



**Universidade Federal do Rio de Janeiro**  
**Centro de Ciências Matemáticas e da Natureza**  
**Observatório do Valongo**



Título do trabalho: subtítulo do trabalho

Nome do aluno

Rio de Janeiro  
Julho de 2024

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Trabalho de Conclusão de Curso submetido ao Observatório do Valongo, Universidade Federal do Rio de Janeiro, como requisito necessário para a obtenção do título de Astrônomo.

Orientador: Nome do orientador

Rio de Janeiro  
Julho de 2024



*À quem for que seja, por qualquer motivo.*

# *Agradecimientos*

*“The nitrogen in our DNA, the calcium in our teeth, the iron in our blood, the carbon in our apple pies were made in the interiors of collapsing stars. We are made of starstuff.”*

Carl Sagan

# *Resumo*

**Título do trabalho: subtítulo do trabalho**

Nome do aluno

Orientador: Nome do orientador

RESUMO DO TRABALHO DE CONCLUSÃO DE CURSO SUBMETIDO AO OBSERVATÓRIO DO VALONGO, UNIVERSIDADE FEDERAL DO RIO DE JANEIRO, COMO REQUISITO NECESSÁRIO PARA A OBTENÇÃO DO TÍTULO DE ASTRÔNOMO.

**palavras chave:** *moléculas, história, etc*

Rio de Janeiro  
Julho de 2024

# *Abstract*

**Thesis title: subtitle**

Nome do aluno

Advisor: Nome do orientador

ABSTRACT SUBMITTED TO THE VALONGO OBSERVATORY, FEDERAL UNIVERSITY OF RIO DE JANEIRO,  
IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF ASTRONOMER.

**keywords:** *molecules, interstellar medium, extragalactic*

Rio de Janeiro

July 2024



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# Abreviações

AGN Active Galactic Nuclei

# Constantes Físicas

Velocidade da Luz no Vácuo  $c = 2.99792458 \times 10^{10} \text{ cm s}^{-1}$

Unidade Astronômica  $AU = 1.495978707 \times 10^{13} \text{ cm}$

# Nomenclatura

Símbolo	Grandeza	Unidade
$g$	Aceleração da Gravidade	$\text{cm s}^{-2}$
$z$	Altitude	cm

# Sumário

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# Capítulo 1

## Introdução

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TABELA 1.1. A amostra de GOALS

Número	RA	Dec	Nome IRAS	Nome (óptico)	Distância	Redshift	$\log(L_{IR}/L_{\odot})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	00:09:53.36	+25:55:27.7	F00073+2538	NGC 0023	63.3	0.015	11.12
2	00:11:06.56	-12:06:28.2	F00085-1223	NGC 0034	81.5	0.019	11.49
3	00:18:50.37	-10:22:05.3	F00163-1039	MCG-02-01-051	111.4	0.027	11.48
4	00:36:52.49	-33:33:17.2	F00344-3349	ESO 350-IG038	85.4	0.020	11.28
5	00:42:49.32	-23:33:04.3	F00402-2349	NGC 0232	91.3	0.022	11.44
6	00:54:03.88	+73:05:05.9	F00506+7248	MCG+12-02-001	67.7	0.016	11.50
7	00:57:39.72	+43:47:47.7	F00548+4331	NGC 0317B	74.1	0.018	11.19
8	01:07:47.54	-17:30:25.6	F01053-1746	IC 1623	82.2	0.020	11.71
9	01:10:08.93	-16:51:09.9	F01076-1707	MCG-03-04-014	134.8	0.033	11.65
10	01:18:08.27	-44:27:51.9	F01159-4443	ESO 244-G012	87.7	0.021	11.38
11	01:20:02.63	+14:21:42.3	F01173+1405	CGCG 436-030	82.2	0.031	11.69
12	01:34:51.26	-36:08:14.4	F01325-3623	ESO 353-G020	82.2	0.016	11.06
13	01:36:23.76	-37:19:51.9	F01341-3735	ESO 297-G011	72.0	0.017	11.16
14	01:38:52.79	-10:27:12.1	F01364-1042		191.1	0.048	11.85
15	01:44:30.56	+17:06:09.0	F01417+1651	VIII Zw 035	112.6	0.028	11.64
16	01:51:14.34	+22:34:56.0	F01484+2220	NGC 0695	130.4	0.032	11.68
17	01:54:57.78	+36:55:07.9	F01519+3640	UGC 01385	76.9	0.019	11.05
18	02:09:31.84	-10:09:30.7	F02071-1023	NGC 0838	53.3	0.013	11.05
19	02:10:09.53	+39:11:24.7	F02070+3857	NGC 0828	73.6	0.018	11.36
20	02:14:00.77	+05:10:13.8	F02114+0456	IC 0214	122.4	0.030	11.43
21	02:17:56.46	+14:31:58.2	F02152+1418	NGC 0877	52.9	0.013	11.10
22	02:23:20.47	+32:11:33.6	F02203+3158	MCG+05-06-036	135.7	0.038	11.64
23	02:24:07.97	+47:58:11.9	F02208+4744	UGC 01845	65.0	0.015	11.12
24	02:30:42.84	-02:56:20.5	F02281-0309	NGC 0958	77.6	0.019	11.20
25	02:37:25.46	+21:06:02.8	F02345+2053	NGC 0992	56.4	0.014	11.07
26	02:42:40.72	-00:00:47.9	F02401-0013	NGC 1068	15.8	0.004	11.40
27	02:46:17.46	+13:05:44.6	F02435+1253	UGC 02238	88.5	0.022	11.33
28	02:46:39.13	+21:35:10.4	F02437+2122		94.4	0.023	11.16
29	02:54:01.79	+14:58:26.0	F02512+1446	UGC 02369	127.7	0.032	11.67
30	03:15:01.47	+42:02:08.6	F03117+4151	UGC 02608	95.5	0.023	11.41
31	03:19:48.18	+41:30:42.0	F03164+4119	NGC 1275	72.4	0.017	11.26
32	03:25:05.37	+40:33:32.2	F03217+4022		95.5	0.023	11.33
33	03:33:36.40	-36:08:25.9	F03316-3618	NGC 1365	17.7	0.005	11.00
34	03:38:47.07	+15:32:54.1	F03359+1523		141.8	0.035	11.55
35	03:54:15.95	+15:55:43.4	F03514+1546	CGCG 465-012	90.1	0.022	11.20
36	04:02:32.47	+60:20:40.0	03582+6012		123.5	0.030	11.43
37	04:12:22.68	+05:32:49.1	F04097+0525	UGC 02982	72.3	0.018	11.20
38	04:13:49.70	-32:00:25.3	F04118-3207	ESO 420-G013	49.8	0.012	11.07
39	04:21:20.04	-18:48:48.4	F04191-1855	ESO 550-IG025	130.0	0.032	11.51
40	04:22:42.81	-40:36:03.1	F04210-4042	NGC 1572	85.1	0.020	11.30
41	04:30:33.09	+38:55:47.8	04271+3849		77.8	0.019	11.11
42	04:33:59.95	-08:34:46.6	F04315-0840	NGC 1614	65.7	0.016	11.65
43	04:35:33.81	+19:10:18.0	F04326+1904	UGC 03094	100.9	0.025	11.41



Tabela 1.1 – *Continua*

Número	RA	Dec	Nome IRAS	Nome (óptico)	Distância	Redshift	$\log(L_{IR}/L_{\odot})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
44	04:46:49.55	-48:33:30.6	F04454-4838	ESO 203-IG001	212.0	0.053	11.86
45	04:52:04.96	-32:59:26.0	F04502-3304	MCG-05-12-006	78.3	0.019	11.17
46	05:07:44.84	-08:01:08.7	F05053-0805	NGC 1797	61.6	0.015	11.04
47	05:08:20.46	+17:21:57.8	F05054+1718	CGCG 468-002	75.1	0.019	11.22
48	05:11:27.46	+24:45:41.1	05083+2441		94.8	0.023	11.26
49	05:16:46.39	+79:40:12.9	F05081+7936	VII Zw 031	216.2	0.053	11.99
50	05:16:55.96	+51:31:56.9	05129+5128		113.7	0.027	11.42
51	05:21:01.45	-25:21:46.2	F05189-2524		172.0	0.042	12.16
52	05:21:06.53	-10:14:46.2	F05187-1017		115.4	0.028	11.30
53	05:40:43.70	+49:41:41.6	05368+4940	MCG+08-11-002	80.6	0.019	11.46
54	05:42:04.55	+69:22:42.8	F05365+6921	NGC 1961	57.5	0.013	11.06
55	05:45:48.03	+58:42:03.6	F05414+5840	UGC 03351	63.9	0.015	11.28
56	05:47:08.49	+17:33:29.1	05442+1732		77.4	0.018	11.30
57	06:09:45.84	-21:40:28.3	F06076-2139		153.3	0.037	11.65
58	06:14:13.75	+80:27:47.1	F06052+8027	UGC 03410	56.9	0.013	11.10
59	06:18:37.82	+78:21:24.0	F06107+7822	NGC 2146	17.4	0.003	11.12
60	06:27:22.39	-47:10:49.4	F06259-4708	ESO 255-IG007	160.3	0.039	11.90
61	06:31:46.45	-17:38:00.7	F06295-1735	ESO 557-G002	89.5	0.021	11.25
62	06:57:34.41	+46:24:10.6	F06538+4628	UGC 03608	90.4	0.021	11.34
63	06:59:40.26	-63:17:52.4	F06592-6313		99.4	0.023	11.24
64	07:03:26.33	-60:16:02.7	F07027-6011	AM 0702-601	132.6	0.031	11.64
65	07:09:15.04	+20:37:10.7	07063+2043	NGC 2342	75.0	0.017	11.31
66	07:16:37.73	-62:20:36.4	F07160-6215	NGC 2369	46.6	0.011	11.16
67	07:27:37.62	-02:54:54.8	07251-0248		338.2	0.087	12.39
68	07:28:46.38	+33:50:22.9	F07256+3355	NGC 2388	59.7	0.014	11.28
69	07:35:43.44	+11:42:34.8	F07329+1149	MCG+02-20-003	72.0	0.016	11.13
70	08:37:01.87	-49:54:30.0	08355-4944		112.1	0.026	11.62
71	08:38:23.18	+65:07:15.2	F08339+6517		83.1	0.019	11.11
72	08:38:24.11	+25:45:16.5	F08354+2555	NGC 2623	81.1	0.018	11.60
73	08:44:28.07	-31:41:40.5	08424-3130	ESO 432-IG006	72.1	0.016	11.08
74	08:52:31.28	-69:01:57.0	F08520-6850	ESO 060-IG016	191.8	0.046	11.82
75	09:00:25.35	+39:03:54.0	F08572+3915		235.7	0.058	12.16
76	09:04:12.69	-36:27:01.5	09022-3615		241.4	0.059	12.31
77	09:13:37.69	-10:19:24.6	F09111-1007		221.4	0.054	12.06
78	09:15:55.10	+44:19:54.0	F09126+4432	UGC 04881	164.7	0.039	11.74
79	09:35:51.59	+61:21:11.9	F09320+6134	UGC 05101	163.8	0.039	12.01
80	09:36:34.02	+48:28:18.8	F09333+4841	MCG+08-18-013	109.8	0.026	11.34
81	09:46:20.70	+03:03:30.4	F09437+0317	IC 0563	89.3	0.020	11.23
82	10:03:59.57	-06:29:08.5	F10015-0614	NGC 3110	75.2	0.017	11.37
83	10:06:04.65	-33:53:06.1	F10038-3338	ESO 374-IG032	145.9	0.034	11.78
84	10:20:00.24	+08:13:32.8	F10173+0828		203.5	0.049	11.86
85	10:22:19.98	+21:34:10.6	F10196+2149	NGC 3221	63.9	0.014	11.09
86	10:27:51.30	-43:54:14.0	F10257-4339	NGC 3256	38.2	0.009	11.64
87	10:43:07.51	-46:12:44.1	F10409-4556	ESO 264-G036	95.9	0.021	11.32

Tabela 1.1 – *Continua*

Número	RA	Dec	Nome IRAS	Nome (óptico)	Distância	Redshift	$\log(L_{IR}/L_{\odot})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
88	10:59:01.70	-43:26:25.2	F10567-4310	ESO 264-G057	80.5	0.017	11.14
89	10:59:18.15	+24:32:34.2	F10565+2448		147.6	0.043	12.08
90	11:03:53.98	+40:51:00.4	F11011+4107	MCG+07-23-019	147.6	0.034	11.62
91	11:21:10.26	-02:59:20.8	F11186-0242	CGCG 011-076	110.5	0.025	11.43
92	11:25:47.31	+14:40:21.2	F11231+1456	IC 2810	146.0	0.034	11.64
93	11:27:54.18	-41:36:51.7	F11255-4120	ESO 319-G022	77.4	0.016	11.12
94	11:28:32.35	+58:33:43.3	F11257+5850	NGC 3690	49.7	0.010	11.93
95	11:53:11.73	-39:07:49.0	F11506-3851	ESO 320-G030	40.3	0.011	11.17
96	12:06:51.78	-31:56:52.8	F12043-3140	ESO 440-IG058	107.0	0.023	11.43
97	12:13:46.02	+02:48:42.2	F12112+0305		295.1	0.073	12.36
98	12:14:09.71	+54:31:35.5	F12116+5448	NGC 4194	42.3	0.008	11.10
99	12:14:12.81	-47:13:42.5	F12115-4656	ESO 267-G030	93.0	0.018	11.25
100	12:14:22.08	-56:32:32.7	12116-5615		121.3	0.027	11.65
101	12:25:03.90	-06:40:52.1	F12224-0624		118.7	0.026	11.36
102	12:26:59.74	-00:53:32.1	F12243-0036	NGC 4418	36.3	0.007	11.19
103	12:56:14.25	+56:52:24.8	F12540+5708	UGC 08058	176.8	0.042	12.57
104	13:01:24.89	+29:18:39.6	F12590+2934	NGC 4922	105.9	0.023	11.38
105	13:01:50.28	+04:20:00.8	F12592+0436	CGCG 043-099	162.6	0.037	11.68
106	13:02:20.02	-15:46:01.8	F12596-1529	MCG-02-33-098	76.3	0.016	11.17
107	13:02:52.42	-23:55:17.8	F13001-2339	ESO 507-G070	101.5	0.022	11.56
108	13:08:18.73	-57:27:30.3	13052-5711		101.6	0.021	11.40
109	13:15:03.49	+24:37:07.6	F13126+2453	IC 0860	55.6	0.011	11.14
110	13:15:06.37	-55:09:22.5	13120-5453		135.5	0.031	12.32
111	13:15:32.82	+62:07:37.4	F13136+6223	VV 250a	133.1	0.031	11.81
112	13:20:35.37	+34:08:22.2	F13182+3424	UGC 08387	105.0	0.023	11.73
113	13:21:23.09	+00:20:33.2	F13188+0036	NGC 5104	87.5	0.018	11.27
114	13:22:21.73	-16:43:06.2	F13197-1627	MCG-03-34-064	79.5	0.016	11.28
115	13:25:44.02	-29:50:00.4	F13229-2934	NGC 5135	59.3	0.014	11.30
116	13:27:23.79	-57:29:21.8	13242-5713	ESO 173-G015	33.3	0.009	11.38
117	13:32:53.40	-24:12:25.5	F13301-2356	IC 4280	79.8	0.016	11.15
118	13:38:17.52	+48:16:37.2	F13362+4831	NGC 5256	122.1	0.028	11.56
119	13:39:55.34	+00:50:09.5	F13373+0105	NGC 5257	103.8	0.022	11.62
120	13:44:42.12	+55:53:13.1	F13428+5608	UGC 08696	160.6	0.038	12.21
121	13:49:13.94	+35:15:26.2	F13470+3530	UGC 08739	78.7	0.017	11.15
122	13:50:56.92	-49:03:18.8	F13478-4848	ESO 221-IG010	61.6	0.010	11.22
123	13:52:16.32	+02:06:18.0	F13497+0220	NGC 5331	145.2	0.033	11.66
124	13:58:35.80	+37:26:20.5	F13564+3741	NGC 5394	57.3	0.011	11.08
125	14:19:43.27	+49:14:11.9	F14179+4927	CGCG 247-020	114.1	0.026	11.39
126	14:30:10.44	+31:12:55.8	F14280+3126	NGC 5653	58.8	0.012	11.13
127	14:37:38.29	-15:00:24.2	F14348-1447		330.3	0.083	12.39
128	14:40:59.04	-37:04:32.0	F14378-3651		276.4	0.067	12.23
129	14:45:10.02	-20:53:30.9	F14423-2039	NGC 5734	65.2	0.014	11.15
130	14:57:00.51	+24:36:45.2	F14547+2449	VV 340a	146.5	0.033	11.74
131	14:57:43.27	-43:07:56.3	F14544-4255	IC 4518	77.5	0.016	11.23

Tabela 1.1 – *Continua*

Número	RA	Dec	Nome IRAS	Nome (óptico)	Distância	Redshift	$\log(L_{IR}/L_{\odot})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
132	15:13:13.07	+07:13:32.1	F15107+0724	CGCG 049-057	63.7	0.013	11.35
133	15:18:06.24	+42:44:41.5	F15163+4255	VV 705	169.2	0.039	11.92
134	15:24:57.98	-63:07:29.4	15206-6256	ESO 099-G004	129.3	0.029	11.74
135	15:26:59.42	+35:58:37.8	F15250+3608		228.1	0.055	12.08
136	15:30:00.85	+12:59:22.1	F15276+1309	NGC 5936	65.3	0.013	11.14
137	15:34:57.23	+23:30:11.3	F15327+2340	UGC 09913	84.8	0.018	12.28
138	15:46:16.41	+02:24:55.6	F15437+0234	NGC 5990	62.8	0.013	11.13
139	16:05:12.87	+20:32:33.0	F16030+2040	NGC 6052	75.2	0.016	11.09
140	16:11:40.84	+52:27:27.2	F16104+5235	NGC 6090	129.2	0.029	11.58
141	16:19:11.75	-07:54:03.0	F16164-0746		121.3	0.027	11.62
142	16:30:54.89	+04:04:41.3	F16284+0411	CGCG 052-037	112.8	0.024	11.45
143	16:34:52.55	-60:37:08.0	16304-6030	NGC 6156	47.0	0.011	11.14
144	16:38:12.64	-68:26:42.3	F16330-6820	ESO 069-IG006	193.6	0.046	11.98
145	16:42:40.11	-09:43:13.7	F16399-0937		121.4	0.027	11.63
146	16:47:30.21	-29:20:14.2	F16443-2915	ESO 453-G005	96.4	0.021	11.37
147	16:52:58.90	+02:24:03.3	F16504+0228	NGC 6240	110.5	0.024	11.93
148	16:54:23.72	-09:53:20.9	F16516-0948		102.3	0.022	11.31
149	16:58:27.81	+58:56:47.5	F16577+5900	NGC 6286	83.9	0.018	11.37
150	17:14:20.45	+53:10:31.6	F17132+5313		210.1	0.051	11.96
151	17:16:35.68	-10:20:40.5	F17138-1017		81.2	0.017	11.49
152	17:23:21.97	-00:17:00.7	F17207-0014		182.1	0.043	12.46
153	17:26:43.35	-59:55:55.2	F17222-5953	ESO 138-G027	94.3	0.021	11.41
154	17:54:51.82	+34:46:34.2	F17530+3447	UGC 11041	75.0	0.016	11.11
155	17:56:56.65	+24:01:02.0	F17548+2401	CGCG 141-034	89.8	0.019	11.20
156	18:00:28.61	-04:01:16.3	17578-0400		67.0	0.014	11.48
157	18:11:35.91	+01:31:41.3	18090+0130		126.6	0.029	11.65
158	18:12:57.46	+68:21:38.7	F18131+6820	NGC 6621	92.4	0.020	11.29
159	18:13:39.56	-57:44:00.9	F18093-5744	IC 4687	76.7	0.017	11.62
160	18:16:37.26	+22:06:42.6	F18145+2205	CGCG 142-034	83.2	0.019	11.18
161	18:32:41.10	-34:11:27.0	F18293-3413		83.0	0.018	11.88
162	18:33:36.00	+59:53:20.3	F18329+5950	NGC 6670A/B	122.4	0.028	11.65
163	18:38:25.75	-57:29:25.4	F18341-5732	IC 4734	71.2	0.015	11.35
164	18:43:12.52	+60:39:11.6	F18425+6036	NGC 6701	60.8	0.013	11.12
165	19:10:59.19	+73:25:04.2	F19120+7320	NGC 6786	107.5	0.025	11.49
166	19:14:31.15	-21:19:06.3	F19115-2124	ESO 593-IG008	201.8	0.049	11.93
167	19:32:22.30	-04:00:01.1	F19297-0406		335.1	0.086	12.45
168	19:56:35.78	+11:19:04.9	19542+1110		260.1	0.065	12.12
169	19:57:37.60	-37:56:08.4	F19542-3804	ESO 339-G011	85.3	0.019	11.20
170	20:25:06.58	-24:48:32.9	F20221-2458	NGC 6907	49.1	0.010	11.11
171	20:28:31.98	+25:43:42.3	20264+2533	MCG+04-48-002	63.6	0.014	11.11
172	20:33:06.13	-02:01:38.9	F20304-0211	NGC 6926	85.7	0.019	11.32
173	20:37:17.73	+25:31:37.5	20351+2521		141.3	0.034	11.61
174	20:57:24.01	+17:07:41.6	F20550+1655	CGCG 448-020	150.0	0.036	11.94
175	20:58:26.78	-42:39:00.5	F20551-4250	ESO 286-IG019	177.4	0.043	12.06

Tabela 1.1 – *Continua*

Número	RA	Dec	Nome IRAS	Nome (óptico)	Distância	Redshift	$\log(L_{IR}/L_{\odot})$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
176	21:04:11.11	-43:35:36.1	F21008-4347	ESO 286-G035	76.4	0.017	11.20
177	21:11:29.28	+58:23:07.9	21101+5810		161.2	0.039	11.81
178	21:36:10.73	-38:32:37.8	F21330-3846	ESO 343-IG013	82.6	0.019	11.14
179	21:48:19.54	-34:57:04.7	F21453-3511	NGC 7130	70.4	0.016	11.42
180	22:14:39.97	-27:27:50.3	F22118-2742	ESO 467-G027	74.7	0.017	11.08
181	22:16:09.13	-36:50:37.2	F22132-3705	IC 5179	50.2	0.011	11.24
182	22:31:25.48	-19:02:04.0	F22287-1917	ESO 602-G025	104.7	0.025	11.34
183	22:41:12.21	+34:14:56.8	F22389+3359	UGC 12150	89.6	0.021	11.35
184	22:49:39.84	-48:50:58.3	F22467-4906	ESO 239-IG002	175.6	0.043	11.84
185	22:51:49.35	-17:52:24.9	F22491-1808		302.2	0.078	12.20
186	23:03:16.84	+08:53:00.9	F23007+0836	NGC 7469	68.0	0.016	11.65
187	23:04:56.55	+19:33:07.1	F23024+1916	CGCG 453-062	103.7	0.025	11.38
188	23:15:46.75	-59:03:15.8	F23128-5919	ESO 148-IG002	182.4	0.044	12.06
189	23:16:00.67	+25:33:24.3	F23135+2517	IC 5298	112.7	0.027	11.60
190	23:16:10.81	-42:35:05.5	F23133-4251	NGC 7552	23.2	0.005	11.11
191	23:18:14.89	+06:34:17.8	F23157+0618	NGC 7591	69.1	0.016	11.12
192	23:18:22.19	-04:24:57.4	F23157-0441	NGC 7592	101.0	0.024	11.40
193	23:21:04.59	-69:12:54.1	F23180-6929	ESO 077-IG014	171.5	0.041	11.76
194	23:27:57.73	+08:46:51.0	F23254+0830	NGC 7674	119.4	0.029	11.56
195	23:28:46.62	+03:30:41.4	23262+0314	NGC 7679	71.3	0.017	11.11
196	23:39:01.32	+36:21:08.2	F23365+3604		253.3	0.064	12.20
197	23:42:00.91	-03:36:54.4	F23394-0353	MCG-01-60-022	92.4	0.023	11.27
198	23:46:05.44	+53:14:01.7	23436+5257		139.3	0.034	11.57
199	23:47:01.73	+29:28:16.2	F23444+2911	NGC 7752/3	71.1	0.017	11.07
200	23:51:13.55	+20:07:41.2	F23488+1949	NGC 7771	58.5	0.014	11.40
201	23:51:22.73	+20:34:55.4	F23488+2018	Mrk 331	73.8	0.018	11.50

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Tipo (1)	Comprimento de onda/Filtro (2)	Telescópio (3)	Amostra (4)
Imag. e Espectr. em raios X	0.4–7keV	Chandra–ACIS	44
Imag. em UV	1528Å(FUV), 227Å(NUV)	GALEX	124
Imag. em UV	1400Å(F140LP)	Hubble–ACS/SBC	30
Imag. em UV	2180Å(F218W)	Hubble–WFPC2	30
Imag. no optico	4350Å(F435W), 8140Å(F814W)	Hubble–ACS	88
Imag. no IV proximo	16μm (F160W)	Hubble–NICMOS	88
Imag. no IV medio	3.6, 4.5, 5.4, 8μm	Spitzer–IRAC	202
Espectr. nuclear no IV medio	5–40μm baixa res., 10–40μm alta res.	Spitzer–IRS	202
Map. espectral no IV medio	5–40μm baixa res.	Spitzer–IRS	42
Imag. no IV distante	24, 70, 160μm	Spitzer–MIPS	202

TABELA 1.2. Sumário do conjunto de dados do levantamento multibanda GOALS. O tipo de dado, o comprimento de onda referido, o telescópio (e instrumentos utilizados) e o número de sistemas observados (incluindo os dados disponíveis em arquivos) são mostrados nas colunas 1-4, respectivamente.

## Capítulo 2

# Título

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Proin eu lacus urna. Integer ultrices lectus odio. Donec fermentum ut sem vitae suscipit. Suspendisse sit amet rutrum ligula, a convallis massa. Duis ultrices eget felis sed gravida. Fusce dapibus consectetur elit, sed mattis nisi rutrum vel. Fusce quam velit, lobortis aliquet purus eget, cursus fermentum dui. Needham & Ling (1959)

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

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<sup>1</sup>Esta é uma nota de rodapé.

# Referências Bibliográficas

Needham, J., & Ling, W. 1959, *The Science of the Heavens*, Vol. 3 (Cambridge University Press), 169–461



# Apêndice A

## Apêndice A - Título

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