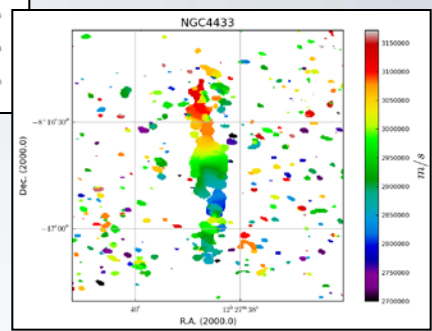
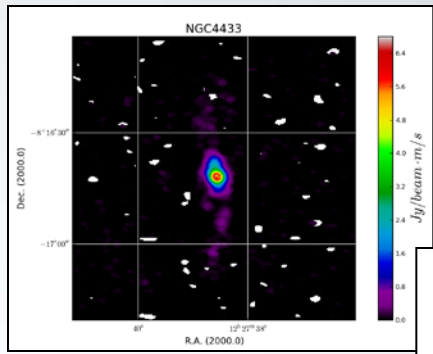
DEC (pix):

Channels (pix):

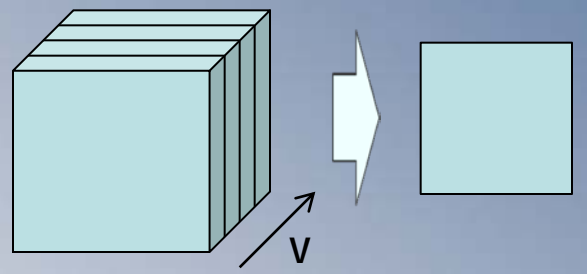
Flux:

Format:

Form is pre-filled with flux values



Integrated Emission



Velocity Weighted Integrated Emission

# Extract /Spectral Profile

**Spectral Profile**

ID

Operation

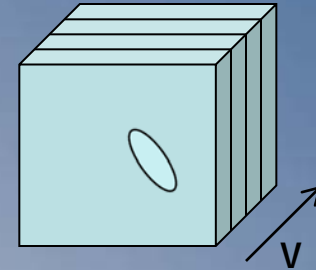
RA (pix)

DEC (pix)

Height (pix)

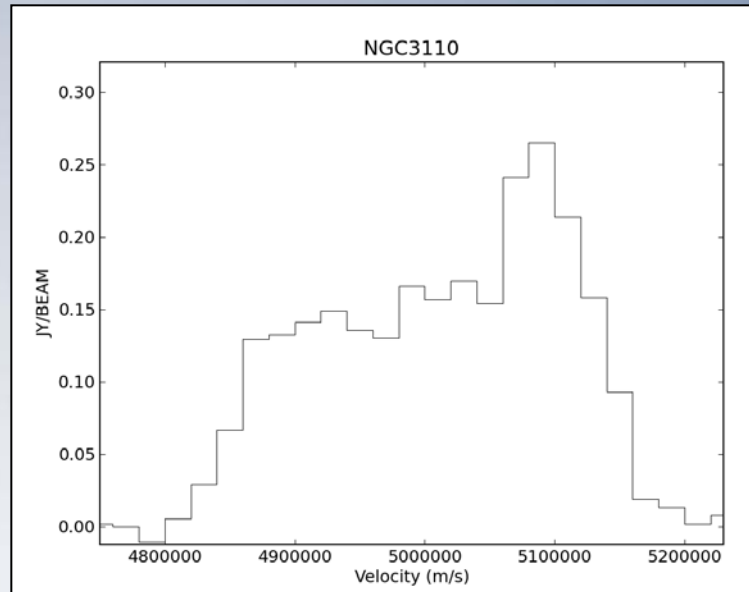
Width (pix)

PA (deg)



Integrated Spectral Profile

Form is pre-filled with galaxy PA value



# Extract /Radial Profile

## Radial Profile on Moment Zero

ID

Operation

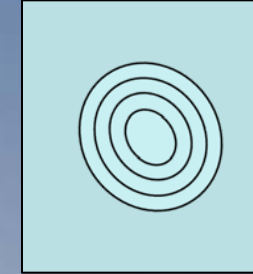
RA (pix)

Dec (pix)

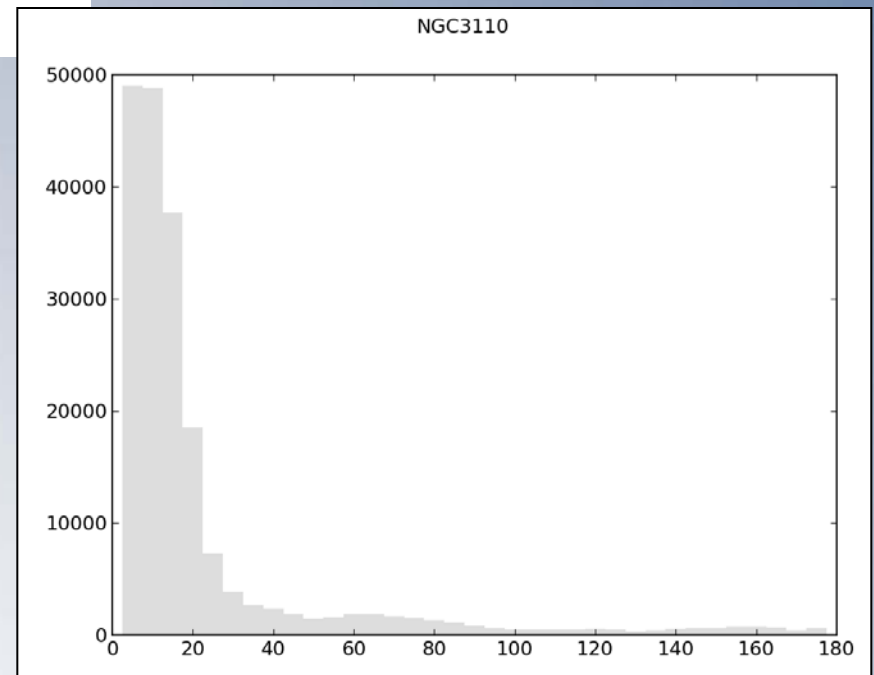
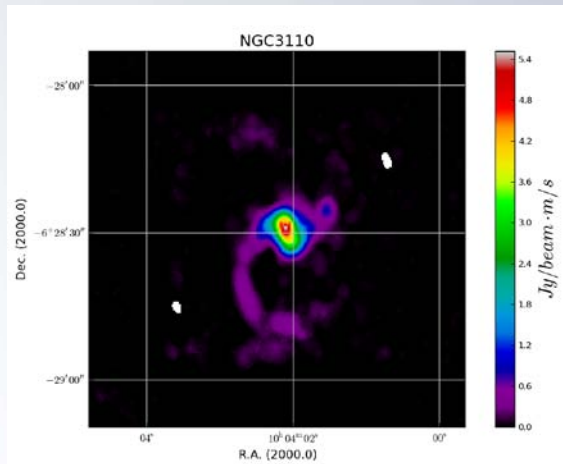
Radius (pix)

Axis ratio (b/a)

Binsize (pix)



Integration of flux along rings  
on Moment Zero image



# AccessData Draft

- Well suited for operations and extraction operations on **Images**
- COORD and SELECT params (Theoretical Simulations Data) slightly out of scope
- The name AccessData may be confusing -> AccessImage
- Keep it simple - **over sizing** standards may be counter-productive
  
- **Single param/axis and compatibility with SIA discovery params**
  - AccessImage
  - Complex Transformations on Images /Cubes
- **Atomic 3-factor semantics in input params**
  - Generic Dataset Access in Multidimensional Space
  - Filtering Operations in Pixel Space performed on single datasets
  
- Well suited for **broadcasted** queries producing **virtual images of the sky** on-the-fly
- Specific operations on **single datasets** may be provided as ad-hoc services
  
- **VO Registry**
  - Complex services like AccessImage mean complex discovery of services
  - Users would like to discover very services for specific purposes