

バーチャル天文台を利用した 天文学研究の成果と 今後の期待

～ JVO use cases ～

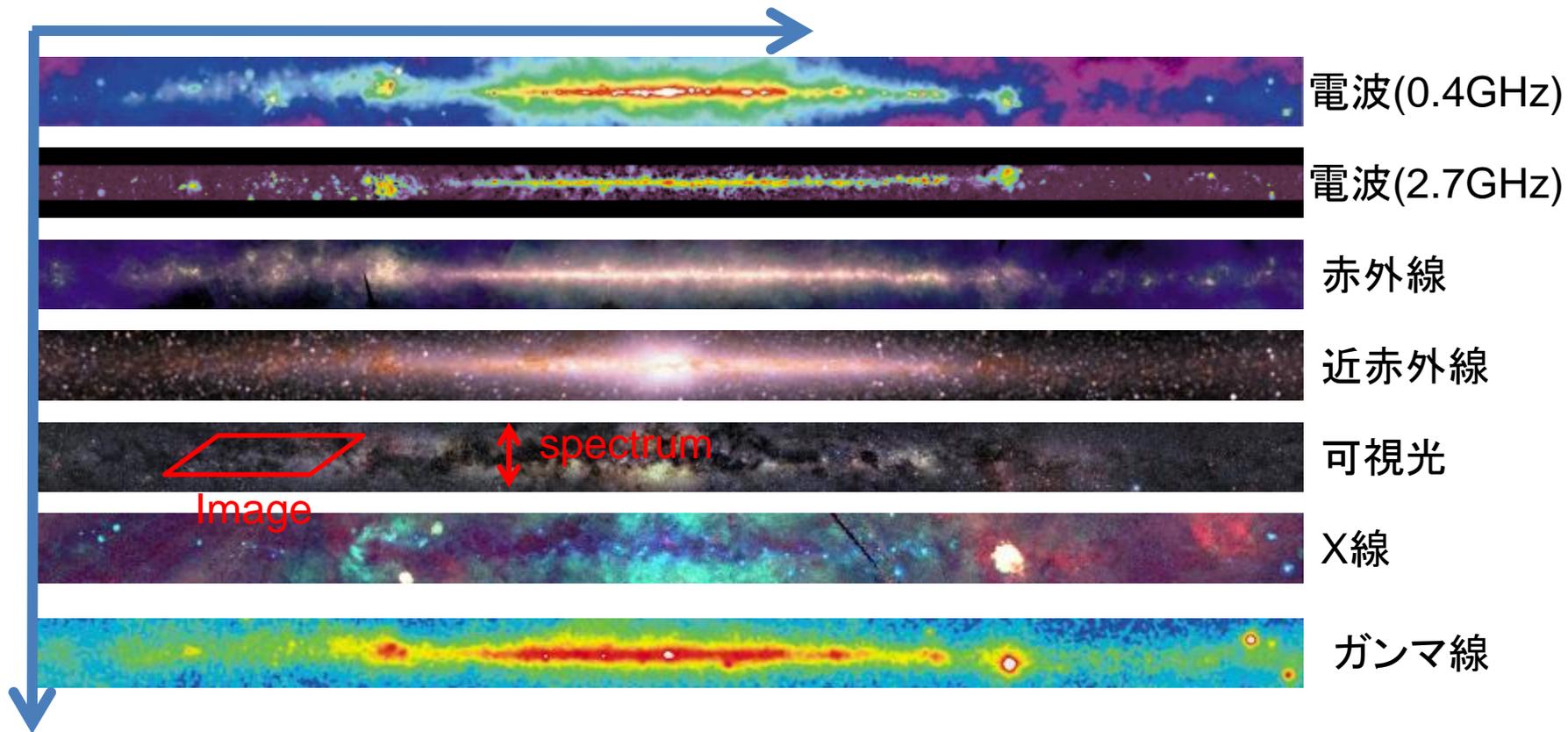
白崎、小宮、大石、水本
(国立天文台)

Data science workshop
2009/08/19 札幌

天文 data

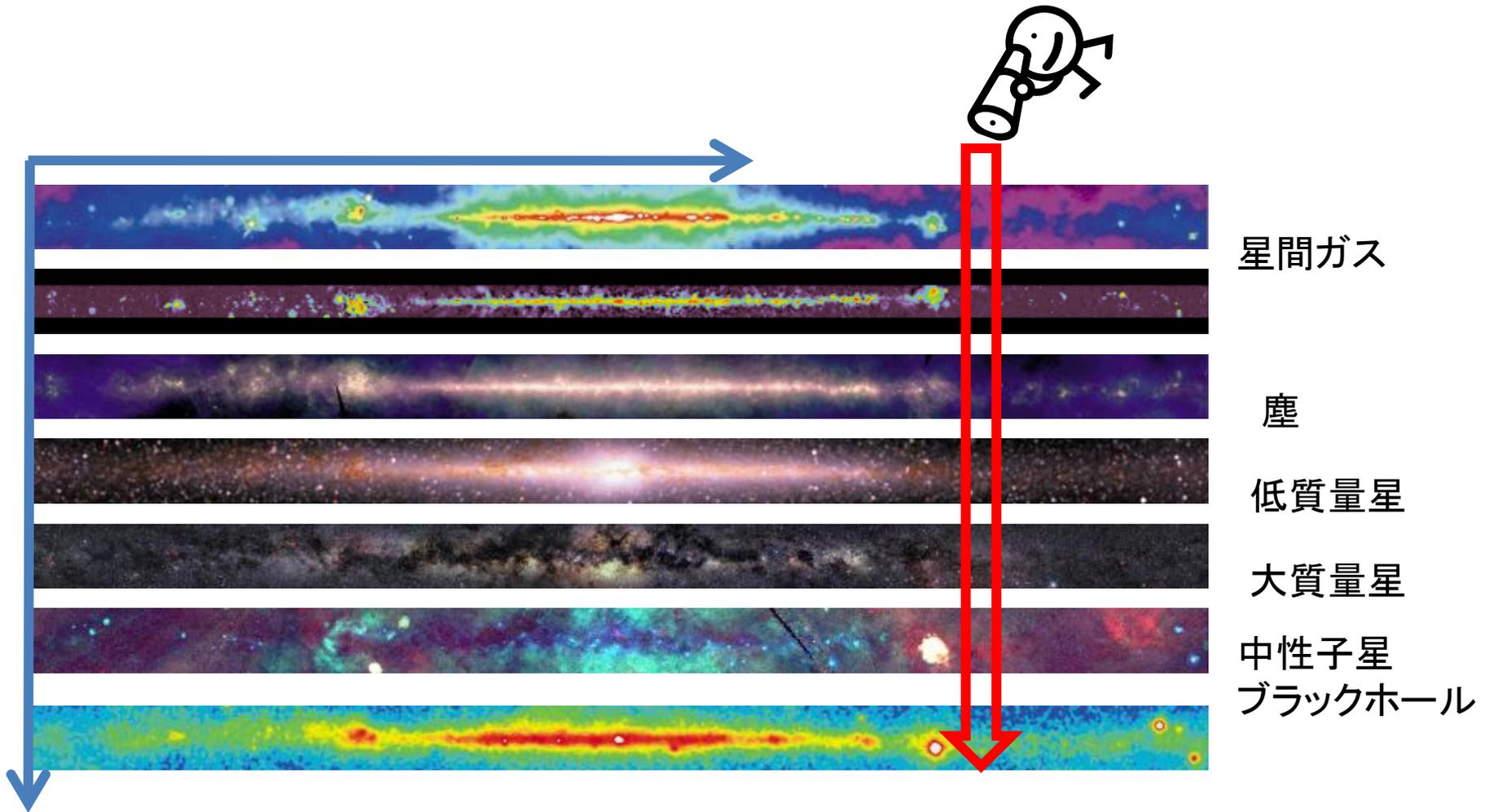
位置(赤径・赤緯)

周波数



日時、観測装置

Use case



JVO

JAPANESE VIRTUAL OBSERVATORY

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Yutaka Komiya

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Parallel search on multiple services [Help\(J\)](#)

Coordinates or Object Name

J2000 (FK5)

Samples:

天体名
⇒座標
その座標の
周囲0degの
データを検索



If you have any questions or requests on JVO, please contact us at:

help_desk@jvo.nao.ac.jp



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Yutaka Komiya

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Search Status

Restart Polling

Force Status Update

completed !

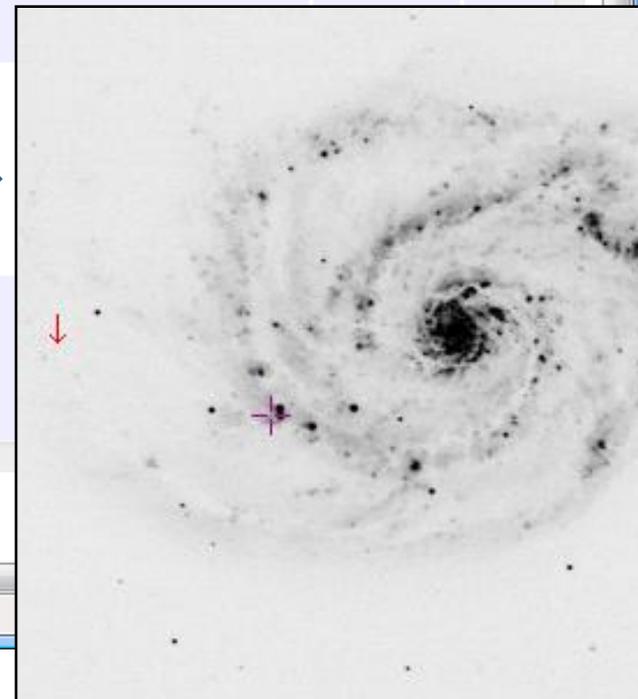
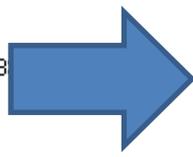
Status	Elapsed Time	Progress
success	762.805 sec	searching=18 finished=3684 waiting=0

Service Name	Data Type	Table Name	# of result	result
Einstein Catalog HRI ESTEC Sources	catalog		1	Result
ROSAT All-Sky Bright Source Catalogue (1RXS) (Voges+ 1999) - 1RXS Correlation to ROSATP3, ROSATWGA, ROSATHRI	catalog		4	Result
The XMM-Newton 2nd Serendipitous Source Catalogue (2XMM) (XMM-SSC, 2007) - The 2XMM catalog, "slim" version -- see also the #W[xcatDB][http://amwdb.u-strasbg.fr/2xmm/][2XMM Public SSC Interface at Strasbourg]	catalog		5	Result
The USNO-B1.0 Catalog (Monet+ 2003) - The Whole-Sky USNO-B1.0 Catalog of 1,045,913,669 sources	catalog		7	Result
Galaxy Evolution Explorer	image		5	Result
Hubble Space Telescope Press Release Image Archive	image		2	Result
Sloan Digital Sky Survey DR5 - Images	image		15	Result
USNO-SA2.0	catalog		2	Result
Master X-Ray Catalog	catalog		65	Result

Save/Download Filter Metadata Graphic Add Column Appearance

Total 15 records page: 1 go << < > >>

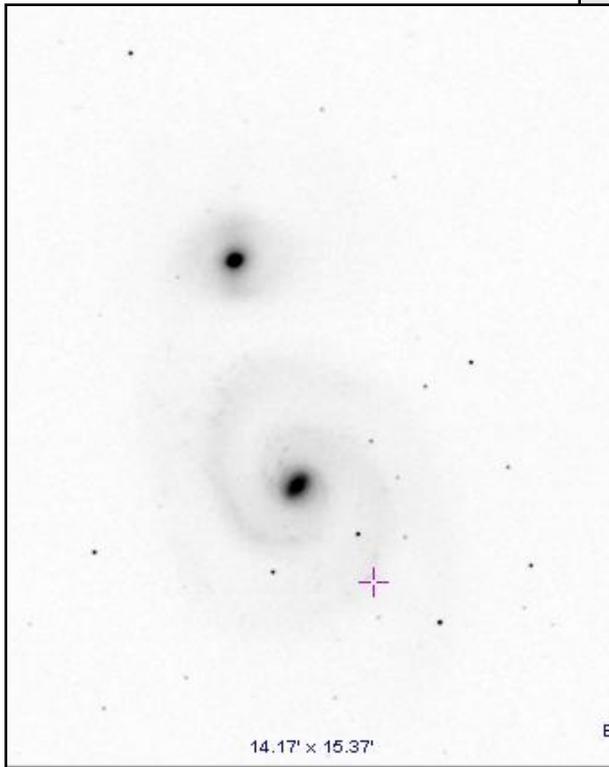
Alias Name			C0	C1	C2	C3	C4	C5	C6	C7	C9
group ID	check	download	TITLE <small>sort</small>	WIDTH <small>sort</small>	HEIGHT <small>sort</small>	SIZE <small>sort</small>	RA <small>sort</small>	DEC <small>sort</small>	SCALE <small>sort</small>	FORMAT <small>sort</small>	EQUINC <small>sort</small>
0	<input type="checkbox"/>	Download	Sloan Digital Sky Survey - Filter u	2048	1489	3049472	202.471041839196	47.3352948181777	{0.000110035211267606}	image/fits	J2000
1	<input type="checkbox"/>	Download	Sloan Digital Sky Survey - Filter g	2048	1489	3049472	202.470053619886	47.3			
2	<input type="checkbox"/>	Download	Sloan Digital Sky Survey - Filter r	2048	1489	3049472	202.472125395373	47.3353838935941			



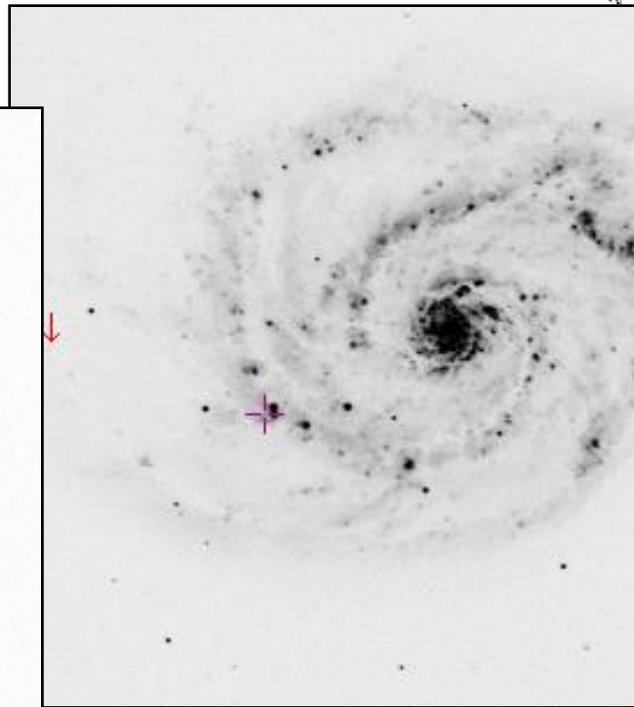
Message

完了

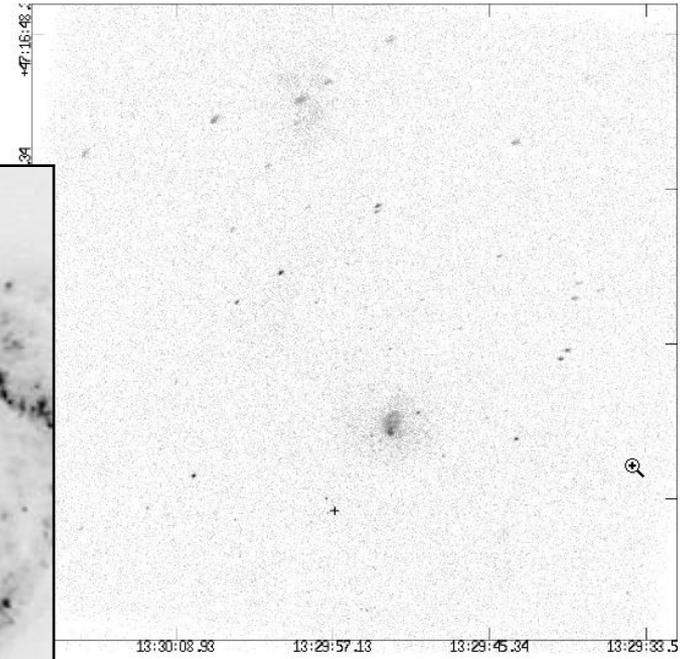
赤外(IRAS)



可視光(SDSS)

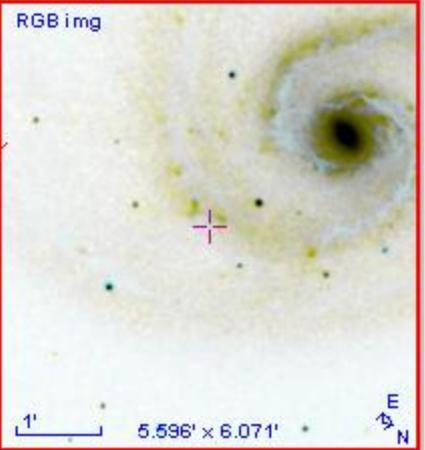
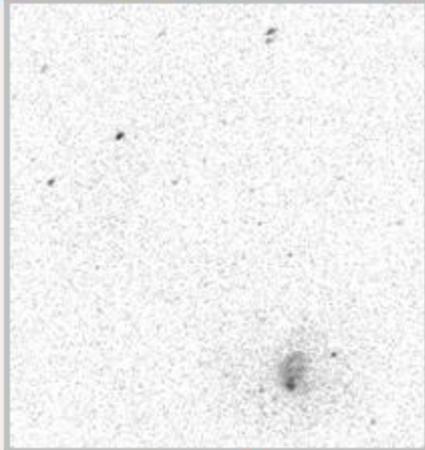
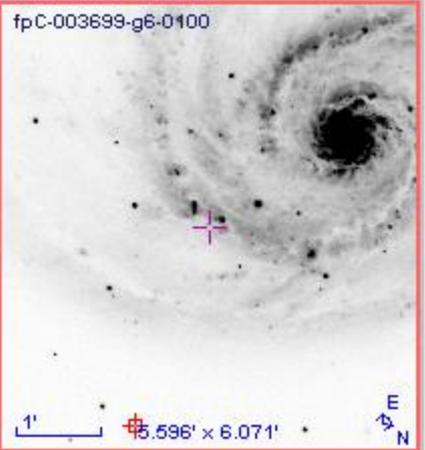
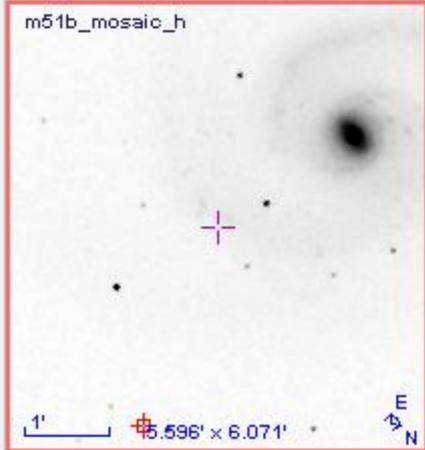


X線(Chandra)



Location **No astrometrical reduction** ICRS

Pixel **1180** full



select pixel
pan prop
zoom del
dist
draw
tag
text
filter
cross
rgb
assoc
cont
mgls

Filter0
 RGB img
 Drawing 1
 1.png
 product~1
 product[5]
 product[4]
 product[3]
 product[2]
 product[1]
 m51b_mosaic_h
 i378b2h0
 fpC-003699-g6-0

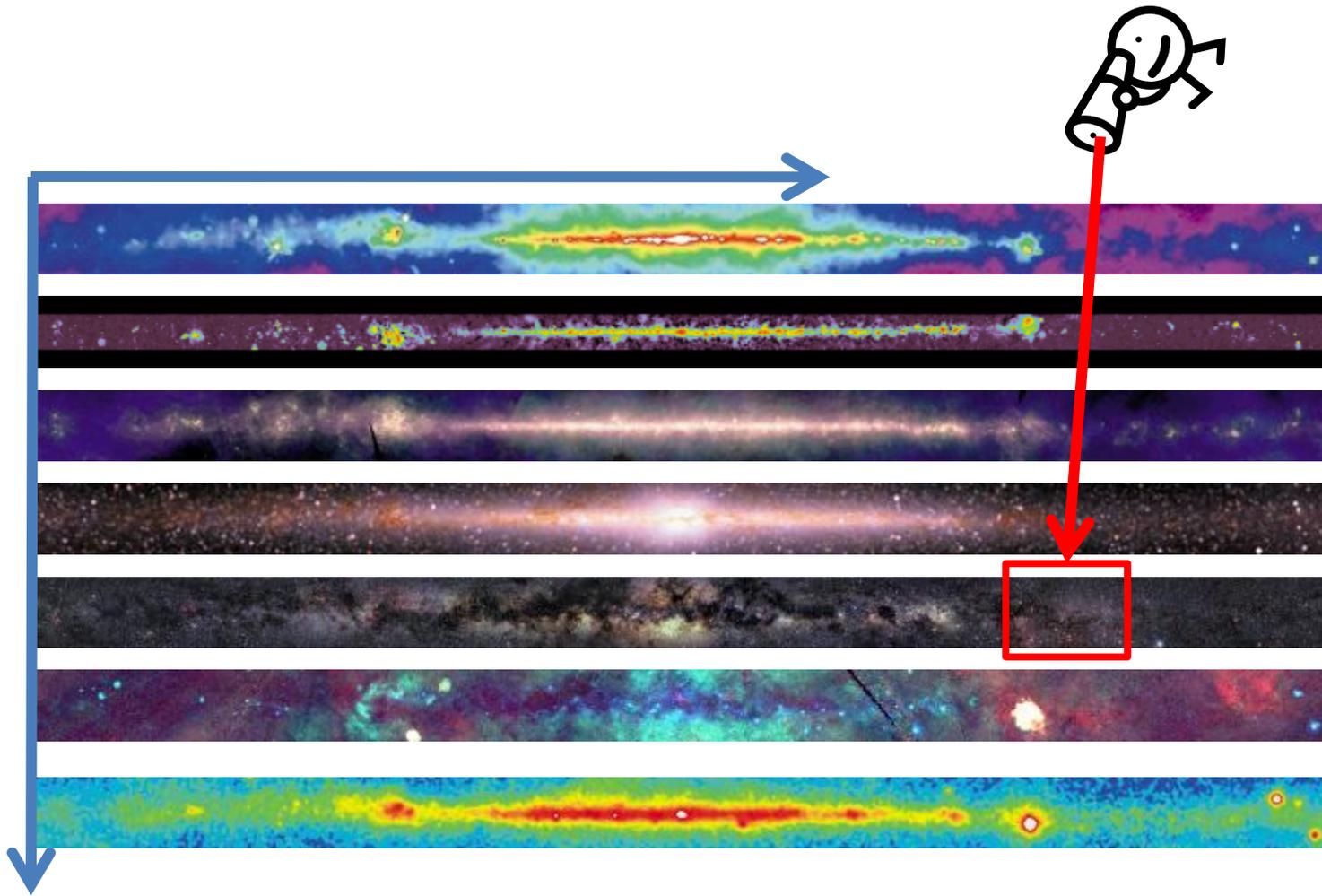
Zoom 1/4x

13.52' x 9.825'

grid multiview match

Search

Use case



球状星团
 ω Cen





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Yutaka Komiya

News

- Suprime-Cam mosaic image updated. (ver.0.2.6, 2009-06-24)
- IVOA Newsletter Vol.2 (2009-05-27)
- SDS Survey Quick Viewer is available. (2009-03-05)
- IRSF Survey Quick Viewer is available. (2009-03-05)
- SED plot functionality was updated. (2009-02-22)
- Multi-region search is available. (2009-02-22)

Registration

- Read "about registration".

Your account information

Service Contents [Help\(J\)](#)

Data Search

- [Quick Search](#)
- [Search on a single VO Service](#)
- [Parallel search on multiple VO Services](#)
- [Xmatch Search](#)
- [JVOQL Search](#)

Subaru

- [Suprime-Cam](#)
- [HDS](#)

Surveys

- [Subaru Deep Survey](#)
- [IRSF Survey](#)

Service Search

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- [Category Search](#)
- [Advanced Search](#)

Astronomical Tools

- [Source Extractor](#)
- [HyperZ](#)

Workflow

- [Workflow Editor \(Script\)](#)
- [Workflow Editor](#)
- [Workflow Monitor](#)

Admin

Data

Execute Query

1. Service

Service is no
Search servi

Select fro

Keyword S

Category S

Specify

× 検索: omeg

完了

VO Service Search Result

		Info					
87	<input type="radio"/>	More Info	Photometric evolution of star clusters models (Kruijssen+, 2008) - *Fitting values for a, b and c for the luminous fractional cluster mass decrease due to stellar evolution.	VizieR	URL	URL	
88	<input type="radio"/>	More Info	Photometric evolution of star clusters models (Kruijssen+, 2008) - Summary of models	VizieR	URL	URL	
89	<input type="radio"/>	More Info	JHKs surface brightness of Galactic globular . (Cohent+, 2007) - Parameters of the King profile fits for Galactic globular clusters	VizieR	URL	URL	
90	<input type="radio"/>	More Info	X-ray sources toward NGC 2808 (Servillat+, 2008) - Detected Chandra sources in the direction of NGC 2808	VizieR	URL	URL	
91	<input type="radio"/>	More Info	Absolute magnitude of Globular Cluster (Di Criscienzo+, 2006) - Globular Clusters in the Milky Way	VizieR	URL	URL	
92	<input type="radio"/>	More Info	Identification and coordinates in NGC 5272 (Evstigneeva+ 1994) - Coordinates of variables in M3 (Tables 1-6 of the paper)	VizieR	URL	URL	
93	<input type="radio"/>	More Info	Velocities and CMT photometry in globular M92 (Drukier+, 2007) - Data for cluster members	VizieR	URL	URL	
94	<input type="radio"/>	More Info	Velocities and CMT photometry in globular M92 (Drukier+, 2007) - Data for non-members	VizieR	URL	URL	
95	<input type="radio"/>	More Info	Velocities and CMT photometry in globular M92 (Drukier+, 2007) - Observing Log for M92	VizieR	URL	URL	
96	<input checked="" type="radio"/>	More Info	UBV(RI)cHalpha photometry in omega Cen (Bellini+, 2009) - Astrometric and photometric parameters for 359391 objects (table6 of the paper)	VizieR	URL	URL	
97	<input type="radio"/>	More Info	UBV(RI)cHalpha photometry in omega Cen (Bellini+, 2009) - Membership probability for the Kaluzny et al. (2004, Cat. <J/A+A/424/1101>) variable star catalog	VizieR	URL	URL	
98	<input type="radio"/>	More Info	2dF study of globular clusters in NGC 5128 (Beasley+, 2008) - Spectroscopic results of the study of globular clusters in NGC 5128 (tables 2, 3 and 4 of paper)	VizieR	URL	URL	
99	<input type="radio"/>	More Info	2dF study of globular clusters in NGC 5128 (Beasley+, 2008) - Lick indices and	VizieR	URL	URL	

× 検索: omega

↓ 次を検索(N) ↑ 前を検索(P) 🔍 すべて強調表示(A) 大文字/小文字を区別(C)

完了



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Data search on a single service [Help\(J\)](#)

UBV(RI)cHalpha photometry in omega Cen (Bellini+, 2009) – Astrometric and photometric parameters for 359391 objects (table6 of the paper)

Execute Query

Check SQL

1. Service | 2. Table | 3. Region | 4. Criteria

 Method to specify center coordinates: Single Multiple VOTable Local File

Object Name

Convert to Coordinate

Center Coord

 Samples:

Search Radius

 Max # of
concurrent queries

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Save/Download Filter Metadata Graphic

Total 50000 records page: 1

nload	_R	_RAJ2000	_DEJ2000
	sort	sort	sort
0.283447	201.80208	-47.75025	
0.277746	201.76372	-47.75027	
0.282936	201.79937	-47.75025	
0.275307	201.64188	-47.75016	
0.278472	201.61164	-47.75013	
0.278793	201.60922	-47.75012	
0.300158	201.50628	-47.74993	
0.274026	201.72153	-47.75013	
0.273759	201.71494	-47.75016	
0.276388	201.62903	-47.75006	
nload	_R	_RAJ2000	_DEJ2000
0.339351	201.99001	-47.74996	
0.321434	201.94261	-47.74999	
0.282011	201.79481	-47.75009	

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=> Location: Top Page > VOTable Viewer

Save/Download Filter Metadata Graphic Add Column Appearance

Columns specify column names which you want to displace. ex. col1, col2, col3 ...

Condition specify selection condition of the records.

Region RA: Dec: Radius: deg specify selection region of the records.

Order specify the names of columns used to order the records.

ALL DISTINCT

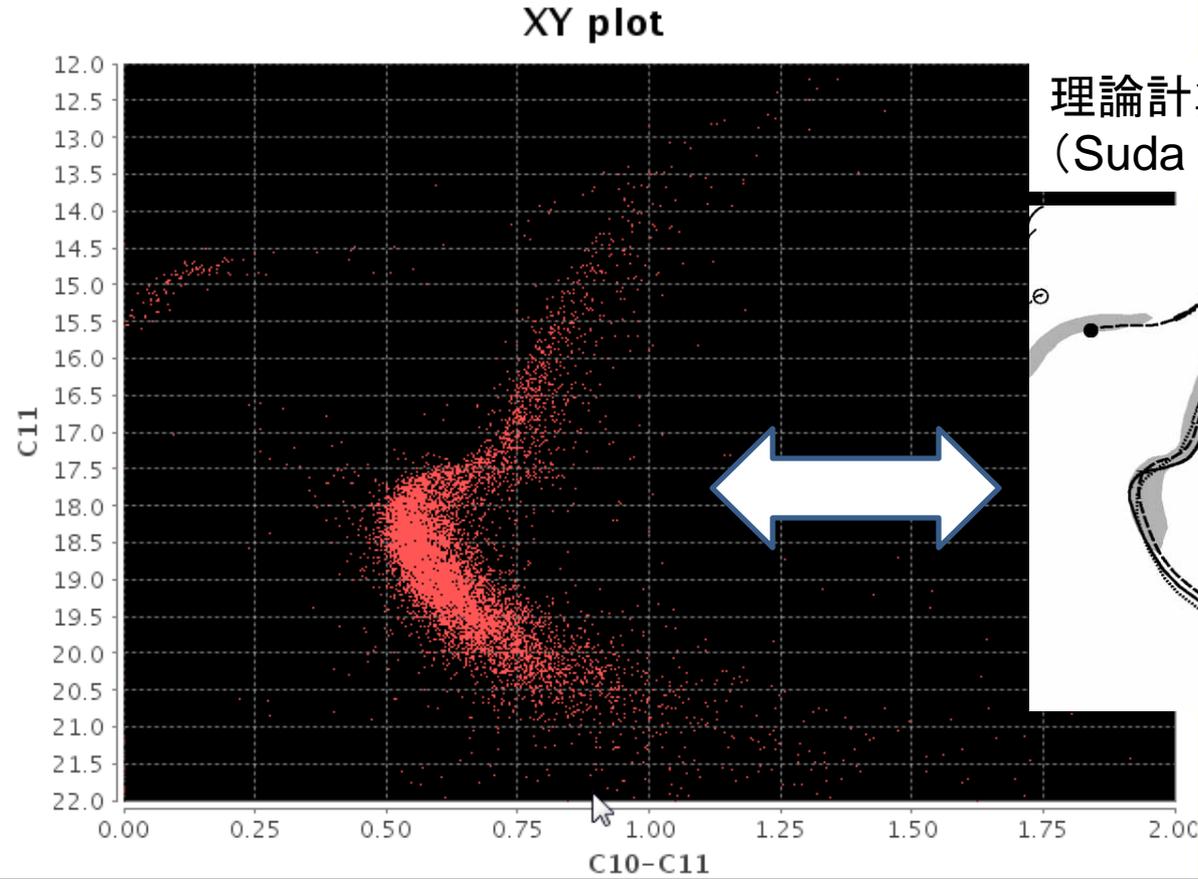
table update completed

0.278793	201.60922	-47.75012	6	201.609219	-47.750121	-1.55	1.6	20.856	20.202	19.66	19.263	57			
0.300158	201.50628	-47.74993	7	201.506294	-47.749911	6.71	21.84	19.905	19.095	18.552	18.136	0			
0.274026	201.72153	-47.75013	8	201.721527	-47.750125	1.23	7.76	20.844	20.116	19.692	19.347	62			
0.273759	201.71494	-47.75016	9	201.714951	-47.750153	5.27	2.33	20.354	19.696	19.261	18.909	70			
0.276388	201.62903	-47.75006	10	201.629034	-47.750053	4.24	7.46	19.275	18.694	18.31	17.953	0			
nload	_R	_RAJ2000	_DEJ2000	SEQ	RAJ2000	DEJ2000	PMRA	PMDE	UMAG	BMAG	VMAG	RCMAG	ICMAG	HA	MM
0.339351	201.99001	-47.74996	11	201.990031	-47.749954	11.91	2.8	21.197	20.246			19.408		62	
0.321434	201.94261	-47.74999	12	201.942606	-47.749989	-2.58	5	19.089	18.485	18.107	17.767			52	
0.282011	201.79481	-47.75009	13	201.79482	-47.750087	5.19	8.32	19.258	18.725	18.331	17.979			35	

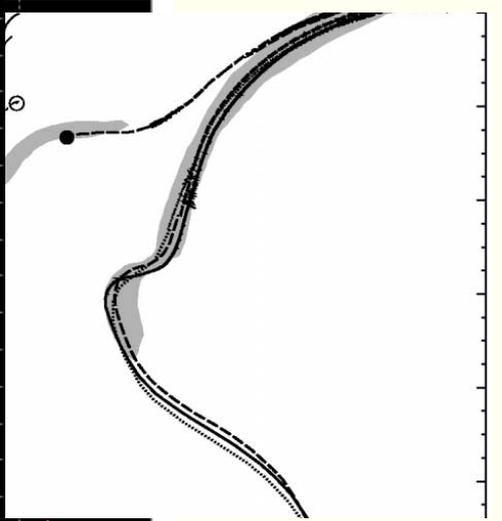
色等級図

Plot XY expr. Axis Filter Histogram Setting Misc

- XY Plot mode:
- Marker
 - Line
 - Line & Marker
 - Dot
- Histogram:
- Histogram
 -



理論計算
(Suda et al. 2007)



JVO VOTable Viewer - Mozilla Firefox

ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://jvo.nao.ac.jp/portal/viewer.do

よく見るページ Firefox を使いこなそう 最新ニュース

Single Service Search JVO VOTable Viewer

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JVOSpace

Save/Download Filter Metadata

Save Result Download Save As

Alias Name	co
group ID	check download
0	0.283447
1	0.277746
2	0.282936
3	0.275307
4	0.278472
5	0.278793
6	0.300158
7	0.274026
8	0.273759
9	0.276388
group ID	check download
10	0.339351
11	0.321434

検索: omega

完了

JVO Space Viewer - Mozilla Firefox

ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://jvo.nao.ac.jp/portal/jvospace.do

よく見るページ Firefox を使いこなそう 最新ニュース

JVO Space Viewer

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JVOSpace Viewer

Partitions: /tmp | /work | /user

Current Directory: /user/

Operations Contents

Filter: Update

memorize Do It

Select all Unselect all

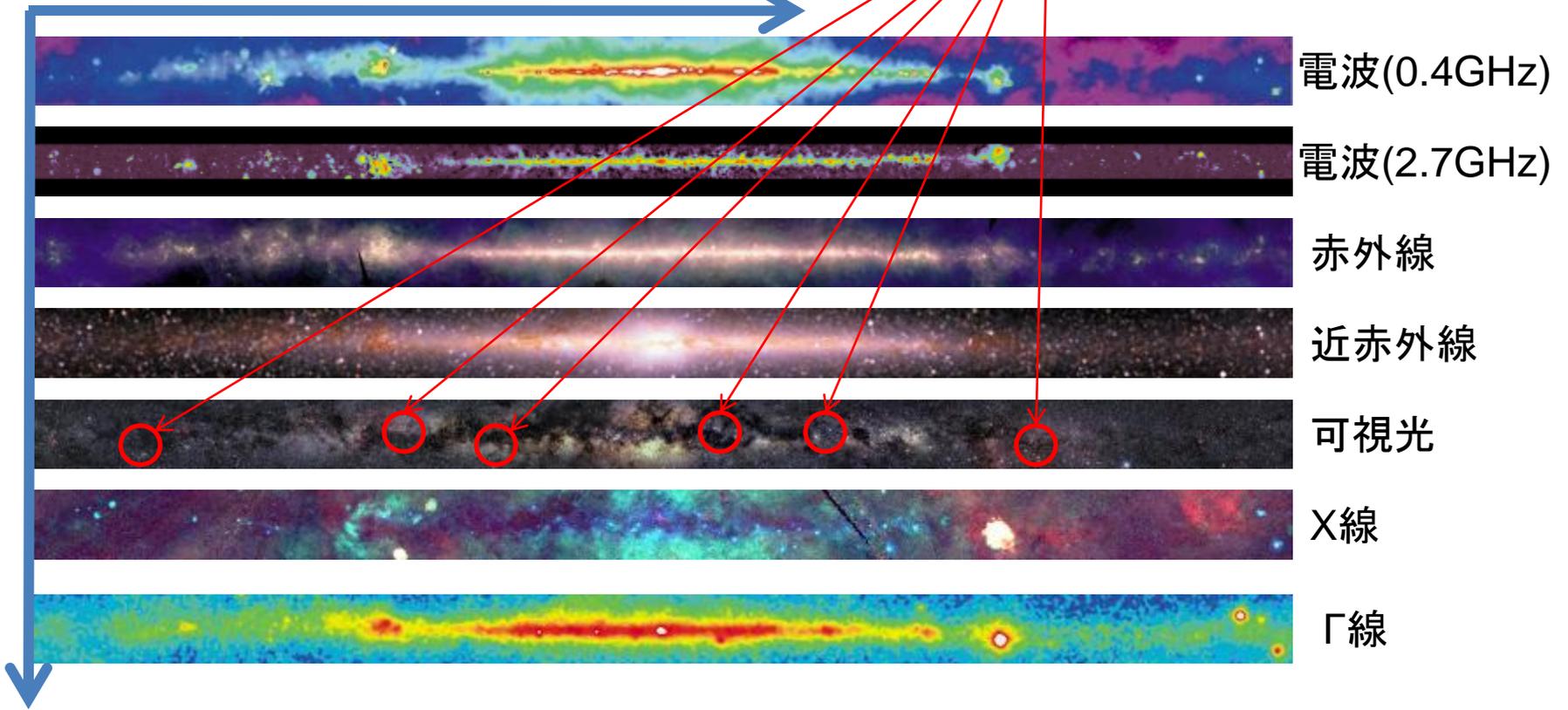
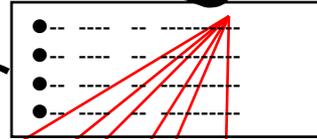
[parentdir]

<input type="checkbox"/> - komiya/	4096	2008-07-24T15:12:28 JST
<input type="checkbox"/> - omegaCen/	4096	2008-07-24T15:38:22 JST
<input type="checkbox"/> - sagaEMP.xml	71795	2008-07-27T13:47:27 JST
<input type="checkbox"/> - sagaEMPvo.dat	47367	2008-07-27T13:46:34 JST
<input type="checkbox"/> - sagaall.dat	155871	2008-07-27T13:41:17 JST
<input type="checkbox"/> - testHDF.xml	751480	2008-06-11T10:55:14 JST
<input type="checkbox"/> - user	10081	2008-07-27T13:21:37 JST

Use Case



リスト



電波(0.4GHz)

電波(2.7GHz)

赤外線

近赤外線

可視光

X線

ー線

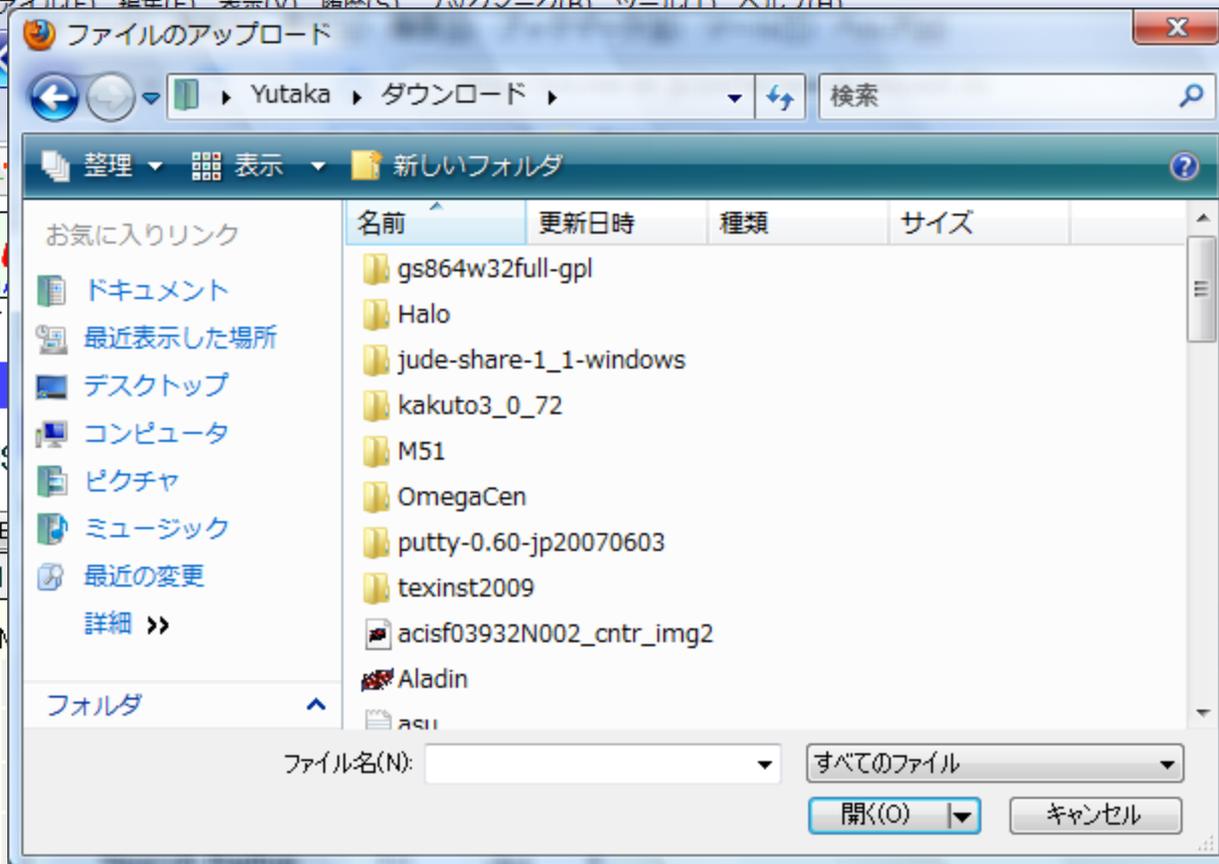


Data search on a single service [Help\(J\)](#)

USNO-A2.0

 1. Service 2. Table 3. Region 4. CriteriaSelected service is: **USNO-A2.0**The service identifier is: **ivo://nvo.nao.edu/usno-a2.0**

Search service



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Save/Download Filter Metadata Graphics **Add Column** Appearance

Total 1134 records page: 1 go << < > >>

Alias Name			C0	C1	C2	C3	C4	C5	C6	C7	C8
group ID	check	download	T.NAME <small>sort</small>	T.RA2000 <small>sort</small>	T.DE2000 <small>sort</small>	T.V <small>sort</small>	T.FE_H <small>sort</small>	T.B_V <small>sort</small>	T.T_EFF <small>sort</small>	T.LOG_G <small>sort</small>	T.URL <small>sort</small>
0	<input type="checkbox"/>		HD122563	14 02 31.8460	+09 41 09.944	6.18	-2.59	0.85	4650	1.24	Link
1	<input type="checkbox"/>		BD+03 740	05 01 16.6219	+04 06 37.021	9.8	-2.65	0.36	6266	4.04	Link
2	<input type="checkbox"/>		CS29497-034	00 41 39.819	-26 18 54.48	12.221	-2.9	1.1	4800	1.8	Link
3	<input type="checkbox"/>		HD88609	10 14 28.9837	+53 33 39.351	8.64	-3.07	0.93	4550	1.1	Link
4	<input type="checkbox"/>		LP625-44	16 43 14.038	-01 55 30.50	11.85	-2.7	0.69	5500	2.5	Link
5	<input type="checkbox"/>		CS31082-001	01 29 31.20	-16 00 48.0	11.674	-2.9	0.772	4825	1.5	Link
6	<input type="checkbox"/>		CD-24 17504	23 07 20.25	-23 52 35.9	12.124	-3.21	0.39	6338	4.32	Link
7	<input type="checkbox"/>		BD-18 5550	19 58 49.7374	-18 12 11.144	9.35	-3.03	0.599	4600	0.95	Link
8	<input type="checkbox"/>		BS16929-005	13 03 29.40	+33 51 06.0	13.61	-3.17	0.62	5250	2.8	Link
9	<input type="checkbox"/>		CS22886-042	22 20 25.8	-10 23 20	13.275	-2.61	0.831	4800	1.6	Link
group ID	check	download	T.NAME	T.RA2000	T.DE2000	T.V	T.FE_H	T.B_V	T.T_EFF	T.LOG_G	T.URL
10	<input type="checkbox"/>		CS22960-053	22 16 17.00	-43 54 21.0	14.95	-3.14	0.76	5200	2.1	Link
11	<input type="checkbox"/>		CS30325-028	15 05 19.8	+06 17 05	12.868	-2.74	0.76	4900	1.8	Link
12	<input type="checkbox"/>		CS30325-094	14 54 39.27	+04 21 38.0	12.317	-3.17	0.7	5050	2.1	Link


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Yutaka Komiya

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Add a column of another catalog

- Service identifier or VOTable path e.g. `ivo://jvo/twomass` (2MASS catalog service)
 - Search a VO data service Keyword Category
 - Search a file in the JVOspace
 - Select from memorized VOTable at the JVOspace ▾
 - Select from memorized VO services ▾
- Table name: e.g. `psc` (2MASS point source catalog)
 - Select from a list ▾
- Column names to be added (comma separated): * e.g. `ra,dec,j_m-h_m,h_m-k_m` (2MASS coordinate and color)
 - Select from a list ▾
- Condition:
 - Proximity of Coordinates : arcsec
 - Coordinate columns of **this** Table (alias name)
 - RA = ▾ DEC = ▾
 - Coordinate columns of the table **to be added** (table column name or VOTable field name)
 - RA = ▾ DEC = ▾
 - Other condition (not implemented yet)

JVO VOTable Viewer - Mozilla Firefox

ファイル(E) 編集(E) 表示(V) 履歴(S) ブックマーク(B) ツール(I) ヘルプ(H)

http://jvo.nao.ac.jp/portal/viewer.do

Search Status Search Status Single Service... JVO VOTA... x JVO VOTable ... Single Service... JVO VOTable ...

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Save/Download Filter Metadata Graphic Add Column Appearance

Total 1134 records page: 1

Alias Name	O0	O1	O2	O3	O4	O5	O6	O7	O8	
group ID check download	T.NAME	T.RA2000	T.DE2000	T.V	T.FE_H	T.B_V	T.T_EFF	T.LOG_G	T.URL	
	sort	sort	sort	sort	sort	sort	sort	sort	sort	
0	<input type="checkbox"/>	HD122563	14 02 31.8460	+09 41 09.944	6.18	-2.59	0.85	4650	1.24	Link
1	<input type="checkbox"/>	BD+03 740	05 01 16.6219	+04 06 37.021	9.8	-2.65	0.36	6266	4.04	Link
2	<input type="checkbox"/>	CS29497-034	00 41 39.819	-26 18 54.48	12.221	-2.9	1.1	4800	1.8	Link
3	<input type="checkbox"/>	HD88609	10 14 28.9837	+53 33 39.351	8.64	-3.07	0.93	4550	1.1	Link
4	<input type="checkbox"/>	LP625-44	16 43 14.038	-01 55 30.50	11.85	-2.7	0.69	5500	2.5	Link
5	<input type="checkbox"/>	CS31082-001	01 29 31.20	-16 00 48.0	11.674	-2.9	0.772	4825	1.5	Link
6	<input type="checkbox"/>	CD-24 17504	23 07 20.25	-23 52 35.9	12.124	-3.21	0.39	6338	4.32	Link
7	<input type="checkbox"/>	BD-18 5550	19 58 49.7374	-18 12 11.144	9.35	-3.03	0.599	4600	0.95	Link
8	<input type="checkbox"/>	BS16929-005	13 03 29.40	+33 51 06.0	13.61	-3.17	0.62	5250	2.8	Link
9	<input type="checkbox"/>	CS22886-042	22 20 25.8	-10 23 20	13.275	-2.61	0.831	4800	1.6	Link
group ID check download	T.NAME	T.RA2000	T.DE2000	T.V	T.FE_H	T.B_V	T.T_EFF	T.LOG_G	T.URL	
10	<input type="checkbox"/>	CS22960-053	22 16 17.00	-43 54 21.0	14.95	-3.14	0.76	5200	2.1	Link
11	<input type="checkbox"/>	CS30325-028	15 05 19.8	+06 17 05	12.868	-2.74	0.76	4900	1.8	Link
12	<input type="checkbox"/>	CS30325-094	14 54 39.27	+04 21 38.0	12.317	-3.17	0.7	5050	2.1	Link

javascript:settab('box', 'head', 10, 1)

JVO VOTable Viewer - Mozilla Firefox

http://jvo.nao.ac.jp/portal/viewer.do

JVO VOTable ... Single Service... JVO VOTA... x

O6	O7	O8	O9	O10	O11	O12						
E_RADEG	E_DEDEG	UCMAG	NO	EPOCH	PMRA	PMDE						
sort	sort	sort	sort	sort	sort	sort						
46	32	15.56	3	1999.352	27.6	-83						
23	29	15.86	2	1999.354	1.1	4.9						
76	136	16.11	2	1999.355	-12.9	-19						
23	32	14.5	4	1999.354	-12.6	18.1						
8	19	13.83	5	1999.356	42.4	-3.1						
65	15	15.85	2	1999.352	-8	12.1						
26	24	15.05	2	1999.352	27.4	-7						
154832	255.578405	-27.682683	21817931	255.5784036	-27.6826806	29	49	14.76	3	1999.353	4.8	-14.8
15244	255.5788	-27.720367	21817932	255.5788077	-27.7203648	55	49	16.28	2	1999.351	-35.7	-10.2
159042	255.582265	-27.765404	21817940	255.5822598	-27.7653917	44	15	14.07	4	1999.356	25.5	-68.7
_R	_RAJ2000	_DEJ2000	1UCAC	RA(ICRS)	DE(ICRS)	E_RADEG	E_DEDEG	UCMAG	NO	EPOCH	PMRA	PMDE
151212	255.582561	-27.73699	21817942	255.5825627	-27.736992	12	9	11.73	6	1999.356	-9.4	11.5
149229	255.58316	-27.727082	21817946	255.5831536	-27.7270756	38	10	16.44	2	1999.352	33.9	-32.9
16354	255.588371	-27.631574	21817958	255.588378	-27.6315631	8	33	14.54	4	1999.355	-32.3	-62.7

Message

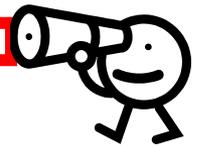
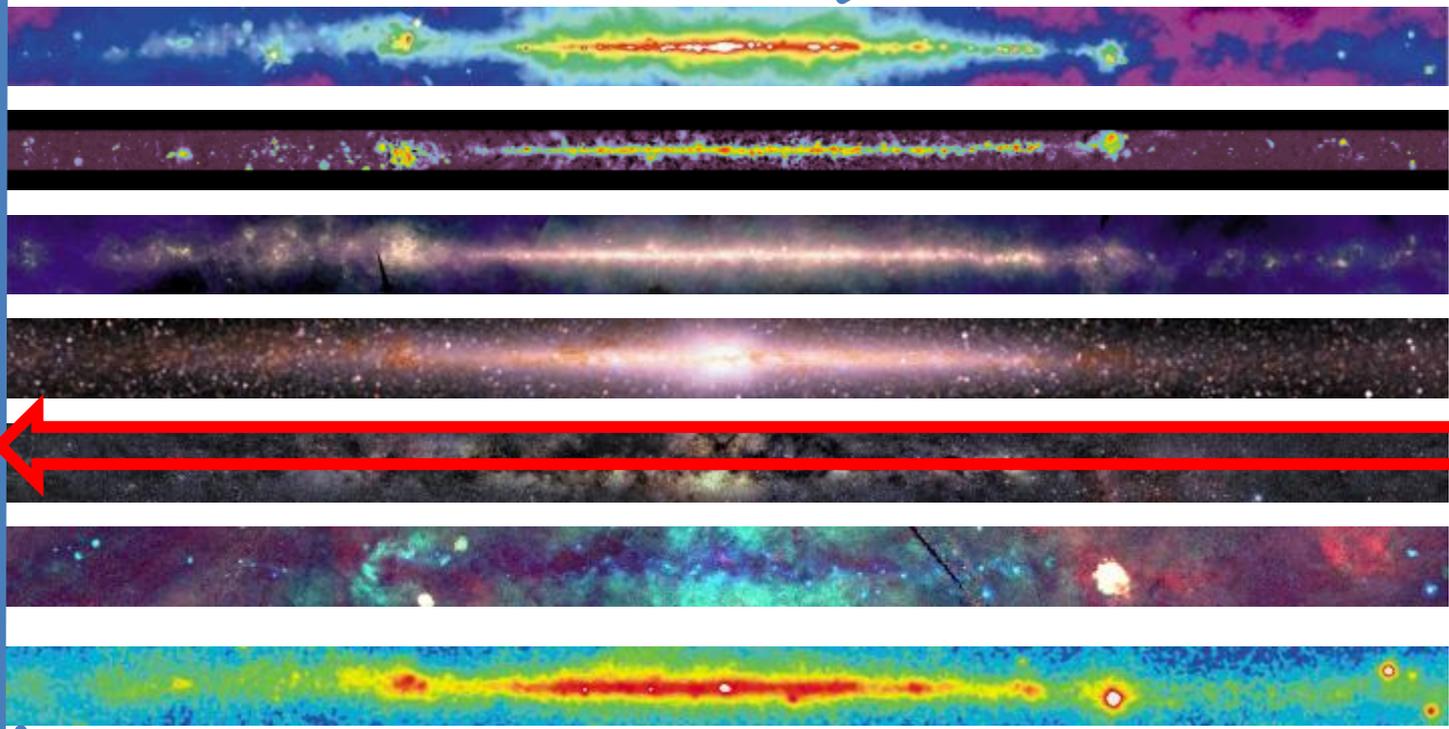
完了

Use case

位置



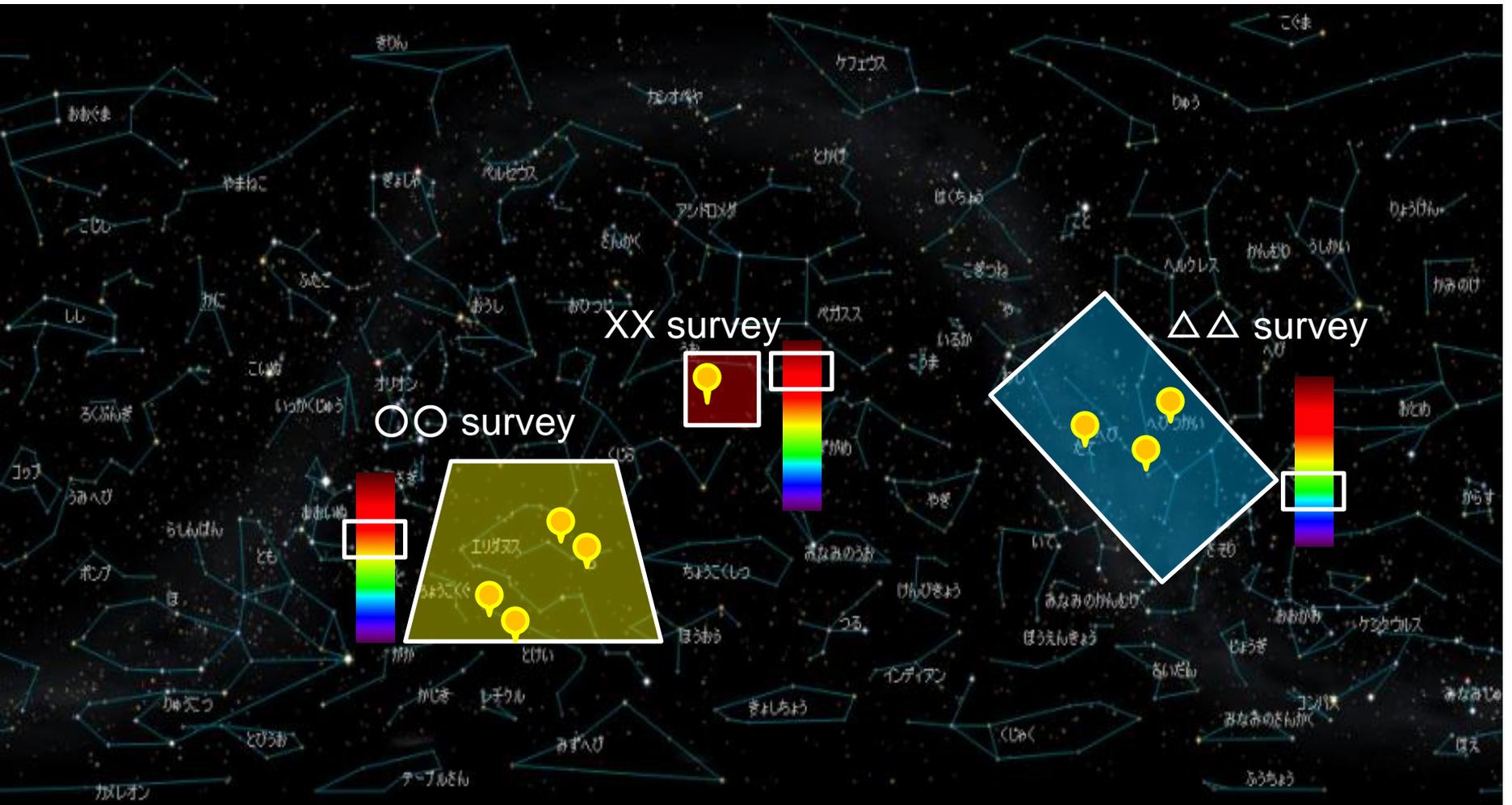
周波数



全天検索 :

大量データへのアクセス⇒並列化を検討

天球上表示



In the near future

- 安定性向上
- 天球上からのデータ探索
- 並列化/全天検索
- JVOSpace の拡充
 - JVOSpace内の検索
 - JVOSpace上での解析
-

乞うご期待！