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The Second Kiso Survey for Ultraviolet-Excess Galaxies. IV

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Abstract

The catalogue list and the identification chart of ultraviolet (UV)-excess galaxies which have been detected on two-color Kiso Schmidt plates are presented for 10 Schmidt fields. Catalogued are 189 objects, down to the photographic magnitude ∼18.0 in the sky area of some 300 square degrees. The total number of KUGs newly detected in the second survey reaches 1,829.

Key words: Ultraviolet-excess galaxies, KUGs, Survey with Schmidt telescope.

1. Observation

We have been continuing the second survey of ultraviolet (UV)-excess galaxies with the Kiso 105-cm Schmidt telescope. This is a continuation and an extension of the original survey for Kiso UV-excess galaxies (KUGs) carried out by Takase and Miyauchi-Isobe (1984–1993a). Its comprehensive catalogue was published by Takase and Miyauchi-Isobe (1993b), where 8,104 KUGs were included in the covered sky area of some 5,100 square degrees. (The data of the area A0432 must be replaced to Myauchi-Isobe et al. 1997.) A variety of faint UV-excess galaxies were catalogued down to $V \sim 17$ mag in the first series of the survey.

The main area of both first and second KUG surveys is spread along $l = 180°$ from the north galactic pole toward the south. And the isolated Schmidt fields are those of specially selected ones relating to voids, clusters, or fields, of which plates are good enough to be treated in these surveys.

In the course of follow-up observations of KUGs (e.g., Maehara et al. 1987, Comte et al. 1994, Tomita et al. 1997), it is clarified that the majority of them are spiral or irregular galaxies with intense star formation in their nuclei, bars, disks, or outer regions. These samples give us clues to the understanding of triggering mechanism of star formation, and of the evolution of some types of galaxies. In addition, Seyferts, LINERs, and active galaxies with some peculiarities are minor constituents of the catalogue. Thus it is a fainter extension of the catalogue of Markarian galaxies (MKGs). In these circumstances, it is worth continuing and supplementing the first KUG survey, and we have started the second survey (Miyauchi-Isobe and Maehara 1998, 2000, 2002).

The method of the second survey is, in principle, the same as that of the first one; *U* (ultraviolet) and *R* (red) double exposure 103a-E plates are used for the detection of KUGs. Exposure times being so set that the *U* and *R* images of early A-type stars are equally bright, the object whose *U* image is brighter than the *R* image is regarded to be bluer than early A-type stars. Typically, a field has several to ten those stars for the comparison. We pick up those galaxies as Kiso UV-excess galaxies (abbreviated as KUGs) with the visual inspection of the plate, and list their parameters in this paper. In some cases, a highly blue portion (e.g., knot, clump, shell, or ring) exists on or contacting the less blue main galaxy body. In this circumstance, the degree of UV-excess of a galaxy is estimated on the comparison of the *integrated U* and *R* brightness of the whole galaxy image on the plate, and the redder galaxy is discarded from the list.

The position, the brightness, and the morphological type

Table IV-1. The Data of Plates.

Area No.	Plate No.	Observation Date	Plate Center R.A. (1950.0)	Dec.	*l*	*b*	No. of KUGs
			h m	°	°	°	
A0384	KL6890	1994 Oct. 6	0 20	+35	116	−27	36
A0385	KL7037	1999 Oct. 4	0 40	+35	120	−28	15
A0431	KL6893	1995 May 9	16 00	+35	56	49	14
A0458	KL6896	1995 Aug. 30	1 00	+30	126	−33	5
A0533	KL6889	1994 Oct. 6	2 00	+25	143	−35	19
A0534	KL6901	1995 Nov. 22	2 20	+25	148	−33	12(1)*
A0592	KL7036	1999 Oct. 4	21 40	+25	77	−20	18
A0665	KL6899	1995 Nov. 22	22 00	+20	78	−27	56(1)*
A0666	KL6888	1994 Oct. 5	22 20	+20	82	−30	8
A0725	KL6894	1995 Aug. 29	18 00	+15	41	18	6
							Total 189(2)*

* Parenthesized is the number of duplicated objects which are doubly listed in the present survey.

of a KUG are estimated by referring to the object identified in the Palomar Sky Survey Print (PSS). Its degree of UV-excess is also confirmed by the comparison of the B (103aO) and R (103aE) print of the PSS. In this paper, catalogued are KUGs in the 10 fields, which have never been treated in the previous KUG surveys. As a result, 710 KUGs are detected in the sky area of some 300 square degrees. The data on the sky area, photographic plate, and the number of detected objects in this work are listed in Table IV-1.

2. Survey Catalogue

The list of detected objects and their identification charts are respectively given in Table IV-2 and Figure IV-1. The evaluation procedures of detected objects, which are presented in Table V-2, are the same as those of the first survey.

Column 1: The running number according to the right ascension.

Column 2: The KUG-name composed of the values of right ascension and declination.

Column 3 and 4: The right ascension and declination for the epoch 1950.0.

Column 5: The morphological type adopted in this work is different from the traditional morphological classification, because there exist conspicuous blue (UV-excess) portions on these KUGs. Thus we adopt another classification scheme, which pays attention to the blue structures on the galaxy images (Takase et al. 1983); it consists of seven types as follows;

Ic : Irregular with blue clumps
Ig : Irregular with a giant clump
Pi : Pair of interacting components
Pd : Pair of detached components
Sk : Spiral with blue knots on the disk
Sp : Spiral with blue bar and/or nucleus
C : Compact.

The type is assigned through visual inspections of both Kiso plates and blue and red PSS prints. A colon (:) is attached to the type, when the type is not certainly assigned, and a question mark (?) means unclassifiable.

Column 6: The image size (along the major and the minor axis) in minutes of arc on the blue PSS print.

Column 7: The apparent (blue) magnitude, which is eye-estimated on the PSS blue print referring to the known magnitude of the catalogued objects. It is usually calibrated using Zwicky catalogues, and extended towards fainter objects.

Column 8: The degree of UV-excess estimated from Kiso plates. H, M, and L denote high, medium, and low degree, respectively. Further explanation on the UV-excess is referred to Takase et al. (1983).

Column 9: The names given in previous catalogues. The abbreviated notations used in this paper have the following correspondence to those adopted in MOL (abbreviation of the catalogue list compiled by Dixon and Sonneborn 1980).

A: ARP, H: HARO, I:IC, M: MCG, MK: MKG, N: RNGC, U: UGC, V: VV, Z: ZWG, nZ: nZW (n= 1, 2, . . . , 8), K: KUG (the previous KUG survey), and KE: KUG errata (Miyauchi-Isobe et al. 1997).

According to the identification with the other catalogues, many objects have been listed before. Especially, a number of KUGs appear in the Zwicky catalogues, and bright KUGs are identified as Markarian galaxies. There are morphologically peculiar KUGs, which appear in the MCG catalogue. This survey picks up 13 objects listed in the first KUG catalogue in the adjacent sky areas to those of the first survey.

In total, the total number of KUGs detected in both surveys is 9,933.

3. Discussion

The UV-excess is one of the major methods to detect active galaxies with conventional ground-based telescope. A number of Schmidt surveys have been carried out in the similar methods to us whose representative is the comprehensive work by Markarian et al. (1989). Even recently, a number of investigators have carried out new deep surveys for those objects applying the modern digitization machines and techniques treating large Schmidt plates; the Montreal survey (Coziol et al. 1993, 1994), the Madrid survey (Zamorano et al. 1994, Gallego et al. 1995), the Hamburg survey (Hopp et al. 1995, Popescu et al. 1996), and the Marseille survey (Surace and Comte 1998). According to them, major constituents of their surveys are galaxies with intense star formation (starburst) activity and/or non-thermal Seyfert-like nuclear phenomena.

The image quality and the limiting magnitude of Kiso Schmidt plates are generally less homogeneous due to the average observation condition of the site. Thus we select the plates of good quality, and apply the visual (non-automatic) inspection method in order to cancel the inhomogeneity originated from the standardized inspection technique. Furthermore, we scrutinize detected objects by referring PSS prints, preventing the degradation of our survey. Our detection method may miss UV-excess objects with smooth light distribution of uncertain morphological types. Therefore, we try to pick up carefully such objects according to the total color as well.

During our scrutinizing individual objects to estimate the brightness, morphological type, and degree of UV-excess, we pick up some KUGs, which exhibit other kinds of peculiar morphologies. Their peculiarities are noticed in the supplements to Table IV-2 notes on individual galaxies, e.g., diffuse, dense, featureless, S-, V-, or butterfly-shaped objects. Although they belong to irregular galaxies, some of them are possibly more enhanced objects of the interacting galaxies of **Pi** or **Pd** type. It is discussed elsewhere that the interaction between component galaxies is an important triggering mechanism of starburst.

KUGs tend to be situated in pairs, groups and/or clusters of galaxies, rather than isolated galaxies of the same morphological type (e.g., Takase 1980). Actually, we detected a conspicuous concentration of KUGs in the second survey (Miyauchi-Isobe and Maehara 1998), though we do not notice any dense KUG concentrations in this work. In the first KUG catalogue, Takeuchi et al. (1999) discovered four KUG-rich regions with sizes of $\sim 10^\circ \times 10^\circ$, and studied KUGs in detail in the prominent filaments of Lynx-Ursa Major region. In general, there is a tendency that the star formation is activated simultaneously in the neighborhood, though it is not fully clarified whether it is due to the effect of the interaction.

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Table IV-2a. List of KUGs (A0384).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	0006+328	0 6 35.6	32 50 43	Sp:	0.2 X 0.1	17.5:	L	
2	0006+333	0 6 56.7	33 23 52	Sp:	0.3 X 0.2	16.5:	L	K0006+333
3	0007+332	0 7 2.4	33 12 13	Sp:	0.2 X 0.2	17.0:	L	
4	0008+339	0 8 4.3	33 59 22	Sk:	0.2 X 0.2	17.5:	L	K0008+339
5	0008+355	0 8 6.0	35 34 17	Sp:	0.7 X 0.4	15.5	H	Z518.017,M+6-1-16,K0008+355A
6	0008+326	0 8 6.5	32 37 6	C	0.2 X 0.2	17.5:	L	
7	0008+353	0 8 18.8	35 20 16	?	0.2 X 0.1	17.0:	L	
8	0008+336	0 8 31.9	33 37 31	Sp	0.9 X 0.1	17.0:	L	
9	0008+335	0 8 35.5	33 31 9	C:	0.2 X 0.2	17.0:	L	K0008+335
10	0010+330	0 10 18.6	33 5 0	Sk	1.6 X 1.1	15.2	L	U117,Z499.078,M+5-1-53
11	0010+371	0 10 50.9	37 9 6	C	0.2 X 0.2	16.5:	M	
12	0011+339	0 11 46.0	33 55 30	Sp:	0.3 X 0.2	16.0:	L	
13	0011+344	0 11 53.9	34 28 32	Sp	0.3 X 0.2	16.5:	M	
14	0013+359	0 13 56.9	35 55 12	Sp	0.8 X 0.3	15.5	L	Z518.020,M+6-1-20
15	0015+334	0 15 17.4	33 26 30	?	0.4 X 0.3	15.5:	L	
16	0017+340	0 17 50.1	34 3 44	Sp:	0.3 X 0.2	17.5:	L	
17	0018+377	0 18 46.5	37 47 34	Sp:	0.6 X 0.1	15.7:	L	M+6-1-28
18	0019+326	0 19 2.1	32 36 21	Sp:	0.3 X 0.2	16.8:	L	
19	0019+344	0 19 39.4	34 25 47	Sp	0.4 X 0.2	15.7:	M	
20	0020+354	0 20 10.4	35 24 52	Sp:	0.2 X 0.1	16.5:	L	
21	0021+332A	0 21 6.9	33 14 28	Pi:	0.1 X 0.1	16.0:	M	
22	0021+332B	0 21 7.2	33 14 21	Pi:	0.2 X 0.2	16.0:	M	
23	0022+329	0 22 0.5	32 58 46	?	0.7 X 0.6	14.7	L	U232,Z500.016,M+5-2-9
24	0023+372	0 23 34.2	37 12 54	Sp:	0.2 X 0.2	16.5:	M	
25	0024+335	0 24 6.6	33 30 16	Sp:	0.2 X 0.2	16.7:	L	
26	0024+355	0 24 11.8	35 33 1	Sk:	0.4 X 0.2	16.0:	L	
27	0025+329A	0 25 31.7	32 59 36	Sk:	0.3 X 0.2	16.5:	L	
28	0025+372	0 25 33.1	37 14 43	Sp:	0.2 X 0.2	16.5:	L	
29	0025+329B	0 25 35.5	32 59 30	Sp	0.4 X 0.2	15.6	M	Z500.025
30	0026+333	0 26 0.5	33 21 29	Sp:	0.2 X 0.2	16.5:	L	
31	0027+326	0 27 18.0	32 37 4	Sp	0.4 X 0.2	15.7	L	Z500.036
32	0029+374	0 29 12.2	37 24 9	Sp	0.4 X 0.4	15.7	L	U318,Z519.010,M+6-2-8
33	0029+370	0 29 27.8	37 3 41	Sp:	0.2 X 0.1	17.5:	L	
34	0030+352	0 30 10.8	35 14 41	Sp	0.3 X 0.3	16.0:	M	
35	0031+334	0 31 55.4	33 28 24	?	0.3 X 0.1	17.0:	L	
36	0034+356	0 34 30.7	35 37 40	Sp:	0.4 X 0.2	15.5	M	Z519.014

Notes on individual galaxies given in Table IV-2a (A0384)

0008+355 : Peculiar galaxy with an asymmetric blue arm whose nucleus and bar-like structure are highly UV-excessed. A star is overlapped at the south end of the bar.

0008+353 : Double star?

0008+335 : Red nuclear region.

0015+334 : A south clump maybe a component of a pair galaxy.

0019+326 : A blue knot is off-centered to the west.

0020+354 : A faint non-KUG is in the east.

0021+332A : North component of a triple system.

0021+332B : Central component of a triple system.

0022+329 : Galaxy with a brilliant outer ring and a red nucleus.

0029+374 : Blue knots on the disk.

0031+334 : A red star is overlapped at the south end.

Table IV-2b. List of KUGs (A0385).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	0032+374	0 32 47.6	37 28 10	Sp	0.4 X 0.3	16.5:	L	
2*	0034+356	0 34 30.8	35 37 40	Sp:	0.4 X 0.2	15.5	M	Z519.014
3	0036+360	0 36 48.0	36 4 20	Sp	0.6 X 0.2	14.9	L	Z519.015,M+6-2-12
4	0036+342	0 36 48.6	34 14 26	Sp:	0.3 X 0.2	16.5:	L	
5	0037+355	0 37 4.4	35 34 39	Sp	0.4 X 0.3	15.5	L	Z519.016
6	0038+361	0 38 10.9	36 8 7	Sp:	0.2 X 0.1	16.5:	M	
7	0042+325	0 42 2.6	32 34 16	Sp:	0.4 X 0.3	16.0:	L	
8	0043+343	0 43 6.7	34 22 45	C:	0.2 X 0.2	16.5:	M	
9	0043+356	0 43 17.4	35 40 59	?	0.3 X 0.2	16.0:	M	
10	0044+324A	0 44 13.9	32 24 9	Sk	2.2 X 0.8	14.1	M	U484,Z500.091(=Z501.010),M+5-3-1
11	0044+324B	0 44 28.2	32 25 15	Sp	0.6 X 0.4	15.1	M	Z500.094(=Z501.013)
12	0045+374	0 45 3.0	37 25 22	C:	0.2 X 0.1	16.5:	L	
13	0048+336	0 48 42.0	33 39 49	C:	0.2 X 0.2	16.5:	H	
14	0051+334	0 51 32.0	33 25 14	Sp:	0.2 X 0.2	17.0:	L	
15	0052+355	0 52 55.2	35 32 54	C:	0.2 X 0.2	16.5:	H	

Notes on individual galaxies given in Table IV-2b (A0385)

0042+325 : The outer regions are bent to the northeast and southeast directions.

0043+356 : Clumpy feature.

0044+324A : Symmetrical arms.

0048+336 : Star-like.

0052+355 : Star-like.

Table IV-2c. List of KUGs (A0431).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	1548+361	15 48 19.0	36 8 39	Sk:	0.6 X 0.4	16.0:	L	
2	1553+354	15 53 12.5	35 27 14	C:	0.2 X 0.2	16.5:	M	
3	1556+326	15 56 41.7	32 36 57	Pi	0.4 X 0.3	16.0:	L	
4	1604+369	16 4 32.0	36 55 56	Sp	0.6 X 0.2	15.8:	L	
5	1607+331	16 7 28.2	33 8 39	Sk	0.4 X 0.4	15.7	L	Z195.019,M+6-35-40
6	1610+351	16 10 13.7	35 6 17	Sp:	0.3 X 0.2	16.5:	L	
7	1611+326	16 11 0.7	32 37 6	Sk	1.1 X 0.6	15.3	M	U10282,Z196.092,M+6-36-2
8	1611+367	16 11 16.6	36 42 59	Sk	0.6 X 0.5	15.7	L	Z196.006,M+6-36-4
9	1611+344	16 11 46.0	34 25 1	Sp	0.6 X 0.2	15.7	L	Z196.007
10	1612+323	16 12 19.3	32 18 5	Sp:	0.4 X 0.2	16.2:	L	KE1612+323
11	1613+346A	16 13 11.5	34 37 28	Sp:	0.6 X 0.3	16.0:	L	KE1613+346
12	1613+336	16 13 12.0	33 39 3	Sk:	0.6 X 0.2	16.2:	L	
13	1613+346B	16 13 24.0	34 40 22	?	0.2 X 0.2	17.0:	L	
14	1615+370	16 15 12.8	37 2 25	Sp:	0.8 X 0.2	16.0:	M	KE1615+370

Notes on individual galaxies given in Table IV-2c (A0431)

1548+361 : Red nucleus.

1604+369 : Bright nuclear region.

1610+326 : Several blue knots are on the arms.

1613+346A : Knotty arms.

Table IV-2d. List of KUGs (A0458).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	0050+287	0 50 16.4	28 45 40	Sk	0.8 X 0.4	14.1	L	U540,Z501.031,M+5-3-16
2	0051+284	0 51 59.4	28 29 21	Sp	0.4 X 0.3	15.3	L	Z501.037,M+5-3-19
3	0053+306	0 53 51.1	30 37 18	Sp	0.4 X 0.2	16.0:	L	
4	0057+315	0 57 23.1	31 33 15	Sp	0.4 X 0.3	14.8	L	MK352,VVI06,Z501.058
5	0103+316	1 3 15.1	31 41 54	Pi:	0.2 X 0.1	17.5:	L	

Notes on individual galaxies given in Table IV-2d (A0458)

0050+287 : Dense arms.

Table IV-2e. List of KUGs (A0533).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	0148+223	1 48 27.7	22 20 7	Sp	0.6 X 0.5	13.7	M	U1315,N695,Z482.026,5ZW123
2	0148+230	1 48 34.8	23 2 11	Sp:	0.3 X 0.3	16.0:	L	
3	0153+264	1 53 30.1	26 29 22	Sp	0.3 X 0.2	16.5:	M	
4	0156+241	1 56 27.2	24 10 29	Sp:	0.6 X 0.2	14.8	L	Z482.035
5	0156+271	1 56 47.6	27 11 26	Sp	1.0 X 0.3	15.2	L	Z482.036,M+4-5-27
6	0157+234	1 57 6.4	23 24 3	Sk	1.6 X 1.3	13.4	L	U1471,N776,Z482.037,M+4-5-30
7	0158+231	1 58 15.0	23 10 31	Sp:	0.4 X 0.3	15.2	L	Z482.046
8	0158+263	1 58 56.1	26 18 20	Sp:	0.7 X 0.4	14.4	L	U1510,Z482.049,M+4-5-38
9	0159+274	1 59 56.6	27 26 24	Sp:	0.4 X 0.3	15.3	L	Z482.058
10	0200+260	2 0 50.8	26 2 11	Sp:	0.6 X 0.4	14.9	L	Z482.062,M+4-5-46
11	0202+272	2 2 41.8	27 13 39	Sp	0.7 X 0.3	16.5:	L	K0202+272
12	0203+267	2 3 35.9	26 47 51	Sk:	1.1 X 0.4	15.5	L	U1595,Z483.003
13	0205+249	2 5 45.3	24 55 35	Sp:	0.6 X 0.1	17.0:	M	
14	0206+273	2 6 10.0	27 18 3	Sk:	0.7 X 0.4	15.4	L	Z483.005,K0206+273
15	0207+254	2 7 24.0	25 26 48	Sk:	0.6 X 0.3	15.3	L	Z483.007
16	0208+221	2 8 13.7	22 7 19	C	0.3 X 0.3	16.0:	L	
17	0208+255	2 8 22.5	25 34 36	Sp:	1.2 X 0.3	15.5	L	Z483.008
18	0210+256	2 10 42.8	25 37 8	Sp:	1.1 X 0.4	14.7	L	U1706,Z483.009
19	0211+276	2 11 10.8	27 38 40	Sp	2.8 X 0.8	13.0	M	U1718,N855,Z504.035,M+5-6-16,K0211+276

Notes on individual galaxies given in Table IV-2e (A0533)

0156+241 : Red nucleus.

0157+234 : Thick arms separated from the nucleus.

0200+260 : Faint nucleus.

0203+267 : A star is overlapped.

0206+273 : Blue arms connected with the bar.

0208+221 : Star-like.

0208+255 : Both ends of the bar are blue.

0210+256 : Blue knots and red knots are on the disk.

Table IV-2f. List of KUGs (A0534).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1*	0211+276	2 11 10.7	27 38 37	Sp	2.8 X 0.8	13.0	M	U1718,N855,Z504.035,M+5-6-16,K0211+276
2	0213+279	2 13 50.0	27 57 46	C:	0.3 X 0.2	16.0:	L	
3	0220+252	2 20 10.8	25 12 30	Sp	0.6 X 0.4	15.7	L	Z483.020
4	0220+233	2 20 51.5	23 22 53	?	0.2 X 0.2	16.5:	L	
5	0220+253	2 20 59.7	25 18 57	Sp	0.7 X 0.7	15.0	L	Z483.026
6	0221+271	2 21 11.7	27 6 58	Sp:	0.8 X 0.4	15.0	L	U1852,Z483.028
7	0222+236	2 22 31.0	23 36 7	Sp	0.4 X 0.3	15.5	L	Z483.036
8	0222+269	2 22 51.6	26 59 45	Sp:	0.4 X 0.4	15.0	L	Z483.041
9	0222+270	2 22 53.5	27 1 1	Sp	0.9 X 0.3	14.9	L	N916,Z483.043
10	0225+260	2 25 24.1	26 5 20	Sp	0.6 X 0.3	14.9	L	U1939,Z483.064
11	0226+228	2 26 23.3	22 51 37	Sp:	0.7 X 0.3	15.0	L	Z483.067
12	0229+263	2 29 59.9	26 23 45	C:	0.2 X 0.2	16.0:	M	

Notes on individual galaxies given in Table IV-2f (A0534)

0220+233 : Star-like object with slight elongation.

0229+263 : Star-like.

Table IV-2g. List of KUGs (A0592).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	2128+238A	21 28 29.7	23 53 31	?	0.2 X 0.1	17.0:	L	
2	2128+238B	21 28 42.6	23 52 5	?	0.2 X 0.2	16.8:	M	
3	2129+232	21 29 23.5	23 12 6	C:	0.2 X 0.2	16.8:	M	
4	2130+244	21 30 34.0	24 28 7	C	0.2 X 0.2	17.0:	L	
5	2131+260	21 31 54.4	26 3 23	C:	0.2 X 0.2	16.7:	L	
6	2135+260	21 35 36.1	26 2 37	C:	0.2 X 0.2	16.8:	M	
7	2136+272	21 36 48.7	27 13 28	Sp:	0.8 X 0.1	16.5:	L	
8	2137+241	21 37 25.0	24 10 41	Sp:	0.6 X 0.4	16.0:	L	
9	2137+244	21 37 39.6	24 25 54	Sp:	0.9 X 0.2	15.7	H	Z472.004
10	2139+279	21 39 41.9	27 55 25	Sp:	0.4 X 0.3	16.0:	M	
11	2139+250	21 39 43.3	25 4 46	C:	0.3 X 0.3	15.7:	M	4ZW74
12	2144+242	21 44 1.3	24 12 22	C:	0.2 X 0.2	17.0:	L	
13	2145+256	21 45 2.7	25 37 13	?	0.2 X 0.2	16.7:	L	
14	2147+265	21 47 39.1	26 34 38	Sp:	0.3 X 0.3	16.5:	L	
15	2147+242	21 47 52.3	24 16 1	C	0.2 X 0.2	17.0:	L	
16	2148+226	21 48 22.4	22 37 1	Ic:	0.4 X 0.3	15.2	H	U11827,Z472.010,K2148+226
17	2149+250	21 49 24.9	25 0 21	Ic:	0.9 X 0.9	14.5	M	U11834,Z472.014,M+4-51-9
18	2151+252	21 51 5.8	25 16 53	Sp	1.0 X 0.2	15.5	L	U11842,Z472.015,M+4-51-11

Notes on individual galaxies given in Table IV-2g (A0592)

2128+238A : Star-like object with slight elongation.

2128+238B : Star-like object with slight elongation.

2129+232 : Slight elongation in the northeast-southwest direction.

2137+244 : A star is overlapped near the nucleus of the blue galaxy.

2144+242 : Star-like.

2145+256 : Star-like.

2149+250 : A brilliant clump near the south edge of the galaxy.

Table IV-2h. List of KUGs (A0665).

No.	KUG-NAME	R. A. (1950.0)			DEC.			MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1*	2148+226	21	48	22.4	22	37	1	Ic:	0.4 X 0.3	15.2	H	U11827,Z472.010,K2148+226
2	2148+223	21	48	43.1	22	22	34	?	0.2 X 0.1	18.0:	L	
3	2148+208	21	48	44.4	20	53	23	C:	0.2 X 0.1	17.5:	L	
4	2149+224	21	49	16.0	22	24	59	Sp	0.8 X 0.2	15.6	M	Z472.013,M+4-51-8
5	2149+215	21	49	50.7	21	33	2	C:	0.2 X 0.1	18.0:	L	
6	2149+200	21	49	53.0	20	0	53	C:	0.2 X 0.1	18.0:	L	
7	2149+208	21	49	58.0	20	53	30	?	0.2 X 0.1	17.5:	L	
8	2149+207	21	49	59.7	20	47	57	C:	0.2 X 0.2	17.5:	L	
9	2152+180	21	52	26.0	18	0	21	Sp:	0.6 X 0.2	17.0:	L	
10	2152+178	21	52	36.7	17	51	59	C	0.2 X 0.2	16.5:	M	
11	2153+203	21	53	58.5	20	21	35	?	0.2 X 0.2	17.5:	L	
12	2154+190	21	54	14.8	19	1	25	Sp	0.3 X 0.2	16.5:	L	
13	2154+224	21	54	24.3	22	28	0	Sp:	0.2 X 0.1	17.5:	M	
14	2154+208	21	54	49.6	20	52	30	Sp	0.6 X 0.1	16.5:	L	
15	2154+219	21	54	57.4	21	58	44	C:	0.2 X 0.2	17.0:	L	
16	2158+174	21	58	18.1	17	29	53	Sk	2.0 X 1.6	12.2	L	U11872,N7177,Z451.002,M+3-56-3
17	2158+194	21	58	18.7	19	25	37	Sp	1.1 X 0.2	16.0	M	U11873,M+3-56-2
18	2158+198A	21	58	42.5	19	48	59	?	0.2 X 0.2	16.5:	L	
19	2158+198B	21	58	46.7	19	48	32	Sp:	0.3 X 0.2	16.2:	M	
20	2159+181	21	59	59.4	18	9	31	C:	0.2 X 0.2	16.5:	M	
21	2200+180	22	0	0.2	18	4	38	Pi	0.9 X 0.3	14.8	H	U11878,Z451.003,2ZW160,M+3-56-4
22	2200+186	22	0	9.1	18	41	31	?	0.2 X 0.1	16.5:	M	
23	2200+195	22	0	9.9	19	30	30	Sp	0.8 X 0.6	14.5	H	U11880,Z451.004,M+3-56-5
24	2200+224	22	0	23.0	22	29	33	?	0.2 X 0.2	17.0:	L	
25	2200+176	22	0	30.6	17	39	37	Sp:	1.1 X 0.2	16.0	M	U11881
26	2201+175	22	1	24.5	17	35	37	Sp:	0.4 X 0.2	17.0:	L	
27	2202+176A	22	2	4.5	17	36	37	?	0.3 X 0.2	16.5:	L	
28	2202+176B	22	2	18.6	17	40	41	C:	0.2 X 0.2	17.0:	L	
29	2202+188	22	2	21.8	18	50	18	?	0.2 X 0.1	17.5:	L	
30	2203+197A	22	3	8.5	19	44	38	?	0.2 X 0.1	18.0:	L	
31	2203+197B	22	3	10.4	19	45	12	?	0.2 X 0.1	17.5:	L	
32	2203+185	22	3	12.8	18	35	35	Sp:	0.3 X 0.2	16.5:	H	
33	2203+189	22	3	43.1	18	55	23	Sp	0.7 X 0.1	16.7:	L	
34	2204+172	22	4	14.4	17	13	1	Sk:	0.6 X 0.4	15.4	L	Z451.009,M+3-56-9
35	2205+208	22	5	3.7	20	49	41	?	0.4 X 0.2	16.5:	L	
36	2205+201	22	5	34.7	20	11	56	C	0.2 X 0.2	18.0:	L	
37	2205+173	22	5	55.2	17	19	9	Sp:	0.4 X 0.3	17.0:	L	
38	2206+173	22	6	7.2	17	18	18	Sp	0.3 X 0.2	16.5:	L	
39	2206+187	22	6	35.5	18	43	42	?	0.3 X 0.2	15.5	M	Z451.014
40	2206+175A	22	6	37.7	17	34	32	Sp	0.4 X 0.3	15.7	M	Z451.012
41	2206+175B	22	6	39.5	17	35	27	Sp	0.4 X 0.3	15.5	L	Z451.013
42	2206+201A	22	6	47.1	20	7	38	Sp:	0.6 X 0.1	18.0:	L	
43	2206+201B	22	6	50.9	20	8	35	Sp:	0.7 X 0.6	15.7	L	Z451.015,M+3-56-13
44	2206+201C	22	6	51.8	20	7	39	C:	0.2 X 0.2	18.0:	L	
45	2206+212	22	6	53.9	21	17	19	Sk	1.3 X 0.9	14.8	M	U11924,Z451.016,M+3-56-14
46	2207+174	22	7	15.2	17	24	56	C	0.3 X 0.3	15.3	M	Z451.017,2ZW168
47	2207+182	22	7	23.9	18	15	23	Sp:	0.8 X 0.3	15.4	L	Z451.019
48	2207+201	22	7	59.1	20	6	27	Sp	0.3 X 0.3	16.2:	L	
49	2208+200	22	8	6.5	20	5	59	Sp:	0.2 X 0.1	17.0:	L	
50	2208+185A	22	8	29.2	18	34	22	C	0.2 X 0.2	16.2:	M	
51	2208+185B	22	8	34.6	18	33	53	Sp	0.4 X 0.2	16.5:	L	
52	2210+191	22	10	13.8	19	11	56	Sp:	0.3 X 0.2	16.5:	H	
53	2210+212	22	10	14.7	21	14	23	C	0.2 X 0.2	16.5:	M	
54	2211+202	22	11	23.1	20	14	10	Sp:	0.3 X 0.2	17.0:	M	
55	2211+214	22	11	28.2	21	29	37	C:	0.2 X 0.2	17.5:	L	
56	2211+206	22	11	37.1	20	38	49	?	0.2 X 0.1	16.8:	L	

Table IV-2h. List of KUGs (A0665).

Notes on individual galaxies given in Table IV-2h (A0665)

2148+223 : Star-like.

2153+203 : A star is in the south end.

2158+174 : A bright knot is at the south of the disk.
The nucleus is red.

2200+180 : A blue stellar component is attached to the nucleus of the other component galaxy.

2200+195 : Both ends of the bar are highly UV-excessed.

2200+176 : The western disk is more elongated.

2202+176 : A star is attached to the east end of the galaxy.

2203+197A : A star is overlapped.

2203+197B : A star is at the northwestern edge of the galaxy.

2204+172 : A blue ring structure is in the northern part of the galaxy.

2205+208 : Three clumps are lined from southeast to northwest.

2206+175 : A faint star is overlapped.

2207+182 : Blue disk with red nucleus.

2211+206 : Surrounded by stars.

Table IV-2i. List of KUGs (A0666).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	2210+190	22 10 47.0	19 3 4	C:	0.3 X 0.2	17.0:	L	
2	2213+189A	22 13 5.5	18 58 13	Sp:	2.0 X 0.2	16.0	M	U11964,M+3-56-19
3	2213+189B	22 13 26.0	18 58 51	Sp:	2.2 X 0.7	13.8	H	U11968,N7241,Z451.024,2ZW174,M+3-56-20
4	2217+186	22 17 56.5	18 41 26	Sp	0.4 X 0.3	15.2	M	Z452.003
5	2222+210	22 22 17.1	21 1 21	Pi:	0.4 X 0.3	16.0:	M	
6	2229+203	22 29 22.1	20 20 48	Sp	0.9 X 0.7	15.3	L	U12067,Z452.023,M+3-57-16
7	2229+194	22 29 26.5	19 26 7	Pd	1.0 X 0.6	14.6	M	U12066,MK306,Z452.022,M+3-57-15
8	2229+201	22 29 39.6	20 9 22	Pi	0.3 X 0.2	16.5:	L	

Notes on individual galaxies given in Table IV-2i (A0666)

2210+190 : A star is possibly overlapped with the nucleus.

2213+189A : Edge-on spiral.

2213+189B : Dense arms and/or disks with the blue nucleus.

2217+186 : Dense arms with bright clumps.

2222+210 : A blue component is connected with an eastern non-KUG.

2229+201 : Two components are lined in the north-south directions.

2229+194 : A blue component(MK305) is detached from a blue barred-spiral galaxy(MK306).

Table IV-2j. List of KUGs (A0725).

No.	KUG-NAME	R. A. (1950.0)	DEC.	MOR. TYPE	APP. SIZE	APP. MAG.	UVX DEG.	OTHER NAME(S)
1	1748+144	17 48 12.3	14 24 25	Sp	0.8 X 0.3	14.7	L	Z083.028,M+2-45-5
2	1753+126	17 53 54.3	12 40 2	C:	0.2 X 0.2	16.0:	L	
3	1757+175	17 57 24.8	17 32 36	Sp:	0.4 X 0.4	15.4	L	Z113.012,M+3-46-7
4	1801+150	18 1 5.6	15 5 48	?	0.3 X 0.2	16.0:	L	
5	1802+140	18 2 11.0	14 2 45	?	0.2 X 0.1	16.5:	M	
6	1809+164	18 9 38.8	16 29 53	?	0.4 X 0.2	15.5:	L	

Notes on individual galaxies given in Table IV-2j (A0725)

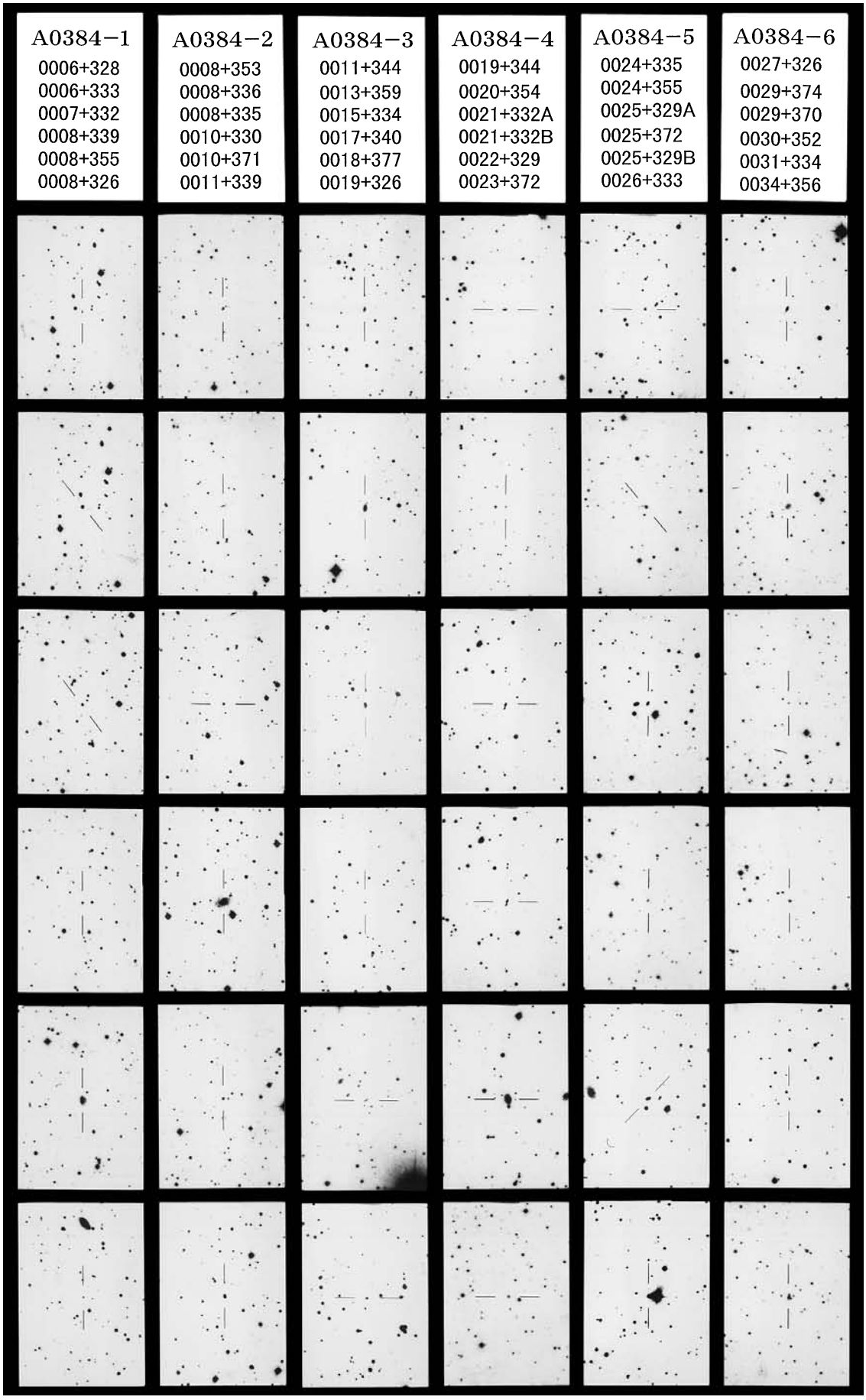
1753+126 : A faint halo is attached to the star-like image.

1802+140 : A faint halo is attached to the star-like image.

1809+164 : Star-like images are lined in the north to south direction.

Fig. IV-1. Finding Charts

In the following pages, finding charts are shown for each KUG listed in the catalogue (Table IV-2). These photographs are reproduced from the Palomar Sky Survey blue prints (©1960 National Geographic Society - Palomar Sky Survey reproduced by permission of the California Institute of Technology). The chart is in magnification of 3.0 times (0.37′/mm), and the field of $11.8' \times 7.7'$. The north is up, east to the left.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A0384−3
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0013+359
0015+334
0017+340
0018+377
0019+326
A0384−4
0019+344
0020+354
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0022+329
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0029+374
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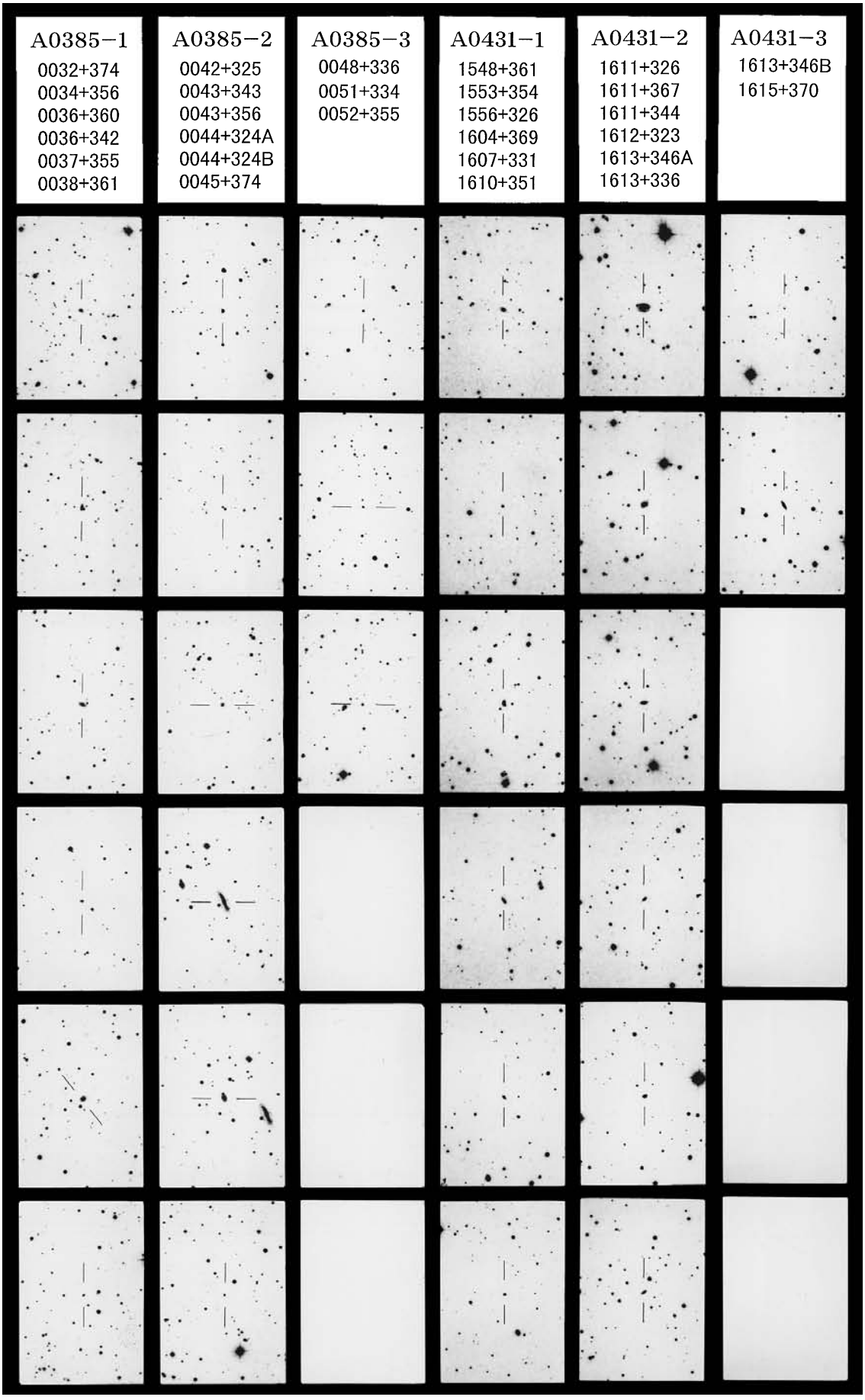
0030+352
0031+334
0034+356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0044+324B
0045+374
A0385−3
0048+336
0051+334
0052+355
A0431−1
1548+361
1553+354
1556+326
1604+369
1607+331
1610+351
A0431−2
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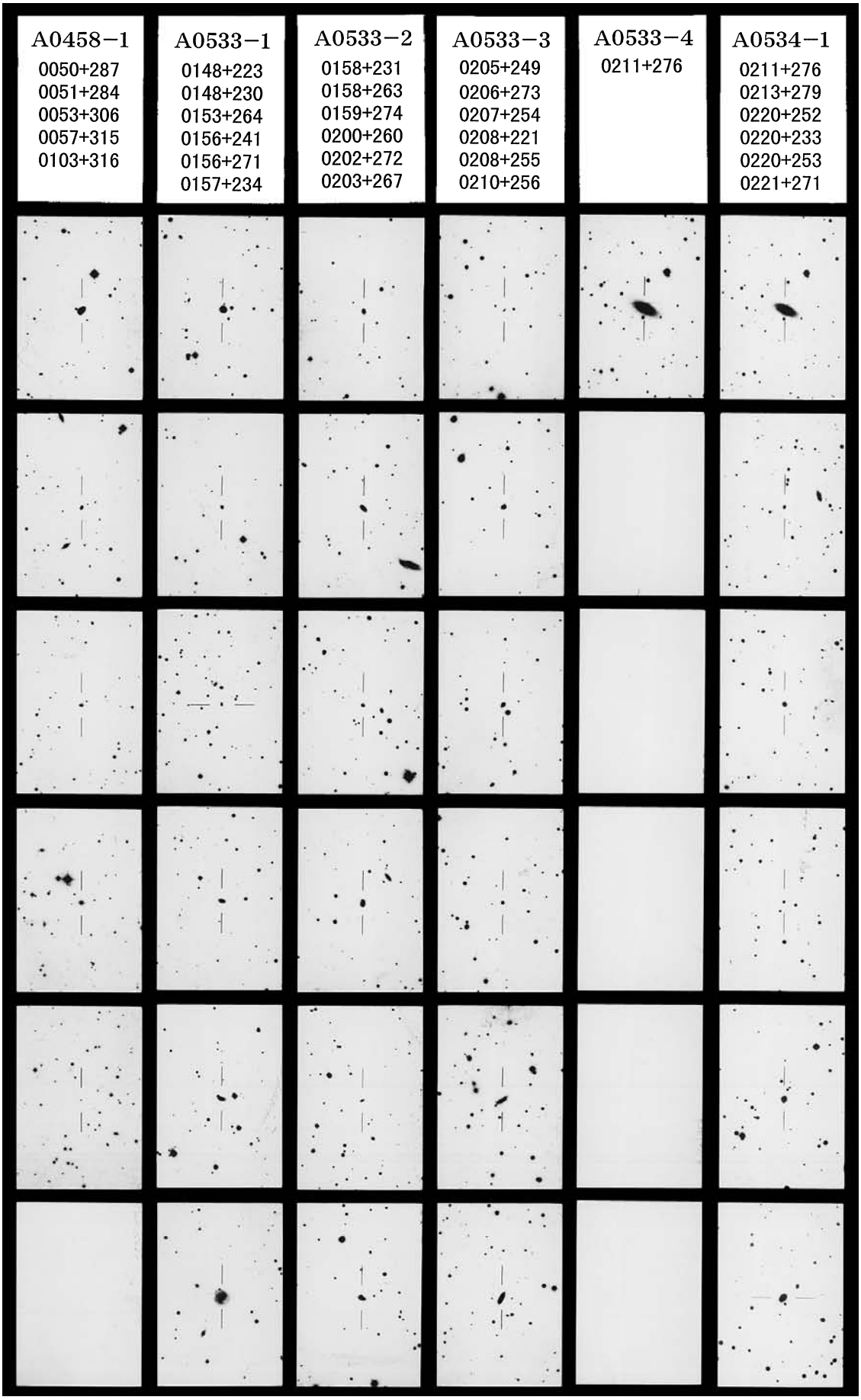
1613+336
A0431−3
1613+346B
1615+370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0156+271
0157+234
A0533−2
0158+231
0158+263
0159+274
0200+260
0202+272
0203+267
A0533−3
0205+249
0206+273
0207+254
0208+221
0208+255
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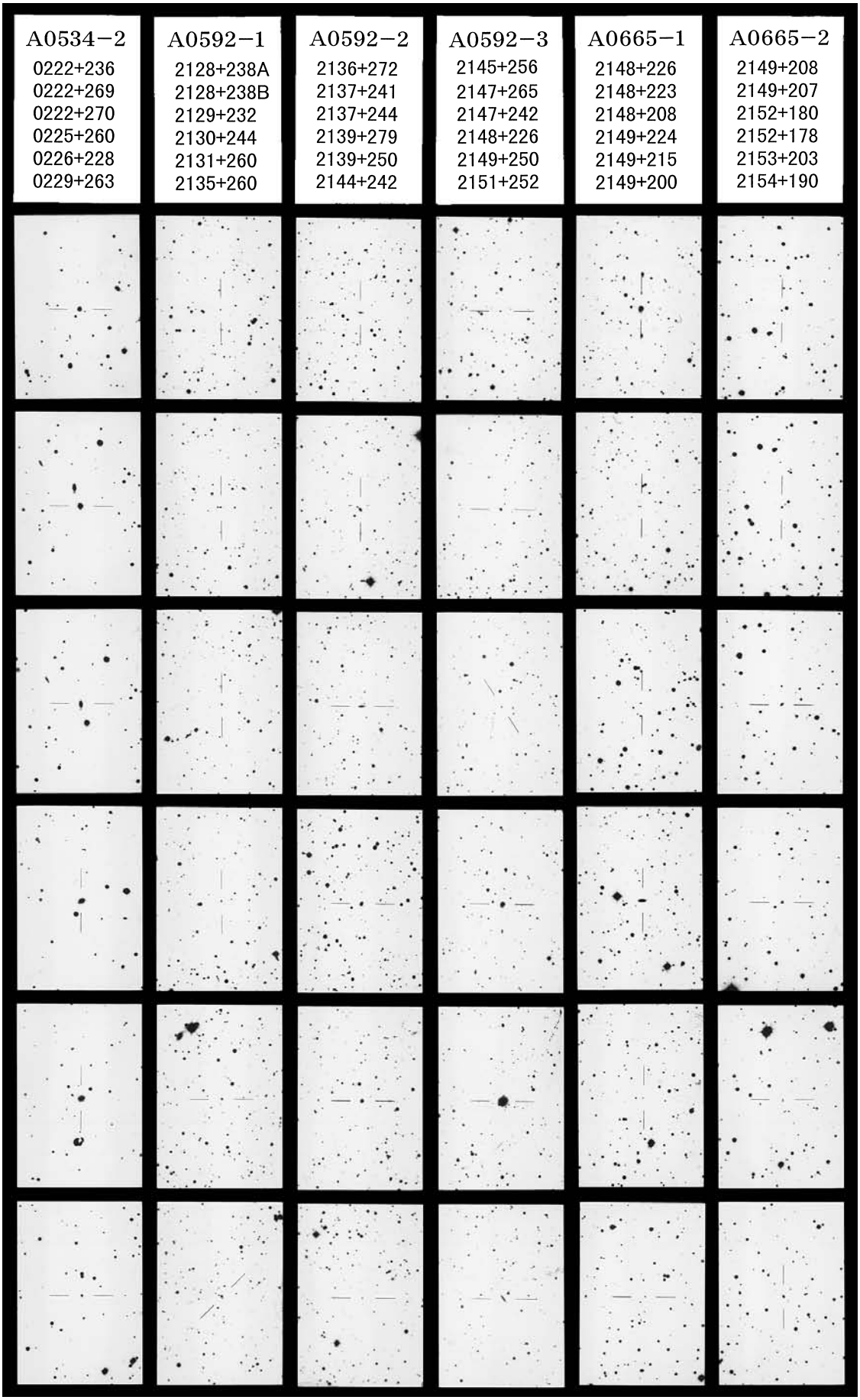
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2129+232
2130+244
2131+260
2135+260
A0592−2
2136+272
2137+241
2137+244
2139+279
2139+250
2144+242
A0592−3
2145+256
2147+265
2147+242
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2149+224
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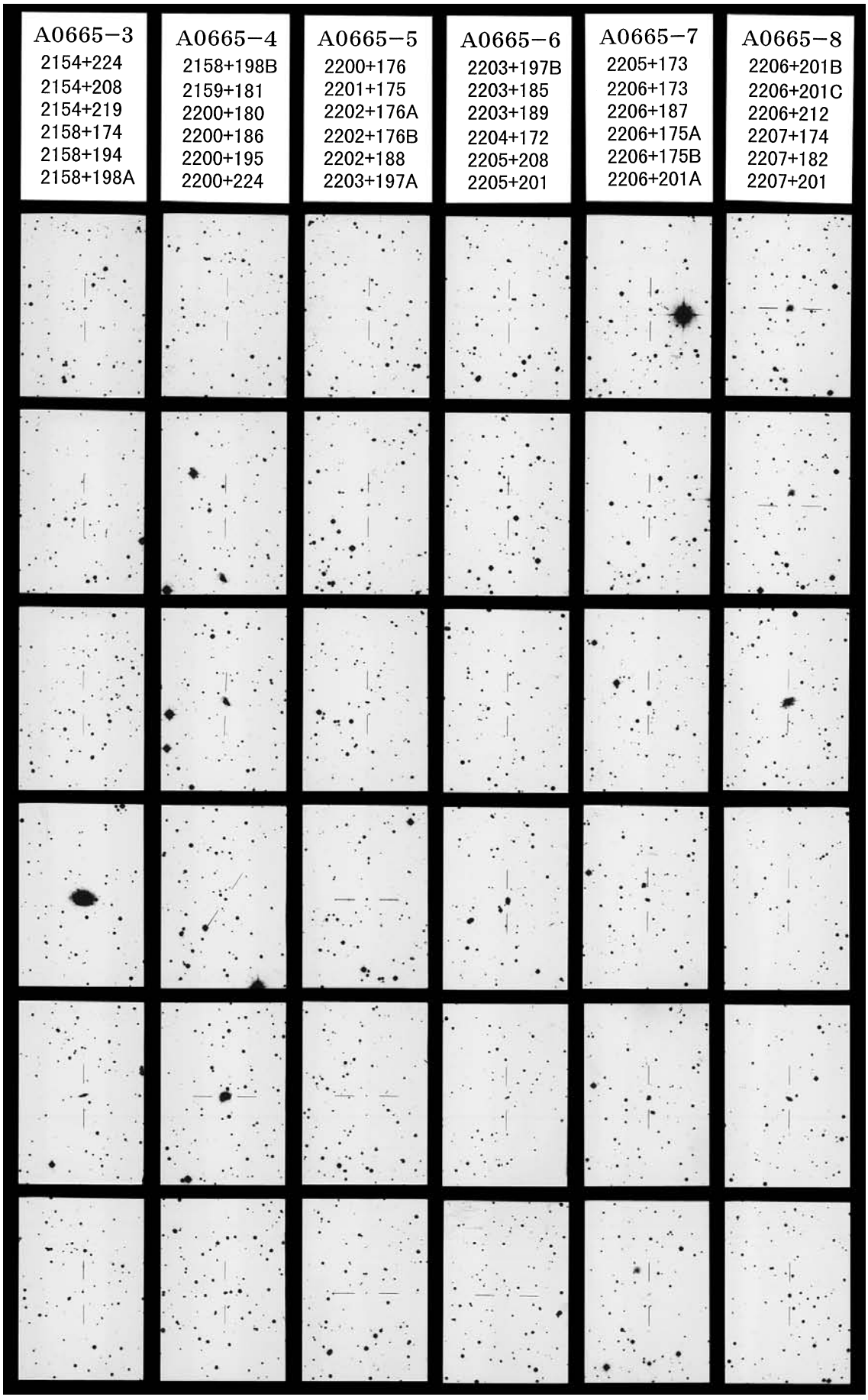
2149+208
2149+207
2152+180
2152+178
2153+203
2154+190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2154+219
2158+174
2158+194
2158+198A
A0665−4
2158+198B
2159+181
2200+180
2200+186
2200+195
2200+224
A0665−5
2200+176
2201+175
2202+176A
2202+176B
2202+188
2203+197A
A0665−6
2203+197B
2203+185
2203+189
2204+172
2205+208
2205+201
A0665−7
2205+173
2206+173
2206+187
2206+175A
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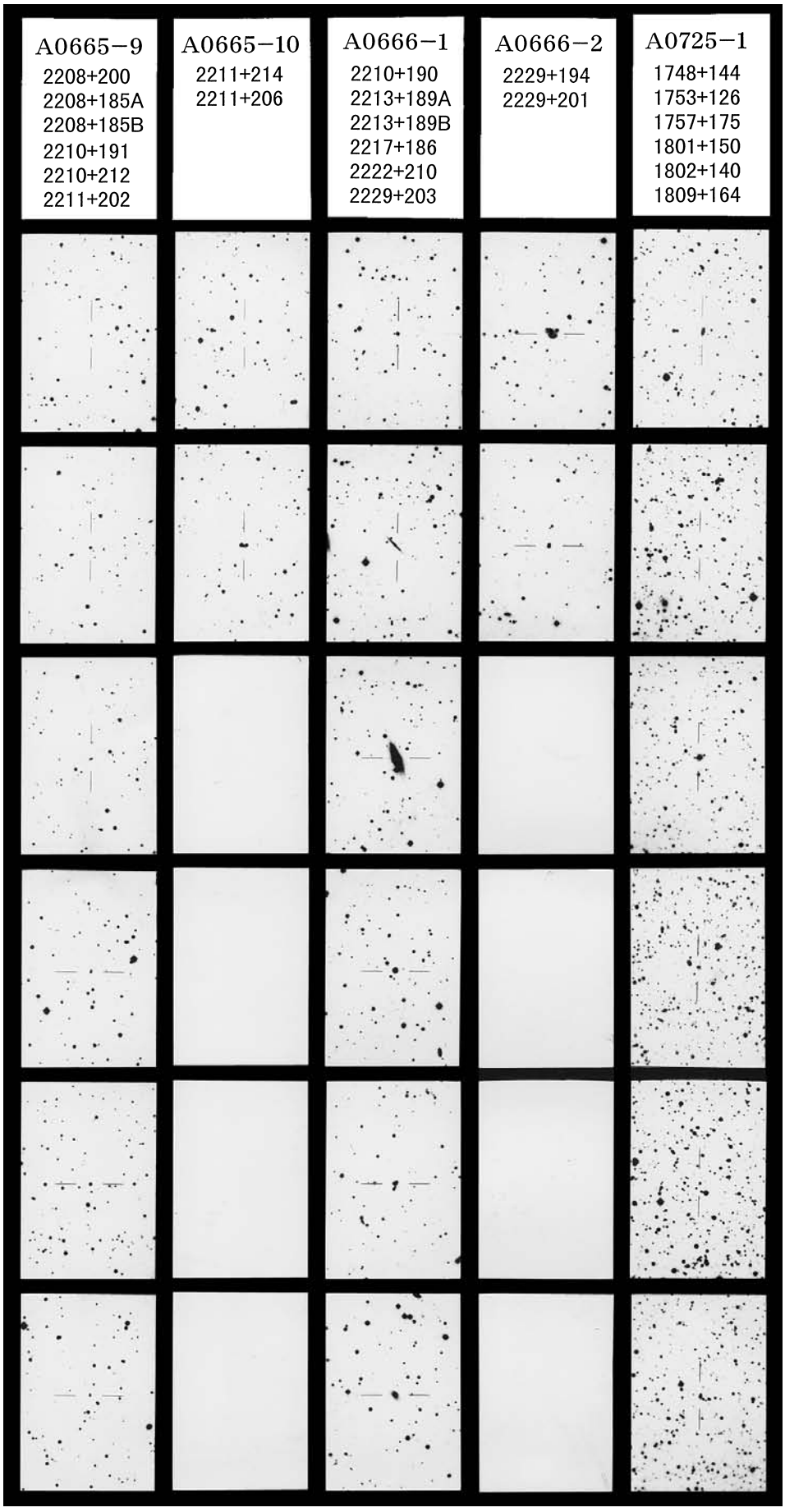
2207+174
2207+182
2207+201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2208+185A
2208+185B
2210+191
2210+212
2211+202
A0665−10
2211+214
2211+206
A0666−1
2210+190
2213+189A
2213+189B
2217+186
2222+210
2229+203
A0666−2
2229+194
2229+201
A0725−1
1748+144
1753+126
1757+175
1801+150
1802+140
1809+164