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4

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from H3

7w	52729	14525		5245 5249	Cr?
7	53457	15247	✓	5279	Fe +?
9	53649	15445	✓✓	5281 5305	Te
10	53923	15719	✓	5305	Fe
9 with	54325	16121	✓	~~5327.19~~	Fe+ 5328.04
9	54515	16311	✓	5337	Ti + Fe
4	54657	16453	/	5347	Cr?
5	54779	16575		5354	Fe Cr
4	54918	16714		5362	5363 —
6	55051	16847	✓	5366	Fe Co (70,71)
4	55051	16947		5376	mn
9	55284	17080	?	5384	83.5 Fe
10	55592	17388	✓	5398	Fe Fe
10	55803	17699	✓	5419	Ti + ✓
8	55993	17789	?	5426	?Fe 24 Fe
10	56318	18104	✓	5445	Fe ✓
4	56926	18722		5481	Fe, Fe, Ti ?
6w	57001	18797	✓	5484	Co ?
12	57534	19330		5520	5522
10	57706	19502		5532	5535 Ba ?
8	57926	19722		5545	44.46 Fe, Fe
10	58923	20719		5568	✓ Fe

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from Hβ

	59241	21037	5630	Fe ✓
	59587	21383	5653	
	59726	21522	5663	Fe ✓
	60062	21858	5681	
10	60427	22223	5706	Fe ✓
5	60566	22362	5715 ✓	Fe
8	60651	22447	5720	
8	60981	22777	5740	
7	61510	23306	5763	
?	61903	23699	5789	Fe

3B ident

21
52

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Sergeis

drawing



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✓	Ba	5535.53	1000	—	5270.36	30	Fe+ ✓	5169.03	8
—	Ba+	4699.97	35	✓	5227.19	40	—	5018.44	8 *
✓	Y+	4883.69	50	✓	5167.49	40	out	4923.92	10
	out	4900.11	30	—	5216.28	10	✓	5325.56	4
✓	Ti+	5418.77	1	—	5194.95	10	—	5316.62	8
		5381.02	(4)	✓	5171.60	20	✓	5276.01	6
✓		5336.78	2	✓	5041.76	10	✓	5234.62	4
✓		5226.56	3	✓	5006.13	20	✓	5197.56	4
✓		5188.70	4	out	4985.56	7	✓ C6	5483.34	40
—	Fe	5110.41	10	out	4957.61	60			
—		5506.78	18	out	4920.52	60			
—		5501.47	12	out	4919.01	30			
—		5455.62	40 *	out	4891.51	50			
✓		5446.92	40	✓	5281.80	10			
—		5434.53	30	?	66.57	30	where?		
? ✓		5429.70	40	✓	32.96	40			
—		5405.78	40	✓	5192.36	30			
✓		5367.14	40	?	5139	20, 10			
✓		5371.50	50	✓	5324.20	30			
✓		5328.04	50	—	5615.66	50			
		5269.54	60 *	—	5586.77	40			
—		5057.64	10	—	5572.86	30			
—		5012.07	12	—	✓ 5369.63	20			
✓		5341.03	20						
(✓)		5328.53	15		+6				

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$$\lambda = 2733.14 + \frac{-2.02 \times 10^{8}}{38204 - 133206}$$

$n_0 = 133191$ $\quad c = -2.00697 \times 10^{8}$ $\quad \lambda_0 = 2748.44$ (2112.89)

n	$n - n_0$	$\frac{c}{n - n_0}$	$\lambda_0 + \frac{c}{n - n_0}$
38204	- 94987	2112.89	4861.33
49739	- 83452	2404.93	5153.37
49977	- 83214	2411.81	5160.25
50777	- 82414	2435.23	5183.67
50949	- 82242		
51104	- 82087		
51326	- 81865		
52224	- 80967		
52481	- 80710		

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One Prism C Plates
Standard of wave length C 15352; remarked
" " intensity Solar spectrum as in
Book 3 for 2 prism X plates.

One Prism X Plates
Standard of wave length X5272 β Indi

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2

G^{hv}

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1h

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		2h				Q	D		Page
15467	o Cet	2	14	−3	4	5	4		30
15453	o Cet	"	"	"	"	3			—
15433	o Cet	"	"	"	"	4			—

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3h

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4h

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	5h						
C 15423 α Ori	5	50	+7	23	4	B	omitted
15425 α Ori					4	4	"
15417 α Ori					4	4	"

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1925phae.proj.1095P

8

6h

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1925phae.proj.1095P

7h

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8h

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1925phae.proj.1095P

9h

~8

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1925phae.proj.1095P

		10h				Q.	D		Page
15437	Uhya	10	33	-12	9	4	3		31
15426	Uhya	"	"	"	-	4	3		~~3~~
15384	Uhya	"	"	"	-	4	3		—

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1925phae.proj.1095P

11h

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12^h

$\sim\varepsilon$

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	13h			Q	D	Page
16822	83UMa	13	37 +55.2	4	3	29
15396	RHya	13	24.2 −22 8	4	2	32
15385	RHya	—	———	3	2	—

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1925phae.proj.1095p

Plate & Star	Position 4^h W	Q	I	Page
C 16826 W Boo	14^h 39 +27.0	4	3	96

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1925phae.proj.1095P

15h

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	16^h			Q	D	
15863	16	19.9	−7 15.4	3	2	—

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17h

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18h

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19h

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1925phae.proj.1095P

	2000		Q	D	~Li	Page
C15242	20 26.8	+48 43.6	3	2		28

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1925phae.proj.1095p

	21h		Q	D		
15899	21h 42	+60.7	3	2		27

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22h

16

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	23h	Q	D	Page
16988	23 52 +42.6	3	—	—

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1925phae.proj.1095p

W Bootis

C 16826 $14^h 39$ +27.0 Q4 D3 whole sp. hazy

15-18	7w
19	3
20	5w
21	5
21a	3
22	3
23	6
24	6w
25,b	5w
26	5
30	5w? hazy
35	2 hazy
36	11 hazy
43	9w
G	wide haze, no lines distinguished
4315	—
44	7
45,a	6
47	6
49a?	6
50	2
53	4
56	4
57	5
58,9	5
61,b	5
63	5
69	2

C 15423 5 50 +7 23 α Oph Q4 D3 Iso not measured

C 15962 19 36 +42 6 Q4 D1 " "

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1925phae.proj.1095p

12 Cephei

C 15899	$21^h 42$	+60.7	Q	3	D2
35	?				
36	9				
38a	9				
40	7				
41.a	10 w				
44	8				
44a	4				
45;a	8				
+37 6	3				
47	7				
49	8				
50	6				
53	5				
54	5				
57	5				
58,9	6 w				

× C 15863 16 19.9 −7 15.4 Φ 3 D2 poor but possible

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1925phae.proj.1095P

28

ω^2 46 Cygni

C 15742 20 26.8 +48 43.6 Q 3 D 2

35 seen
36 10?
43 8
G strong, conv.
44 8
45 8
46 6
47 7
48a 7
~~50~~ ~~49~~ 3
57 5
58,9 7d
63 7w
69 suspected: 1?

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1925phae.proj.10953

83 U Ma

C16822 13 37 +55.2 P + D 3 very good
violet end badly scratched

23 8 ?
24 9 ?
26 6 ?
29 6
30 7
35 3
36 12
38 40 13 w
41, 2 12
43 10 w
G strong, con
43 15 —
44 9
44a 4
45 8
46 4
43 60 4
43 70 3
43 76 3
47 8
49a 9
50 4
54 4
55, 6 slt
57 4
58 5
59 5
63 8
64 5

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1925phae.proj.1095P

o Ceti

15467 2 14 −3 4 QR D 4

6	11
7	8
	4
9	8
10	10
3999	7
14	6
15-18	10w
19	3
20	8
21	4
23	8
24	11we
25,a	4,4
28	4
30	6
35	6
36	11
38a	9
41,a	9
G	5,5
+315?	6w
44	–
45	10we
46	6
50	3

rest obliterated by bands

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1925phae.proj.1095P

C 15437 10 33 −12.9 U Hya Q4 D3
Lines uncertainly identified.

35	6 G band vis, con.
36	7
43	6
44	5
45	–
47	7
50	6
53	–
54	–
55	3
56	3
	9
	9
	10
	10
616	7

C 15426 U Hya. Q4 D3 hazy. Not measured
C 15384 U Hya Q4 D3 " " "

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1925phae.proj.10958

C 15396 13 24.2 −22.8 R Hya ✓ Q4 D2 good in violet

7 8
9 8
10 9?
15-18 11w
19 4
20 8
21 2
23 7
24 8e
26 5
30 7w
38 9
35 to 36 wide and nr.
38a 8
Red end in poor focus, banded.

C 15453 o Ceti Q3 n.m.
C 15433 o Ceti Q4 " "
C 15425 α Ori Q5 D4 iso n.m.
C 15417 α Ori Q4 D4 iso " "
C 15385 R Hya Q3 D2 n.m.
16836.3 DM 39° 2193 Q4 D1 n.m. too faint
16988 2352 +42.6. Q3i narrow. useless.
17277 21h. Mt and Md useless
16795 10 56.8 −1°.57. Q3. focus. useless.
14866 21h 39.6 Q3i. D2 useless.
16061 +18° 3817 Q4 D2 "
16067 4h 28m Q4 D2 "
16818 13 47 +35.0 Q3 D4 narrow "
16647 useless
16715 0 15.3 +37 57 "

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74 Virginis

16812 13 27 -5.8 Q 4 D2

44 6
45,c 6
46 6w
48a 7w
49a 8w
50,b0 8w
69 1

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7 Pegasi

14875 $21^h 37$ +5.2 Q 4 D 3 excellent

44	7
44a	4
45	7
~~436~~	6
4360	5
4370	5
4376	5
47	6
48a	7
50	4
53	6
54	6
53	4
56	5
57	6
58	5
59	6
60	4
61	4
61A	5
62	5
63	5
69	—

Is this ~~is~~ the star in question?
Class more K

bright between.

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57 Pegasi Mb

16985 23 4.5 +8.8 R4 D2
contrast very slight

35	-
36	12?
43	107
G	con
4315	2
+4	6
45	6
46	5
47	5
47	6
50	2
53	3
54	4
57	4

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55 Pegasi

16987 23 09 -6.6 Q4 D3 good

15-18 9
19 2
20 6
21 6
21a 3
22 6
23 6
24 6
26 6
30 5?
35 4
36 11
38a 12
43 12
G 5,
11
4315 ?
44 9
45 9
46 8
47 9
49 10
50 4
53 4
54 4
55 } 8w
56 }
57 6
58/9 7w
63 7
69 —

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X 89 Pegasi

16991 0 09 +19 6 Q4 D2 good

36	12
+3	11
G	6, 10
44	7
45	7
46	5
47	7
48a	7
50	~~4~~
53	4
54	4
~~55~~	5
56	5
57	5w
58	5
59	5
60	5
~~61~~	5
62	4
63	6
64	–

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HR 1693

17222.3 $5^h 4$ 36.9. Mv. Q 3 D4 very narrow

6	12 focus poor
10	14 " "
3999	5
14	5
15-18	9
20	7
21	4
23	6
26	5
30	5w
35	2
36	11
43	6
4300	5
4308	2
4315	–
43[illegible]	3
45	4
46	4
50	3
54	4

rest obscured by heavy bands

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30 Piscium Mb

C 17007.2 23 56.8 −6 35 Q 4 D 2

plate heavily fogged except just around spectrum. poor and hazy

44	8
45	8
46	5
4360	4
4376	4
47	7
48a	8
50	3
53	4
54	5
63	7
69	1
57	1
58,9	7

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1925phae.proj.1095P

51 Geminorum Mb

C 16410.1 7 7.7 +16 3 Q3 D4

very narrow

15-18	9
20	7
23	4
25	2
26	1
30	2
35	–
36	1
43	7
G	wide hazy.
44	5
45	5
46	3
47	2

nothing else measurable.

C 16755 6 2.8 -21 48 useless. hazy.

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ψ Virginis Mv

C16807 12 49 -9.0 Q 3 D 3

very narrow

15 18 9
20 7
23 2
24 4
26 2
35 1
36 11 hazy
43 4
G wide hazy
44 4
45 5
46 3
47 2

nothing else measurable.

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17055 23 53 +24.6 ψ Pegasi ✓Mα Nbr. Excellent. Q 5 D 3 C

15-18	10
20	7
21	5
22	5
23	7
24	8
26	7
30	6
35	2
36	11
38a	9
40	7
41a	8
42	8
43	8
G	7
	8
4315	5
	3
44	8
	3
59	9d
46	7
4360	5
70	5
76	6
47	7
48	3
48a	3
49	7
49a	7

50	6
53	7
54	7
55	4
56	5
57	5w
58	7
59	7
60	7
61	6
61a	6
62	6
63	6
69	1?

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Other plates — 119 Lacerti Mar
C17262, 63, 64, 67 and C I 2819, 2538, 26222, 10493.

C17247 HP1003. 5 26 +18.5 φ 3i D3

15-18	10
19	4
20	7
21	3
22	3
23	8
24	7
26	5
30	6
35	6
36	8
43	7
G	wide
44	6
45	8
46	6
47	7
48a	7
53	4
54	6
57	6
58	4
59	4
61b	5
62	5
63	7
69	5

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DM 120° 707 π 26 Eridani Md

C 17197 3 41 −12.4 Q 3 D 5 burnt out in red end.

6	17
7	7
9	7
10	11
3999	6
14	5
15	11
19	3
20	7
21	6
22	4
23	7
24	6
25a	5
26	6
30	5
35	3
36	9
43	6
6	5
	6
44	6
45	6
46	3
47	5
48	5
50	3

rest burnt out

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HR 1105 – Camelopardalis Ma

C17183 HP 583. 3 34 +62.9 +62.597. P3 D3 very poor.
background much fogged

23	8
24	8
35	7
36	8
43	8
44	6
45	7
47	4
48	7w
63	7

C17181 1 52 33 +62 58. (Md) +62° 2007. Useless

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Map

C 15424 5 50 +7 23 α Orionis Q5 D 4 isochromatic? X

6	13
9	6
10	12
3999	6
14	5
15	11
20	9
21	5
22	4
23	8
24	9
26	6
30	7w
35	5
36	10
43	8
G	7
	7
4315	3
44	7
45	7
46	4
4360	3
47	7
48a	7
53	4
54	4
55, 58	9w
57	6

58	6w
63	7
69	6

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X 5270 HR 583. 1 55 -21 34 ν Ceti Q 4 D4 excellent

15	11
19	3
20	8
21	6
21a	3
22	6
23	8
24	6, 6
26	7
30	7w
35	6
36	11
36b	5
38	6
39	8
40	7
41	6
42	6
43	7
G 4300	6
4308	9
4315	4
44	8
45	5, 5
46	7
4360	6
4370	6
4376	6
47	8
48	4
48a	8
49	6
50	7
53	7
54	7
55	6
56	6
57	7
58	7
59	7
61	5w
61b	6
62	5
63	6

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1925phae.proj.1095P

Mb

X5312 3 60 -61 22. γ Reticuli Q4 D3

35	7
36	11
43	8
4300	6
4308	8
4315	5
44	7
45	7
~~4360~~ 46	6
4360	5
4370	3
4376	5
47	6
48,9	10
50	6
53,4	6,6
57	6
58	5
59	5
616	5 } ui band
62	6 } ui band
63	6 } ui band

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	Ma δ Reticuli		K5 ι Reticuli
44	8	44	9
45	8		4
46	7	45	8
4360	5	46	7
4370	4	47	8
4376	5	48,9	8
47	8	50	6
48,9	8	53	4
50	5	54	4
55	5	57	5
56	6	58,9	8
57	6	60	3
58	5	63	7
59	6		
60	4		
61	3		
666	5		
62	4		
63	6		

X5297 same region | Q 3D 3 good. mm.

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× 4717 10 34 -78 6 χ Chamaeleontis Q4 D3 excellent

26	8
30	7
35	6
36	12
43	7
4300	6
4308	9
4315	5
44	7
45	8 wd
46	7
4360	5
4370	5
4376	6
47	8
48, a	9
50	7
53	7
54	7
55	4
56	5
57	7
58	6
59	7
60	4
61	4w
61	6
62	5
63	6

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X4782 A Capricorni 21 1 -25 24 q3 D2

44 qw
45 7
46 6
4360 5
4370 2?
4376 2?
47 8
48,9 8
50 6
53 5
54 5
57 5
03 8w

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X4387 20 45.9 -27 17 ω Capricorni AGC 28598 Q3 D4

35 5
36 11
43 6
4308 7
44 8
45 7
46 6
4376 4
47 7
48,9 7
50 5
53 5
54 5
55 3
56 4
57 6
61 4
62 4
63 7

X9413 19 59.7 -53 10 too hazy

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1925phae.proj.1093

5562 9 17.1 −25 32 θ Pyxidis p3D? very hazy nebs.

X5070 H Scorpii 1630 −35 3 p3 D3 very hazy.

35 7
36 12
43 6
G 5
8
4
(4)
44 7
4
45 7
46 6
4360 4
4370 4
4376 5
47 8
48 6
4829 8
~~49~~ 50 6
53 6
54 6
56 5
57 6
58 6
59 6
61a 2
61b 5
62 2
63 6

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X 5271 3 15 -22 7 τ_4 Eridani. Q5 D3 excellent.

15	10	55	5
20	10	56	5
21	6	57	7
22	4	58	7
23	7	59	7
24	6w	60	4
26	6		
30	5w		
35	5		
36	11		
37	5		
38	6		
38a	7		
40	6		
41,2	12w		
43	7		
4300	6		
4308	8		
4315	6		
44	8		
	4		
45	10d		
46	8		
4360	5		
4370	5		
4376	6		
47	8		
48	10d		
50	7		
53	7		
54	7		

not con

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Eder + Valenta

Flame

I 1 Head of 4314 band very pronounced; running to
5. KCl 4047, 4044 only lines
6 Rb 4216, 4202
7 Cs 4593, 4555
8-10 Ca salts 6265 very strong
5543, 5517.
12 $SrCl_2$ 4608
II 3-5 Cu 4651 not strong
7 $MnCl_2$ 4035, 33, 31.
8 Pb 4062
III. 1 Mg 4571
IX. 6. Kaes 5832, 5813, 5802, 5783, 6360, 5343, 5340
XI. 1, 2 Y. 4900. 4884. 4675 4644 4527, 28 4423 4398
4375 4310 4236 4143 4128 4103 4078 3951

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Sp. of La in sun.

3245.250 (5) ?
(4)

49.481(4,3) -
65.795(5,4) -
03.241(-5,5) 000 Nd? La
37.630(6,15) 0 La .630
44.705 (5,7) 2 La .655
76.472(3,3) 2 La .471
81.046(8,-) 5 Nd? Ni La .026
81.16 (-,10)

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1925phae.proj.1095

Identification of standard lines in C 15698.2

12h 22.2 +24° 54.4 m = 5.7 +24° 2464

marked on plate	
7	= H
11	= K On 2 prism X std α Centauri
15	= ~~15~~ 3999
16	= ~~16~~ 14
18	= 15
19	= 20
20	= 21
21	= 21a
22	= 22
23	= 23
25	= 24
28	= 26
30	= 30
35	= 35
36	= 36
37	~~38~~ = 38
38	~~39~~ = 39
40	~~41 42~~ = 41, a
44	= 44
45	= 45
46	= 46
50	= 47
51	= 48a
53	= ~~53~~ 3, 4
57	= 57
74	= 69

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Number of Balmer lines observed.

Star and plate	No. of lines	Q	D	Remarks
H 2215 ✓ α Cyg ✗	18	5	3	17 not seen. std plate
H 2219 ε Cyg ✗	12	4	3	violet not strong
H 2278 +24 540	11	4	3	violet weak, prob. useless
+23 505	10	4	3	" " " "
+23 507	12	4	4.	H.P. 608
+24 547	12	4	4	HP 610
+23 516	13	4	4	HP 613 possibly 14. 13 hazy
+24 563	10	4	3	violet weak, prob. useless
+23 541	12	4	4	η Tauri
C 294 Pleiades	~~16~~	~~3~~	~~4~~	violet weak
H 2279 ε Ori ✗	16	3	4	lines very faint & hazy
H 1810 α Lyr. ✗	12	5	3	~~6~~ see violet rather weak. stained plate.
H 1821 ζ Ori ✗	10	4	4	lines hazy. stained plate
H 2274 β Ori ✗	15	4	4	lines faint. 15 uncertain
H 2222 α CrB ✓	—			rejected. back fogged
H 2288 α CMa ✗	14	4	4	violet strong
H 2287 α CMa ✗	14	4	4	" "
H 2286 α CMa ✗	13	3	4	focus rather poor
H 2285 α CMa ✗	14	4	4	violet strong
H 2289 η CMa ✗	12	3	3	violet cut off. probably ✗12
H 2223 α Oph ✗	13	4	3	violet rather weak
H 2283 γ Ori ✗	13	3	3	focus rather poor
H 2224 α Cyg ✗	19	5	4	violet strong
H 2225 α Lyr ✗	14	5	5	" "
H 2217 α CrB ✗	12	4	3	violet very weak
H 2227 α Cyg ✗	18	5	4	violet rather strong
H 2284 α Lyr ✗	14	3	5	" very "
H 2291 ε Ori ✗	16?	3	4	lines weak.

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H2293 ΣOri	16	5	4	lines weak
H2210 α Lyr	14	5	4	
H2213 α Lyr	13	4	4	focus rather poor
H2283 α CMa	—	—	—	too dark
H2158 α Lyr	13	4	3	× × Quartz prism
H2212 α Lyr	14	4	4	
H2226 α Cyg	18	4	5	violet strong
H2218 α Oph	12?,13?	4	3	" weak
H2282 γ Ori	13 & 14?	3	4	focus rather poor. lines
H2211 α Lyr	14	4	4	weak
H2280 α CMa	14	4	5	violet strong
H2275 β Ori	16	4	5	
H2276 β Ori	15	4	5	
H2273 β Ori	16	4	5	
H2277 β Ori	16	4	5	focus rather poor

Miscellaneous plates.

Plate	Prism	Star	No. lines	Q	D	
C 6156	2	β Ori	15	5	3	16 suspected. vt ft
C 171	1	α Aql	13	4	4	vt ft. focus poor.
C 170	1	α Aql	14	4	4	vt ft
C 173	1	α Aql	14	4	4	" "
C 287	1	γ Lyr	15	4	4	vt falls off.
C 1984	1	α Cyg	17 seen	4	4	vt falls off
X 7632	2	β Cru	13	5	3	3 exps counted
X 9652	2	β Cru	13	5	3	
X 9665	2	β Cru	13	4	3	
X 9695	2	β Cru	13	4	3	
X 4857	1	γ Cen	14	4	4	
C 3104	1	β Ori	16	5	5	Excellent.

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c 6106	2	β Ori	16	4	4	very good
c 32	2	β Ori	15	3	3	focus poor. may be 16
c 1800	1	β Ori	16	4	4	very good. may be 17
c 1993	1	α Dyr	15	4	4	very good
x 4597	1	α Car	(14)	4	4	more vt cut off
x 4057	1	β Cen	13	4	4	excellent
x 3892	1	α Car	19	4	5	
x 3877	1	α Car	19	4	4	
x 6163	1	α Car	16+	4	4	vt cut off
x 3865	1	α Car	18	4	4	
x 3861	1	α Car	16+	4	3	vt cut off
x 3862	1	α CMa	14	4	4	
x 3869	1	α CMa	14	4	4	
x 4058	1	β Cen	13	4	4	focus poor
x 4056	1	β Cen	—	—	—	
x 4059	1	β Cen	13	4	4	
x 4778	1	ν Sco	13	4	3	possibly 14. vt ft
x 4591	1	α Cru	12 scan	3	3	focus poor.
x 9733	1	β Cru	13	3	5	very poor focus
x 3856	1	δ Ori	14+	3	4	focus very poor
x 7402	1	β Cru	13	4	4	
x 7364	1	β Cru	—	—	—	no vt.
x 6295	1	β Cru	13	4	4	
x 4192	1	β Cru	13	3	3	focus poor
x 3859	1	α Eri	14	3	4	
x 4498	1	α Eri	14	3	3	
x 4085	1	α CMa	14	4	4	
x 4488		α Eri	13+	4	3	vt cut off
x 7577	2	β Cen	13	4	4	

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Balmer series A stars

Plate	Boss	DM	Lines	Intensity	Remarks	HD
20914.51(52)	4328	5615	10	10+	PF	
17420.18	5761	5741	12	10	PF	212061
17412.16(15)	5904	5904	14	10+	PF	216627
17410.13	5427	6174	12	10		200761
10078.32	4859	4876	11	8	at edge	177756
4941.4	4445	11661	11-12	6	lines wide	59217
17417 (14657.8)	5171	3911	13	10		191692
11077	4586	4292	11+	8	~~PF~~	165040
(20144.8)	~~45~~		13	8		
B4118	5315	3501	15	10	ex	197051
B2938	5214	5642	11+	8	no more v	193432
B44062	"	"	11	6	PF	"
B8391	4360	4467	13	7		155125
I37218	~~No plate~~, 4346	3142	9	8	PF	154494
I37028	5837	3770	12	8	✓	214454
"	5813	3875	11	10	10th line very strong	213558
I37277	5608	2288	11	9	at edge	207260
I37333	5270	1821	10+	9	PF	195725
I37609	~~4284~~	2220	10	9	PF	152107
I37730	~~4220~~	2724	11	10	PF	49630
I37811	useless		10	8	PF	
I37971	5191	2376				192696
I37891	useless					
I37938	5323	4403	10	8	v.p.f.	197461
I37874	5320		too bright useless			

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	Boss	DM	lines	Int.	Rem	HD
I 38015						
↓	4460	1945	10+	8	superposed	159560
I 38022	4802	3916			no v. poor focus. useless	175638
I 38067	4948	1345	10	8	poor focus	182564
I 38101	5900	4961	11	8		216735
I 38118	5761	5741	10+	9	poor focus	212061
I 38118	5703	4961	9+	9	poor focus	210418
I 38464	4500	3403	12	8		161868
	4552	3560	12	8	p.f.	164577
I 38480	4584	2925	10+	8	very poor focus	166014
I 38493					useless. poor focus	
I 38505	4761	1809	10+		poor focus	170073
I 38507	5301	4658	12?	9	" "	196724
I 38596	5703	4961	13	10		210418
I 38597	5858	4436	11	7	violet weak	214994
I 38607					useless. p.f.	
I 38727	4182	3049	11+	7	violet weak	148112
I 38777		useless				
I 38779		(10+)		useless		
I 38948	5282	4353	11?	8	p.f.	196180
I 9700	4584	2925	12+	8	p.f.	166014
B 2589	4670	889	12	9	Exellent plate	170000
	5788		~~12+~~		no plate	
B 3649	4434	13412	12+			158643
B 3682	4830	13855	11+		focus poor	176638
B 2910	5301		11+		no violet more	
B 574	4182	3049	13	9		148112
B 1706	5282	4353	13	10+		196180

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May 28	Bon	DM	lines	Int	remarks	HD.
B 3904	4143	12037	11	8	end	146624
B 5207	useless		~~11~~	~~8~~	~~end~~	
B 3443	5473	10037	11	8	end	202730
B 19946	4830	13855	12	9	h	176638
B 4982	"	"	11	8		"
B 4972	"	"	12	7		"
B 5783	4155	12849	10+		end	147084
B 8598	6057	6437	10+		end	211565
B 5605	useless for focus					
B 10106	4868	13350	12?	9	h	178253
B 8605	"	"	12	10.		"
B 2947	star not identified.					
B 10561	5551	5701	13	8	g	205767
10080	useless				v.f.	
6228		"	~~12+~~		~~end~~	
8199	"	"	12+	8	end	"
B 10871	4143	12037	12	8	end	146624
3664	"	"	11	8	end	"
B 10086	4832	16575	14	9	ex	176687
5276	"	"	15	10+		"
B 6476	star not on plate					
5836	useless. edge of plate dont focus					
5762	star not on plate					
4033	"	"	"	"		
B 3650	"	"	"	"		
B 8392	4868	13350	10?	9	v.f.	178253
B 3721	5916	19370	13+	10++	f.o	216956
"	5808	17126	11	8		n3398
5675	5464	16498	10	8	v.f.	202627

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B 5464	ditto	"	11	8	—	"
B 4483	6062	15420	11	9	—	221760
10033	4119	4324	13	10++	narrow	145570
8603	"	"	10+	8	end	"
5712	star not on plate					
5824	too faint					
3907	4725	5071	10+	7	end	170296
42692	4587	13731	12	9	ex	168955
43815	star not identified					
44481	4832	16575	14	7	ex	176687
43328	"	"	14	9	ex	"
43208	star not on plate					
43194	"	"	13	9	p	"
42846	5916	19370	13	9		216956
"	5808	17126	12	7	ex	213398
B 41748	star not on plate					
B 37259	6062	15420	12	8	ex	221760
37250	useless. bf.					
B 41857	star off plate					
B 36512	4725	5071	12	9	bf	170296
44234	"	"	13		ex	"
36837	too poor					
44239	5084	2086	11		bf	188228

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The c stars.

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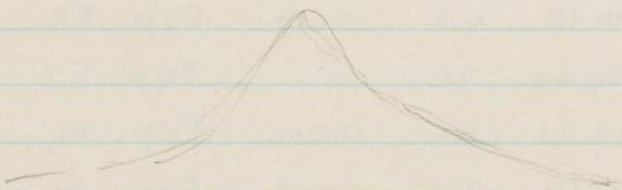
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171635 d Dra

193370

Last 2 hours



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1925hae.proj.1095p

Oct 1925

List of stars marked ✓ in Mt W Contr. 199. and data given for them.

Boss	Name	RA 1900	Dec	Harv. vis. mag.	μ	Spectrum Est	Spec M Meas	Spec M	Spec π	Trig π & auth.
325 ✓	α UMi	1 22.6	+88 46	2.1	0.044	Fq	F8	−3.0	0.010	0.041 Fehrl.
619	14 Per	2 37.6	+43 52	5.6	0.004	Gop	F7	−2.6	0.003	
637	SU Cas	2 43.0	+68 28	6.1	0.016	F4	F4	−1.4	0.003	0.010 W
772 ✓	α Per	3 17.2	+49 30	1.9	0.039	F5	F8	−1.3	0.023	0.017 Yerk.
1074	58 Per	4 29.8	+41 4	4.5	0.025	G4p	F8	−4.2:	0.002	
..	32 Jan	4 31.4	+18 20	7.1	0.016	F8p	F6	−2.1	0.001	
..	SU Aur	4 49.6	+30 24	8.7	..	F7p	F8	−1.1	0.001	
1185 ✓	β Cam (10)	4 54.5	+60 18	4.2	0.013	F7p	F8	−2.9	0.004	
..	RX Aur	4 54.5	+39 49	7.6	..	Fqp	F7	−1.7	0.001	
1187 ✓	ε Aur	4 54.8	+43 41	3.4	0.014	F5p	Fq	−2.0	0.008	0.060 J
1347	α Lep	5 28.3	−17 54	2.7	0.003	F4p	F4	−0.7	0.021	0.014 M
1606 ✓	46 Aur	6 17.2	+49 20	5.1	0.014	K2p	G5	−3.6	0.002	
.. ✓	T Mon	6 19.8	+7 8	6.2	0.029	G1p	G0	−2.0	0.003	
1629	RT Aur	6 22.1	+30 33	5.3	0.024	F8p	F5	−1.9	0.003	0.031 W,
.. ✓	W Gem	6 29.2	+15 24	7.1	0.009	Gop	F6	−2.6	0.001	
1815 ✓	ζ Gem	6 58.2	+20 43	4.0	0.009	Gop	Fq	−3.4	0.003	0.015 A, S, M
1839 ✓	SC Ma	7 4.3	−26 14	2.0	0.005	G2p	G0	−2.9	0.010	−0.052 F
2065	ξ Pup	7 45.1	−24 37	3.5	0.007	G6p	G1	−4.2:	0.003	
2155	29 Mon	8 3.6	−2 42	4.4	0.025	G3p	Fq	−4.2:	0.002	
2153 ✓	p Pup	8 3.3	−24 1	2.9	0.100	F7p	F6	−2.1	0.010	0.031 M
2224	29 G Pup	8 18.6	−26 2	5.9	0.017	F5p	F2	−2.0	0.003	
2602	o Leo	9 35.8	+10 21	3.8	0.150	F5p	F6	−1.4	0.009	0.032 A, M
..	SU Dra	11 32.2	+67 53	9.2	..	A5	..	0.9:	0.002	
..	SW Dra	12 12.8	+70 4	10.0	..	F4	..	0.6:	0.001	
..	RY Boo	14 45.2	+23 27	7.2	0.051 ‖	F2	F4	0.5:	0.005	
4443	β Dra	17 28.2	+52 23	3.0	0.016	Gop	F8	−3.5	0.005	0.005 A, M
4493 ✓	X Sgr	17 41.3	−27 48	4.7	0.023	Fqp	F8	−1.3	0.006	
4542 ✓	ν Her	17 54.7	+30 12	4.5	0.004	F2p	F3	−0.2	0.012	
4564 ✓	W Sgr	17 58.6	−29 35	4.7	0.015	Gop	F5	−2.0	0.004	

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1925phae.proj.1095P

H.D. Clist HA
from 56,
H.D.C. 162

8890 ✓ ac

20902 ✓

Hm ac

c

ac

ac

46595 ✓

52973 ✓ ac

54605 ✓ c

type F5, HA 28

70761 ✓ ac

161592 ✓ ac

164136 ✓ ac

164975 ✓ ac

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1925phae.proj.1095p

P.M.W Cont. 199 (Cont'd)

Bon.	Name	RA	Dec.	Harv. m	μ	Spec Cat.	Meas.	Spec M	Spec π	Trig π	Auth.	
..	W Ser	18 4.1	-15 34	9.0	..	Fqp	Go	-0.6	0.001			
4632	γ Sgr	18 15.5	-18 54	5.8	0.013	G2p	F8	-1.6	0.003			
..	U Sgr	18 26.0	-19 32	6.9	0.012	Gop	F7	-1.4	0.002			
..	YZ Sgr	18 43.7	-16 50	7.4	..	G1p	Fq	-2.7	0.001			
..	TT Aql	19 3.2	+1 9	7.6	..	G2p	Fq	-1.4	0.002			
4874	π Sgr	19 3.8	-21 11	3.0	0.040	F4p	F3	-0.8	0.017	0.017	M	
..	RR Sgr	19 22.3	+42 35	7.3	0.221 ‖	Fop	F3	0.3	0.004			
..	U Aql	19 24.0	-7 15	6.6	0.017 ‖	Gop	F7	-2.3	0.002			
..	U Vul	19 32.3	+20 7	7.0	0.031 ‖	Gop	Fq	-2.0	0.002			
..	SU Cyg	19 40.8	+29 1	6.6	..	F7p	F5	-1.1	0.003			
5071	η Aql	19 47.4	+0 45	4.1	0.012	Fqp	Fq	-2.7	0.004	0.004	M	
5098	S Sge	19 51.5	+16 22	5.8	0.004	G1p	F8	-2.5	0.002			
5197	α' Cap	20 12.1	-12 44	4.6	0.015	Gop	F7	-3.9	0.002	-0.012	M	
5229	γ Cyg	20 18.6	+39 56	2.3	0.003	Gop	G0	-3.0	0.009	0.014	A[1]M, Y, F	
5244	ρ Cap A	20 23.2	-18 9	5.1	0.026	Aq	F0	-1.0	0.010	0.024	M	
5255	41 Cyg	20 25.3	+30 2	4.1	0.010	F6	F4	-1.1	0.009	-0.018	M	
..	V Vul	20 32.3	+26 11	8.6	..	G1p	Gq	-0.8	0.001			
..	X Cyg	20 39.5	+35 14	6.5	0.018	G3p	G0	-2.1	0.002	0.006	S	
5370	T Vul	20 47.2	+27 53	5.8	0.015	Fq	F7	-1.7	0.003			
5431	ξ Cyg	21 1.3	+43 32	3.9	0.007	K2p	G5	-2.9	0.004	-0.003	A	
5507	ζ Cap	21 21.0	-22 51	3.9	0.023	G1p	Fq	-3.9	0.003			
5527	β Aqr	21 26.3	-6 1	3.1	0.017	Fq	F8	-2.1	0.009	-0.016	F, M	
5562	γ Cap	21 34.6	-17 7	3.8	0.188	F4	F4	-0.7	0.013	0.018	M	
5676	α Aqr	22 0.6	-0 48	3.2	0.015	G0	F8	-2.8	0.006	0.010	M	
5804	5 Lac	22 25.4	+47 12	4.6	0.021	K2p	G4	-2.8	0.003	0.005	A	
5807	δ Cep	22 25.5	+57 54	4.1	0.012	G0	Fq	-2.7	0.004	0.011	A	
5931	B.D. +56° 2923 (Rad Sqn)	22 55.9	+56 25	5.5	0.009	G2p	G2	-2.6	0.002			
5963	89 Aqr	23 4.6	-23 0	4.9	0.013	F8	Fq	-0.7	0.008			
6135	ρ Cas	23 49.4	+56 57	4.8	0.007	G5p	G4	-3.3	0.002	0.032	A, M	

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H.D. C list
from H.D.C.

Doubly rev. bright H lines

178524 ✓

183344 ✓

187929 ✓ ac
188727 ✓
192876 ✓
194093 ✓ c

ac

197572 ✓
198726 ✓

ac

ac

✓

✓ c

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1925phae.proj.1095p

The List of K stars with difference between Sp. Meas. and Cat. Mt. W. Contr. 149

Gross	Name	RA	Dec	m	μ	Cat	Meas	Spec M	Spec π	Trig π	Auth
9	5 Cet	0 3.1	-3 0	6.3	0.006	K2	G4	1.2	0.010		
84	48 Peg	0. 23.0	+15 54	6.5	0.018	K5	K1	0.5	0.006		
121	2 ..	0 31.3	+43 56	5.4	0.035	K2	G8	1.4	0.016		
131	..	0 33.6	+48 48	5.7	0.019	K5	G9	0.5	0.009		
191	20 Cet	0 47.9	-1 41	4.9	0.017	K6	K0	0.3	0.012		
355	..	1 31.6	+57 28	5.7	0.004	K0	G6	-0.3	0.006		
430	..	1 50.0	+36 47	6.1	0.005	K3	G9p	1.0	0.009		
572	..	2 26.3	+1 49	5.4	0.013	K3	G9	1.0	0.013		
581	..	2 29.5	+36 52	5.9	0.016	K3	G9	0.9	0.010		
639	η Per	2 43.4	+55 29	3.9	0.030	K4	G5	0.4	0.020		
746	..	3 12.5	+33 51	4.9	0.013	K2	G8	0.2	0.012	0.012	A
765	..	3 16.0	+64 14	5.6	0.019	K2	G5	1.3	0.013		
832	..	3 34.5	+59 39	6.0	0.002	K2	G7	2.0	0.016		
862	BU. 1854 Per	3 40.2	+41 9	8.6†	1.372	K0	G6	6.3	0.035	0.030	M, Y & D, Wil
915	γ Eri	3 53.4	-13 48	3.2	0.130	K5	K0	0.5	0.029	0.019	M
1136	9b Tau	4 44.0	+15 44	6.3	0.017	K2	G8	0.9	0.008		
1234	..	5 5.9	+15 55	5.4	0.004	K6	K1	0.5	0.010		
1334	..	5 26.3	+74 59	6.4	0.019	K5	K1	0.4	0.006	0.011	A, Jo
1348	..	5 28.4	+54 22	6.0	0.007	K6	K0	0.4	0.008		
..	AG Bonn 4866	5 37.0	+43 31	7.7	0.033	K0	G6	2.8	0.010		
1511	..	5 59.2	-26 17	5.2	0.104	K2	G8	1.4	0.017		
1596	..	6 14.4	+14 42	6.0	0.019	K6	K1	0.6	0.008		
1606	46 Aur	Previous list									
1608	5 Lyn	6 18.1	+58 28	5.5	0.011	K6	K2	0.6	0.011		
1632	47 Aur	6 22.6	+46 45	6.0	0.007	K5	K1	0.5	0.008	0.017	M
1643	..	6 24.9	+78 5	5.9	0.019	K5	K1	0.7	0.009	0.017	W
1818	..	6 59.2	-5 11	5.9	0.006	K2	G6	0.5	0.008		
1987	ν Gem	7 29.8	+27 7	4.2	0.119	K6	K2	0.5	0.018	0.010	A
2023	τ Gem	7 37.1	+29 8	4.3	0.247	K1p	G7	2.6	0.046	0.027	A, Ye, Jo

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Diff.

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K stars.

Boss	Name	RA	Dec	m	μ	est	Sp Meas	Spec M	Spec π	Trig π	Auth
2208	31 Lyn	8 16.0	+43 31	4.4	0.107		K5	K1	0.7	0.018	0.009 A, Ab
..	AG Lei 3648	8 39.3	+33 36	8.0	0.011	‡	K2	G8	1.1	0.004	
2529	28 Hya	9 20.4	-4 41	5.8	0.023		K4	G9	0.6	0.009	
2533	α Hya	9 22.7	-8 14	2.2	0.035		K5	K0	0.1	0.038	0.004 Y, F
2550	λ Leo	9 26.0	+23 25	4.5	0.056		K6	K2	0.5	0.016	0.039 M
2573	11 Leo Min	9 29.7	+36 16	5.5	0.753		K1	G6	5.4	0.096	0.140 A, S, Y, Jo
2580	8 Leo	9 31.5	+16 53	5.9	0.021		K1	G7	0.6	0.009	
2603	13 Leo	9 35.9	+26 22	6.4	0.049		K2	G8	0.7	0.008	0.012 W
2622	18 Leo	9 41.0	+12 16	5.9	0.016		K5	G9	0.6	0.008	
2639	23 Leo	9 45.6	+13 32	6.7	0.037		K7	K0	0.2	0.005	
2701	..	10 5.0	+41 9	6.5	0.017		K2	G8	0.6	0.007	
2751	μ U Ma	10 16.4	+42 0	3.2	0.084		K5	G8	0.7	0.032	0.051 Y
2844	35 H U Ma	10 35.9	+69 36	5.2	0.023		K4	G9	0.7	0.013	
2922	..	10 54.5	+46 4	5.7	0.016		K5	K0	0.5	0.009	
2931	61 Leo	10 56.7	-1 57	5.0	0.041		K6	K1	0.3	0.012	
C1361	Bu 695 P	11 5.6	+31 0	8.8	0.623		K7	K3	8.4	0.083	0.068 Y
2985	ν U Ma	11 13.1	+33 38	3.7	0.027		K4	G9	0.4	0.022	
3029	87 Leo	11 25.2	-2 27	5.1	0.026		K4	G9	1.1	0.016	
C1511	Groom 1855	12 4.6	+40 49	7.4	0.325		K0	G6	5.7	0.046	0.064 K
3177	..	12 6.5	+82 16	6.3	0.019		K3	G9	0.8	0.008	
3179	68 U Ma	12 6.8	+57 37	6.5	0.020		K4	K0	0.8	0.007	
3193	2 CVn	12 11.1	+41 13	5.8	0.051		K6	K2	0.6	0.009	
3336	7 Dra	12 43.5	+67 20	5.7	0.008		K3	G8	0.7:	0.010	
3348	32 Com	12 47.2	+17 37	6.5	0.023		K4	G9	0.6	0.007	
3374	36 Com	12 54.0	+17 57	5.0	0.036		K6	K1	0.9	0.015	
3488	..	13 23.6	+72 55	6.1	0.030		K4	G9	0.3	0.007	
3931	9 Ser	15 21.2	+15 47	5.5	0.033		K6	K0	0.2	0.009	
4048	..	15 50.2	+20 36	5.8	0.083		K4	G8	0.8	0.010	0.040 W
..	AG Lei 4734	16 11.4	+32 24	8.5	0.035	‡	K4	G8	1.0	0.003	
..	AG Lund 6686	16 13.2	+38 52	8.0	0.026	‡	K3	G9	0.9	0.004	

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78

K stars

Boss	Name	RA. Dec.	m	μ	St Sel	St Meas	Spec M	Spec π	Trig π	Auth
4152	..	16 14.0 +66 37	8.2	0.011	K2	G8	1.2	0.004		
4175	ν^2 CrB	16 18.7 +33 56	5.3	0.055	K6	K2	0.6	0.012		
4546	6 Sgr	17 55.6 −17 9	6.3	0.012	K1	G7	0.2	0.006		
4547	93 Her	17 55.6 +16 45	4.7	0.012	K2	G8	−0.3	0.010		
..	Groom. 2506	18 1.4 +42 51	7.5	0.035	K2	G8	1.1	0.005		
..	AG Lei 6547	18 8.5 +33 16	7.1	0.020‡	K6	K1	0.5	0.005		
..	AG Leip 8478	18 20.3 +9 41	7.9	0.016‡	K3	G8	0.8	0.004		
4724	..	18 34.6 +77 28	5.8	0.006	K2	G8	0.6	0.009		
4915	..	19 13.3 −15 43	6.3	0.285	K3	G9	0.9	0.008		
4986	β^1 Cyg	19 26.7 +27 45	3.2	0.009	K0	G6	0.8	0.033	0.000	A, M, Y
5043	..	19 40.4 +41 32	6.0	0.017*	K6	K2	0.4	0.008	0.008	W
5047	γ Aql	19 41.5 +10 22	2.8	0.014	K3	G9	0.3	0.032	0.034	M
5116	..	19 54.0 +58 35	5.1	0.025	K5	K1	0.4	0.012		
5118	γ Sge	19 54.3 +19 13	3.7	0.062	K6	K2	0.5	0.023	0.005	A
5142	62 Aql	19 59.2 −0 59	5.8	0.119	K1	G7	1.7	0.015		
5177	19 Vul	20 7.6 +26 31	5.8	0.020	K3	G8	0.5	0.009		
5187	o^2 Cyg	20 10.5 +46 26	4.0	0.002	G9p	G1	−2.0	0.006	−0.002	A, M
5231	9 ..	20 19.2 +40 42	6.1	0.054	K6	K0	0.2	0.007		
5284	70 Aql	20 31.5 −2 54	5.2	0.011	K4	G8	1.0	0.014		
5431	ξ Cyg	See previous list								
..	AG Leid 8741	21 4.9 +32 22	8.1	0.023‡	K0	G6	2.4	0.007		
5584	ε Peg	21 39.3 +9 25	2.5	0.025	K0	G4	−0.3	0.028	0.006	A, M, F
..	AG Leid. 9158	21 46.5 +32 12	8.6	..	K0	G6	2.3	0.009		
C 2885	Groom 3689	22 3.1 +52 39	7.9	0.629	K1	G7	4.8	0.024	0.057	Ye, Y, F, J
5804	5 Lac	See previous list								
5954	56 Peg	23 2.2 +24 56	5.0	0.038	K0p	G2	1.9	0.025		
5978	ϕ Aqr	23 9.1 −6 35	4.4	0.143	K4	K2	0.6	0.017		
6016	..	23 18.1 +59 35	5.9	0.003	K4	G8	0.5	0.008		
6105	Lal 46607	23 42.1 +56 54	5.8	0.021	K3	G8	0.3	0.008		

ε Cor
α Lac

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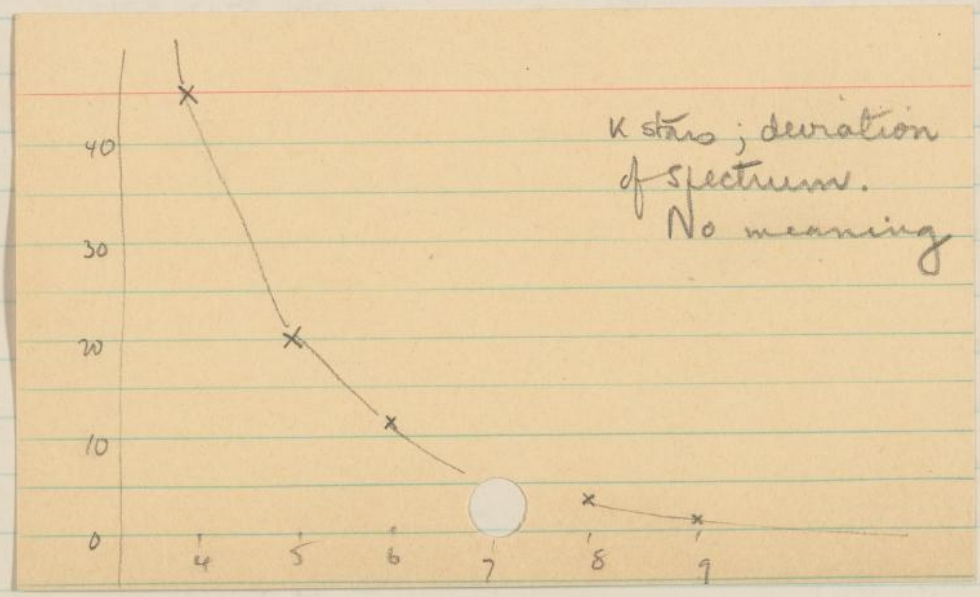
1925phae.proj.10950

ψ UMa η Dra

Nos.	4	5	6	7	8	9
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K stars; deviation of spectrum. No meaning

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IV List of bright M stars with spectra available. Brit than 5m.0

a. From H.A. 28, 195 ff. X Plates

	Name	Position	m	Class. (IAU) Class	Rem.	Plates	Pr
7	η Scl	0 22.9 -33 34	4.81	Mb	–	12. 5056, 5147, 5176	1
33	ψ Phe	1 49.6 -46 48	4.11	Mb	–	12 4931, 5024, 5202,	1
41	υ Cet	1 55.3 -21 34	3.83	Ma	–	11 4446, 4536, 5253,	2
68	α Cet	2 57.1 +3 42	2.68	Ma	–	(1) 7944	3
72	τ_4 Eri	3 15.1 -22 7	3.79	Mb	–	9 5271, 7257, 7807,	2
95	γ Hyi	3 48.8 -74 33	3.12	Ma	–	8 6336, 6262, 5485	3
98	S Ret	3 57.2 -61 41	4.31	Ma	–	14 5161, 5297, 5312	1
99	γ Ret	3 59.5 -62 27	4.41	Mb	–	11 5297, 5312, 5131	1
135	– Ori	5 24.7 -1 11	4.90	Ma	–	(1) 3856	1
172	α Ori	5 49.8 +7 23	0.91	Ma	211	6 3875, 3883, 4533,	3
186	η^2 Dor	6 11.1 -65 34	4.81	Mb	–	(1) 0088	1
225	– Pup	6 53.6 -48 35	4.91	Ma	–	(2) 0081, 0117	1
247	L^2 Pup	7 10.5 -44 29	var.	Md	215		1
256	– CMa	7 12.6 -27 43	4.92	Mb	–	(1) 4417	1
428	g Car	9 13.4 -57 7	4.16	Ma	–	5 5506, 6321, 6406	2
431	θ Pyx	9 17.1 -25 32	4.93	Ma	–	(1) 5562,	1
488	χ Cha	10 34.3 -78 6	4.09	Ma	–	(3) 4717, 6414, 6686	1
596	ε Mus	12 12.1 -67 14	4.13	Mb	214	(3) 4791, 5576, 6669	1
599	F Cen	12 13.6 -54 35	4.97	Ma	–	(2) 9105, 9253	1
611	χ Cru	12 25.6 -56 33	1.55	Mb	–	9 3982, 3988, 3989	2
671	g Cen	13 43.6 -33 58	4.28	Mb	214	(2) 4756, 5601	1
739	σ Lib	14 58.3 -24 53	3.25	Mb	–	8 4186, 4187, 4189	2
816	S Ap$_1$	16 53 -78 27	4.73	Mb	204	20 4175, 4758, 4807	2
829	α Sco	16 23.2 -26 13	1.06	Ma comp	212	16 4093, 5730, 6588	3
835	H Sco	16 29.8 -35 3	4.08	Ma	–	8 4796, 5015, 5070	1
895	– Sco	17 50.7 -41 42	4.71	Ma	–	5 9100, 9256, 9333	1
913	η Sgr	18 10.9 -36 48	2.96	Mb	–	16 4365, 5030, 5085	2
999	– Pav	19 53.3 -59 39	4.87	Mb	–	(2) 9118, 9888	1

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Remarks
from HA 28

H strengthened, 4227 weakened

Bright H

Similar to β Gru

Similar to β Gru

Spectra partly superposed on δ² Aps
K hazy, H strong.

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Bright M stars. a. × Plates

	Name + position	m	Class	Rem.	Plate		P.
			Class(I.A.U.)				
1002	C Sgr 19 56.5 -27 59	4.69	Mb	–	11	4844, 4938, 5105	1
1008	ξ Tel 19 59.7 -53 10	4.82	Ma	–	15	9258, 9413, 9454	1
1027	ω Cap 20 45.9 -27 17	4.43	Ma	–	11	4292, 4387, 4939	1
1036	A Cap 21 1.3 -25 24	4.63	Ma	–	15	4782, 4981, 4996	1
1073	δ² Gru 22 23.8 -44 45	4.26	Mb	–	7	4345, 4971, 5053	1
1075	ν Tuc 22 26.2 -62 29	4.80	Mb	–	6	9130, 9319, 9329	1
1083	β Gru 22 36.7 -47 24	2.09	Mb	213	17	482, 4296, 5650	3
	From H.A. 28. c plates						
30	7 Cet 0 9.6 -19 30	..	..	–	(1)	777	
185	β And 1 4.1 +35 5	2.37	Ma	Mo –	12	725, 725, 945, 965	
370	o Cet 2 14.3 -3 26	2.82 var	Md	Mq 131	16	(many)	Bright H
482	α Cet 2 57.1 +3 42	var	Md	M2	6	291, 1561, 5172, 5193	
489	ρ Per 2 58.8 +38 27	var	Mb	M4 –	5	283, 695, 967, 1453	
533	4 Eri 3 15.1 -22 7	3.95	Mb	–	(1)	3048	
612	–						
821	–			–			
~~850~~	~~o¹ Ori 4 49.9 +11 5~~	~~5.19~~	~~Ma~~	~~–~~	~~(1)~~	~~813~~	too faint
~~855~~	~~5 Ori 4 48.2 +2 20~~			~~20~~	~~(2)~~	~~1580, 1762~~	too faint
1072	ν Aur 5 44.2 +37 16	4.99	Ma	–	(1)	774	
1091	α Ori	0.92	Ma	128	11	803, 1043, 1182, 1203	(H strong, 4227 weak)
1102	π Aur 5 52.5 +45 56	4.59	Ma	–	(1)	775	
1160	η Gem 6 8.8 +22 33	var	Ma	–	5	878, 465, 1481, 2599	
1194	μ Gem 6 16.9 +22 34	3.19	Ma	M3	(2)	773, 2219	
1292	–						
1360	–					too faint	
1361	–						
1438	ρ UMa 8 53.5 +68 1	4.99	Ma	–	(2)	804, 1700	
1752	–						
1782	π Leo ~~9 54.9 +8 32~~ ~~10 1.4 +11 15~~	4.89	Ma		(2)	1788, 1854	
~~1893~~	~~ν Hya 10 44.7 -15 40~~			~~125~~	~~(2)~~	~~1109, 6545~~	
1958	–						
1968	λ Dra 11 25.5 +69 53	4.06	Ma	32?	(4)	814, 2579, 2594, 4939	

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see note

1493; 1504, 1875, 2201, 6395, 6423, 6586

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Class

2012	ν Vir	11 40.7	+7 6	4.20	Ma	M1		②	1824, 2639	
2114	–									
2193	δ Vir	12 50.6	+3 57	3.66	Ma			④	881, 914, 1805, 2600	
2201	–									
2356	–									
2510	–									
2574	γ Ser	14 58.3	+15 53	[illegible]	–	Mb		①	1298	
~~2633~~	~~ζ Ser~~	~~15 21.1~~	~~+15 47~~	~~5.46~~	~~Ma~~		~~65~~	~~②~~	~~1871, 1905~~	
2726	80 Oph	16 9.1	−3 26	3.03	Ma		127	④	1277, 1295, bq11, bq12	Absorption bands not well defined
~~2772~~	~~g Her~~	~~16 25.3~~	~~+42 6~~	~~5.06~~	~~Mb~~		~~129~~	~~②~~	~~1902, 2607~~	
2802	–									
2849	–									
2879	α Her	17 10.1	+14 30	3.48	Mb	M5		1	459, 1261, 1274, 1281	
3065	–									
3210	δ² Lyr	18 51.0	+36 47	4.52	Mb			①	810	
3224	–									
3357	–									
3434	–									
3498	–									
3649	–									
3792	–									
3845	μ Cep	21 40.4	+58 20	var	Ma		126	5	1439, 1478, 1525, 3005	4227 not strong and sp. therefore pec.
4040	λ Aqr	22 47.4	−8 7	3.84	Ma		2	③	176, 1411, 3070	
4078	β Peg	22 58.9	+27 2	2.61	Mb		2	③	769, 1552, 2228	
4120	–									
~~4247~~	~~φ Peg~~	~~23 47.4~~	~~+18 34~~	~~5.23~~	~~Ma~~		~~–~~	~~①~~	~~3007~~	
4267	–									

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too faint

too faint

too faint

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List of plates of cepheid variables selected from BR 2, p. 3 ff

Name	Plates
α UMi	C 1273, 36, 37, 41; 1307 9, 13668, 13737, 39, 40, 14671
3 Gem	C 704, 727, 729, 747, 825, 1469
ℓ Car	X 8267
η Aql	C 687, 691, 748, 1430, 1446, 1451
δ Cep	See list and coll. 3q plates.
κ Pav	X 7768, 8645, 8660, 8843

Further list:— brighter than $m_{pg} = 10.0$

SU Cas	2 43.0	+68 28	
T Mon	6 19.8	+7 8	see below
RT Aur	6 22.1	+30 34	
S Mus	12 7.4	-69 36	F8 X11998
S TrA	15 52.2	-63 30	
X Sgr	see below		
Y Oph	17 47.3	-6 7	
W Sgr	see below		
U Sgr	18 26.0	-19 12	
U Aql	19 24.0	-7 15	
SU Cyg	19 40.8	+29 1	
S Sge	see below		
X Cyg	20 39.5	+35 14	
T Vul	20 47.2	+27 52	
β Cep	21 27.4	+70 7	

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between $7^{m}.0$ and $8^{m}.0$

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Plates Nov

List of available bright c stars in order of spectral class. ↓

	Class.	Star.			m	Plates
			10 38.9	-58 42	5.44	X 4044, 4709
✓	B3	-Car				
✓	B5	O^2 CMa	6 58.8	-23 41	3.12	X 4511, 6225, 6232, 6255, 8198, 8326
✓		η CMa	7 20.1	-29 6	2.43	X 4470, 7206, 8346, 8955, 0158
✓		HR 3994 -Vel	8 43.1	-45 32	5.54	X 12380 X 4515
		67 Oph	17 55.6	+2 58	3.92	C 1333
✓	B0	15 Sgr (HP 3069)	18 9.3	-20 46	5.60	X 5103, 5930
✓	B1	ζ^1 Sco				X 8471, 8476, 9287 5058, 4400, 4985, 5753, 6325, 6463, 6598, 7691, 7865
✓		ε CMa	6 54.7	-28 50	1.49	X 4012, 8396, 8940, 0008, 0154
✓		θ Ara	17 58.8	-50 6	3.84	X 8651, 4008, 5715, 7599, 9669, 9670
✓	B2	χ_2 Ori				C 1801, 2468, 2502
✓	B8	β Ori	5 9.7	-8 19	0.32	X 7945, 8104, 3879, 4084, 4101, 4532, 7896, 7966, 8915
✓		HR 3708 -Vel	9 15.4	-51 8	5.87	X 11934
✓		HR 4250 -Car	10 48.4	-56 43	5.57	X 12305, 12326, 12451
✓		μ Sgr	18 7.8	-21 5	4.08	X 5796, 9034, 4904, 5103, 5122, 5930
✓		4 Lac	22 20.4	+48 58		C 2424, 6015, 2433
✓		α Dra	16 28.2	+68 59	4.98	C 14914
✓	B9	-Cam	HR 1035 3 21.0	+59 36	4.42	C 2159, 3023, 6067, 6075, 6081, 6094
✓		-Cam	HR 1040 3 21.9	+58 32	476	C 3023, 6075, 6081
✓	A0	✱ 13 Mon	6 27.5 ~~6 19.8~~	+7 24 ~~+7 8~~	4.50	C 2584 C 16176
✓		α Vel	8 42.6	-45 40	4.01	X 4515, 6259, 8368
✓		η Leo	10 1.9	+17 15		C 1771, 6530, 5489, 6581
✓	A2	β_2 Tuc	0 27.0	-63 31	4.33	X 5299, 7247, 4984, 5158, 5445, 5704, 6963, 7160 7085
✓		i Per	2 15.3	+55 23	5.22	C 16683
✓		l Pup	7 39.8	-28 43	4.10	C 6157 X 4379, 6181
✓		-Car	HR 4169 10 33.6	-58 13	5.57	X 9094, 4053
✓		-Car	HR 4228 10 44.2	-59 24	6.12	X 4044, 4709, 4846, 4869, 5568, 6480
✓		-Cen	HR 4438 11 ~~26 6~~ 43	~~-60~~	6.36	X 11473
✓		O_2 Cen	11 27.1	-58 58	5.30	X 4728, 6340, 7356, 7357, 7377, 7431
✓		-Cen	HR 4541 11 45.5	-62 5	5.65	X 12364
✓		-Cen	HR ~~4773~~ 4583 11 50.0	-62 43	6.05	X 4772, 6246
✓		-Cru	HR 4576 11 53.7	-63 47	5.66	X 4772, 6246
✓		-Cir	HR 5379 14 16.8	-67 44	5.71	X 11226, 11560
✓		i^2 Sco	17 43.1	-40 4	4.89	X 4421, 5778

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Suggested comp. data H&A.

Rem. 40, 96. Narrow lines. Intensities abnormal
Remarks on individual intensities

As O_2 CMa in certain lines

Rem. 58. Lines very sharp. As η Leonis
Rem. 91

Rem. 40, 117
Rem. 11. H lines narrow, as α Cyg.
40, 155

Rem. 83. As α Cyg, but lines not as sharp

Rem. 78 Lines sharp. As α Cyg
43, 156

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Bright C-stars.

		Position		m	
A2	α Cyg				C477, 1486, 1984, 5929
✓A3	HR 2874	7 25.6	-22 49	4.80	X0138
✓A5	19 Aur	5 13.4	+33 52	5.16	C 16214, 16327
✓F0	22 Aud	0 5.1	+45 31		C758, 731
✓	HR3291 = Pup	8 18.6	-26 1	5.86	B8826, B130-92
✓	HR 3496	8 43.9	-45 48	5.83	X12380
✓	HR 3739	9 20.6	-51 18	6.14	X 11934
✓	ν Her	17 54.7	+30 11	4.48	C1382, 1390, 2946, 2994
✓				2.69	~~C 2946, 2994~~ C 1088, 2243
✓F2	α Sgr	19 3.8	-21 11	3.11	X4009, 4423, 5164 HR 3712, X 12316 (F2)
✓F5	α Per	3 17.2	+49 30	1.90	X7983, C371, 1543, 2113, 2253, 2257, 5207, 5257, 6208
✓	ν Per	3 38.4	+42 16		C 3870
✓	ε Aur	4 54.8	+43 41		C 1086, 1466, 1460, 2310, 2446, 4864
✓	β Dor	5 32.7	-62 33	3.70	X4500, 4431, 5497, 6196, 8213, 8335
✓	δ Vol	7 16.9	-67 47	3.92	~~C 4514~~ X4514, 6221, 7245, 8345, 8990
✓	HR2957	7 35.5	-48 22	5.65	B8951, B18559
✓	b Vel	8 37.3	-46 18	4.06	X4502, 4515, 6259, 6405, 8367, 9102
✓	HR4110	10 23.7	-57 8	4.94	X 9094, 7430, 9086, 9249, 9400, 9431, 9457
✓	γ Car	11 8.3	-59 46	4.73	X4065, 4754, 6291, 6292, 7355, 7382, 7417
	DM 3938 = RCrv	9 52.9	+8 48	6.27	
? ✓	ν² Cen	13 55.4	-45 7	4.50	X4766, 5593, 5629, 5630, 6370, 6399, 6449, 6583, 6640
✓	2' Sco	17 40.5	-40 6	3.10	X4421, 5778, 7657, 8638
✓	W Sgr	17 58.6	-29 35	var.	X5739, 5909, 9200
✓	κ Pav	18 46.6	-67 21	var.	see above, p 86. X7768, 8645, 8660, 8843
✓	35 Cyg	20 14.8	+34 40	5.18	C 5132
✓	41 Cyg	20 25.3	+30 2	5.45	C 1397
✓F8	α UMi	1 22.6	+88 46	2.12	See above, p 86, for plate nos.
✓✓	δ CMa	7 4.3	-26 14	1.85	X6275, 8274, 8948, 0156
✓✓	j Pup	7 52.6	-22 37	4.35	X5331, 7329
✓	HR 3232	8 8.9	-46 20	~ 5.68	B8952
✓✓	x Car	11 4.4	-58 26	4.02	X4733, 4043, 4064, 6348
✓	DM 3216	11 5.4	-58 18		X4733, 4064
✓✓	o' Cen	11 27.1	-58 53	4.93	X 4728, 6340, 7356, 7357, 7377, 7431
✓	HR 4511	11 38.8	-61 56	5.18	X6499, 6417
	π Sgr, continued				* 5901, 6540, 6541, 7606, 7611, 7624, 7834

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Suggested comp. data from HA.

Rem. 42. metallic lines as in ε Aur.

Rem. 43. Lines appear to be sharp

Rem. 50. Sharp lines. as ι, δ Sco

Rem. 55. Between α Cyg and ε Aur

i Cha (F2) X123 89. ν UMa (F2) C. 1678, 2553.

Rem. 27 Lines narrow. as α UMi

Rem. 40, 182

Rem. 40, 182

Rem. 40, 182

Rem. 89

–

α Fornacis

4438, 4508, 5334, 6192, 6261, 7116, 7856, 8060, 8142, 8190

–

Rem. 41. Lines sharp. As δ CMa

Rem. 40, 186

Rem. 157, 187

40, 187

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Bright C-stars

F8 (cont)	S Mus					
✓	HR 4768	12	26.1	−58	52	5.44	× 12357, 12390, 12503
✓	HR 5621	15	0.6	−66	42	5.80	× 12397, 12435
✓ ✓	γ¹ Nor	16	9.6	−49	49	4.95	× 5888, 4789, 6531
✓ ✓	χ Sgr	17	41.3	−27	48	var	× 7057
✓ ✓	d Dra	18	30.9	+56	58	4.95	C 2620
✓ ✓	γ Cyg	20	18.6	+39	56		C 615, 2018, 5889, 505, 615, 634
✓ ✓	ρ Cas	23	49.4	+56	57		C 2396, 6992
✓ G0	10 Cam	4	54.5	+60	18		C 849, 1786, 2602, 2610
✓	T Mon	6	19.8	+7	8	var.	C 2584
✓	HR 2650 ζ Gem	6	58.2	+20	43	var.	See above, p. 86, for plate ✓
✓ ✓	HR 4276 U Car	10	53.7	−59	12	var.	× 4050
✓?	HR 7956 T Cru	12	15.9	−61	44	var ~~5.80~~	B plate only. See H.D.C.
✓ ✓	HR 6062 S Nor	16	10.6	−57	39	var.	× 12096
✓	HR 7570 η Aql	19	47.4	+0	45	var.	See above, p. 86, for plates ✓
✓	HR 8414 χ Aqr	21	0.6	−0	48	3.19	C 1328, 3069, 5971
✓ ✓	HR 8571 δ Cep	22	25.4	+57	54	var.	See above, p. 86, for plates ✓
✓ Pec no	HR 4210 η Car	10	41.2	−59	10	var.	× 4044, 4709, &c

B0	B1	B2	B3	B5	B8	B9	A0	A2	A3	A5	F0	F2	F5	F8	G0	Pec
1	3	1	1	4	6	2	3	13	1	1	6	5	17	15	9	1

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Suggested comp.

Rem. 41. Lines sharp. As δ CMa

Rem. 41 Lines sharp. As δ CMa

Rem. 184

184

—

Rem. 179 Narrow lines. Also as δ Cep

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X894

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C-stars. Estimates of line intensity

Standard: solar spectrum as for second list of cooler stars.

λ Standards

F8

× 1 pr short α For 7116, 6261

" " " long ABC 8279 × 11433 . $6^h 41.6$ $-3\ 41$ large PM (L.013)
(72 CMa)

× 2 pr α For × 8142

C 1 pr long HP 1522, C 17200. short X, Orionis C286

2 pr α Aur β C 5256

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1925phae.proj.1095p

X.4064
R = 5 D = 4
1 prism

1 Prism
x Carinae

Standard α Fornacis
X 7116

Line		α For	x Car
Ca+		16	16
Cr	3944	3	5
	3948-51	1	7
	3952-57	1	6
Al	3962	3	5
Ca+		14	16
	3990	–	7
	3999	–	w
	4003?	5	
Fe	4005	6	6
	4012	–	5d
			3
	4022		5
	4024		6
Ti+	4028	–	3
Mn	4031	8	8
Mn	4041	3	5
Fe	4046	6	5
Mn	4049	–	5
	4054	2	5
	4064	4	7
	4067	1	4
	72	2	5
	77	5	8
	4084	4	6 (k n)
Fe	4096	–	2
Fe	98	–	1
H	4101	9	7

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	α For	α Cor
4106.6	–	2
4110	–	5
~~4118.7~~		~~1~~ 3
4118.9	3w	6w
4122	3	6
4128	3	7
4132.4	3	6
4137	–	3
4144	5	7
49	4w	5
54		5w
~~56~~		
62	–	5
64	–	2
67	–	2
4172	2	9
4177	5	7
85	2	4
87	2	4
91	2	4
96	5w	4
98		4
4202.4		4
4205		4
4210?	–	4
4215	4	6
19	–	2
~~1922~~	–	3
4227	6	7
4233	3w	6
36	–	4
40	–	4
42	–	3
4247	3c	6

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X 4064 cont.

	α For	x Car
4250	3	4
4261	1	3
4272	5	5
4290	4w	6
4294-7	—	5
4300,3	5w	4:4
4308-9	—	4
4314	4	6
4321	—	3
4326	—	5
4330	5	4
Ti+ 4333 4337	—	6 2
H 4340	8	5
4344		2
52	4	6
55		1
59	2	6
68~~79~~	-	6
74~~87~~	2	6
79		2
83	4w	6
(here) 85		3
95		4
99		5
4405		3
bd 4408		4
4415	3w	6
4422	2	4
27-35	3w	6 wl
4444	2	8

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	α For	x Car
4450	—	4
55	—	3
62	—	3
69	—	4
4481	5	5
4489	—	5
94	—	4
4501	—	4
4508	—	5
34	2	5
41	—	3
44	—	3
49	2	4
54	2	4
64		4
~~77~~		~~4~~
72		3
84		4
95	3	2
19		3
29		4
46-48		3
57		4
63		4
4668		3
4670 ~~4668~~	2	5
4709	1	3w
4765	1w	7
4798		2
4805-8		2
4824		4

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	α For	x Car
4836		2
48		4
55		4
H 4861		7
4872 ~~4878~~	→	Bw
4878 ~~4891~~	faint →	4
4891 ~~4903~~	→	4
4906 ~~4914-20~~	→	3
4920 ~~4933~~	→	3
4935	4958	8
		4
		3
? 5028		3
5040		7

After this, the excess in the sense (c-star – comparison star) will be stated in the second column.

Where the line cannot be traced clearly in the comparison star, no entry will be made in the second column.

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×7057 × Sagittarii Q4 D3

	× Sgr	excess
K	16	3
	5	0
	4	
	4	
	5	-1
H	16	3
3982	5	+3
3987	3	
3995	3	
4003	6w	+1
4005	4	-1
4025	5w	+3
4030	8w	0
4041	3	0
4046	4	-2
4054	3	2
4064	3	-2
67	3	1
72	3	-2
77	9	2
87	5w	-1
? 96	2	0
4101	7	-1
4118	5w	2
4128	4	0
4144	5	0
4172	6	0
4177	4	+2
4215	4	0
4227	6	-1

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1 Prism ✓

	X Sgr	excess
4290	5	0
4300	5w	0
4308	2	-2
4315	5	+3
4326	5	-1
4337	not seen	
4340	9	0
52	5	0
60	2	+2
68	4	+3
75	5	+1
83	5	0
95	3	+2
99	4	+3
4415	4	+2
4435	3	-1
44	5	+1
4481	5	0
4868	5	+1
4861	9	+1

all the lines in this spectrum inclined to be fuzzy, not entirely due to quality.

Only of of X Sgr with this dispersion?

X

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1 Prism ✓

X 7329 ζ Puppis Q & D3

	ζ Pup.	Ex	
	16	+2	intermediate lines too hazy.
	16	+3	← (Haziness probably plate quality)
3982	4	+2	
3998	5w	+2	
4005	5w	+1	
4028	4	+4	
4030	7w	+1	
4041	—	-(2)	
4046	5	-2	
4064	4w	-1	rest of plate too hazy to be measured
4067	4w	-2	
4072	3	-1	
4077	7	+2	
4084	3	0	
4101	9w	0	
4110	4	+4	
4118	4	+1	
4144	3	-1	
4172	5	0	
4215	4	+2	
4227	5	-1	
50	4w	0	
61	4w	0	
72	4w	-2	
90	5w	0	
4300	~~8w~~ 4 2	~~9~~ -3	
08	~~8w~~	~~0~~	
15	3	0	
26	4w	-2	
4340	8	0	

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1 Prism ✓ Standard α Tornaeis 1 μ.

X4728 O_1 Centauri. Q 4 D 3 Super on O_2 Cen qv.

	O_1 Cen.	Ex.	Very narrow and rather faint
4012-14	7	–	
4024	7	–	
4031+c	8w	+1	
4046	5	-2	
4064	6	+2	
68	4	+1	
72	5	-1	
77	6	+0 (w)	
83-85	5w	0	
4101	9	0	
4110	8w	+4	
18 to 28	5	+2	
28	5	+2	
32 to 37	5	+1	
37	5	+2	
44	5	0	
4162	4	–	
72	8	+3	
77	7	+4	
4215	5	+3	
4227	6	0	
4233	5	+3	
4036	3	0	
4247 4250	4	+2	
50 61	4	+2	
61 72	5w	+3	
72 90	8w	+5	
90	5	+2	

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O_2 Cen Ex.

4300	5 nG	+2
08	4 G	−1
15	6 bd	+4
21	3	−
26	5	−1
33	3	−
37 40	~~8~~ 13	−6
52	5	+2
60	4	−
68	5	+3
75	5	+2
83	7	+2
4395	4	+3
4399	5	+3
4415	7	+4
35	4	+1
4444	7	+3
69	5	+3
81	5	+2
89	5	+2

rest very faint

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1 Prism

✓ 12435 A.G.C. 20470 Q 4 D 2 Faint, but good sp. Lines rather hazy (quality?)

		Excess
4077	8	+3
83-5	4w	0
4101	9	-1
4110	4	—
4144	4	-1
4172	7	+4
77	7	+2
4215	4	0
27	8	0
32	3	—
4290	6	+1
4300	6	+1
08	3	-2
15	5	+2
4321	3	—
4325	5	-2
4331	3	
4337, 40	10	+2
4352	5	+1
4360	3	—
4368	3	—
4375	5	+1
4383	6	+1
4395	3	—
4399	4	—
4408	3	—
4415	5	+2
4435	4	-2
4444	6	+1

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AGC 20470

4461	5	+3
81	6	+1
89	5	+2
4765	5	+2
4861	8	0

Rest very faint & hazy.

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✓ 1 Prism

X4789 γ_1 Normae. Q4 D2 good sp. but small density

		Ex.
4031	10 w	—
4077	10	+2
4083	5	–
4101	11	+2
4110	6	—
4128	6	+2
? 4134	4	0
4144	5	0
4172	7	+2
4177	6	+3
4215	4	+1
4227	7	-1
4233	4	+2
4260	5	0
4270	6	0
4290	5	+1
4300	5	+1
4308	2	-2
4315	5	+3
4326	5	-1
4340	11	+2
43	4	—
4352	5	0
4360	5	+3
4368	5	+3
4375	5	+2
4383	7	+1
4395	3	–
4399	4	–

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4408	2	—
4415	4	0
4435	3	-2
4444	6	+1
4468	4	+2
4481	5	-1
4489	3	+1
4584	4	+1
4668	5	+1
4765	5	—

Hazy from here on

too faint to go further

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√ 1 Prism Comp X6261 α Tor

X12390 AGC 17062 Q 4 D 2 Excellent though faint

4077	9	+1
4083	3	-2
4101	9	0
-	2	-2
-	2	-2
4133	3	-1
4144	4	-1
4172	6	+1
4177	5	+2
4215	4	+1
4227	6	-2
4232	3	+2
4260	4	-1
4272	5w	-1
4290	6	+1
4300	5	-1
4308	2	-3
4315	6	+4
4321	3	+2
4326	5	-2
4331	3	0
4337 4340	11	0
4352	6	+2
4360	4	+2
4368	6	+4
4375	6	+2
4383	7	0
4395	4	-
4399	4	-

AGC 17062 focus rather hazy

G band v.s. in α Tor absent in 17062

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4408	3	—
4415	525	+2
4435	2	-2
4444	5	+3
4454	—	4
64	4	- (α For hazy)
81	5	-
89	4	-
4501	4	—
08	4	—
15	4	—
34	5	—
54	5	—
64	4	—
72	4	—
84	6	+2
4619	5	—
29	5	—
4668	6	+1
4765	4	0
4824	3	—
4861	10	0

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✓

X8645 κ Pavonis Q 4 D3 Excellent. 2 Prisms
Comparison α Fornacis X 8142
Lines of κ Pav not very sharp but sharper than α For

	κ Pav	
3970	30	+15
3982	4w	—
3997	10	+5
4005	9	0
4012	4	+2
4014	5	+2
4024	7	+3
4031	6	+1
4033	6	+1
4034	5	+1
4041	6w	+1
4046	9	0
4049	6w	+2
4054	5w	+2
64	7	0
67	7	0
72	7	0
4077	10w	+2
83	6w	+2
4101	10	+1
4110	5vw	—
18	6	+2
22	5	+2
28	5	—
32	5	—
34	5	—

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	kPaw	
4137	5	−
4144	7	+1
49	5	−
54	3	−
56	3	−
61	5	−
63	3	−
67	4	+1
72	11w	+3
77	10	+2
79	8w	+2
88	8	+2
91	8	+2
96	7	+2
98	8	+2
4202	5	−
4205	6	−
4215	7	+4
4227	12	+2
4233	6	−
36	5	−
40	5	−
4247	6	+1
50	5	+1
54	3	
59-60	7w	+2
4272	4	0
4274	8	0
4290	9	±2
94	3	−
97		
4300	8	+1
03	8	−

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	K Par	Ex	
4305	3	–	
4308	5	-2	
4315	8	–	no G band to K Par
4321	~~5~~	–	
4326	~~8~~ 6	-1	
4331	6	+1	
4333	3	–	
4337	–	–	
4340	10	0	
52	4	+1	
60	8	+2	
68	5	+2	
75	6	+2	
83	8	+1	
95	7	+1	
99	8	+1	
4405	6	–	
4408	7w	–	
4415	10w	+4	
4423	5w	–	
27 31	5w	–	
4435	5w	0	
4444	6	+1	
4455	3	-1	
4468	3	–	
69	~~6~~	+1	
81	8	0	
89	8	+2	
94	4	–	
97	3	–	

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	KPar	EK
4501	6	–
4508	6	–
4515	6	–
4528	5	+2
4534	7w	+3
4541	4	–
4544	4	–
4550	6	+1
4554	6	+1
64	6	–
72	6	+1
76	3	
80	2	
4584	7	+3
95	4	–
4619	4w	–
4629	5w	–
4754 ~~4657~~	6w	+1
4765 ~~68~~	8	+3
4824	6	–
4840	4	–
4855	4	–
4861	11	+2

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1925phae.proj.1095

✓

X 8267 l Carinae Q 4 D 3 2 prisms
violet very faint
Comparison α Fornacis X 8142

	l Car	
4077	enh	
4083	0	
4087	enh	Sp very faint in the violet
4096	enh	
4110	"	No measures possible
4123	"	
28	"	
32	"	
34	red	
4172	enh	
77	enh	
4215	8	+4
17	5	
19	5	
4227	9	0
	4	+1
4233	6	+4
47	5	+2
50	5	+2
4261	4	-2
4272	5	+1
74	5	+2
4290	6w	0
4300	5w	0
4308	6	-2
4315	7	+2
4321	3	—

β band stronger in l Car than in α For

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1925phae.proj.1095P

	lCa	Ex
4326	10	+1
4331	5	=
4333	5	−
4337	8	−
4340	9	0
45	5	−
47-8	5	−
52	8	+2
55.3	4	0
60	7	+3
68	6	+3
75	9w	+3
79	4	−
83	11	+2
85	3w	−
90	4w	+1
95	7	+1
99	9	+3
4405	7	+1
4408	9w	+1
4415	5	0
4417	5	0
4427	5w	−
27	4	−
30	4	−
4435	8	+2
4444	11	+5
47	4	
57	5	
4454	4	
4460	3	−2

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	l Cav	Ex
4462	4	
69	12w	+2
73?76?	3	
81	11	+2
89	10	+4
94	5	–
4497	5	–
4501	8	+4
08	5w	–
15	4	–
4534	9w	+2
41	4	–
44	4	–
49	5	0
4554	6	+2
58	3	–
64	7w	+2
72	6	+2
76	3	–
80	5	–
4584	6	–
? 92	5w	–
? 95	5w	–
? 4613	3	–
? 4616	4	–
4619	5	–
4626	3	–
4629	6	–
4657	10w	+5
64	10w	+4

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1925phae.proj.1099p

	l Car	Ex
68	5	–
~~68~~-70	12w	+5
79	3	–
"	6w	–
4699	4	–
4703	5	–
4709	7	+1
" 14	5	+2
37	6	–
" 54	4w	
65	12w	
4805	5	
4808	3	
4824	5	
4840	4	–
4855	5	–
4861	10	0

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1925phae.proj.1095p

/

C 4564 ε Aurigae Q5 D4 Excellent

Comparison (i) α Fornacis × 8142
(ii) α Aurigae
(iii) α Canis Minoris C 6294

	Eam	(i)	(ii)	(iii)	
3889.1 H5	11			+3	Comparisons
3900	8			+3	rather difficult
3906	5	too		−1	because of plate
3913	8			+2	background to
?	4	hazy		0	C 4564
?	4			−	
3930	3			−	
3933	13	-5		+3	
38	7			-1	
45	5	too		-1	
53	4w	hazy		-1	
57-8	4w			-1	
3961	5			0	
3970	13	-5		+1	
3982	5	−		+1	
3987-92	6	−		−1	
3997-8	5	+1		−1	
4003	5	+1		+2	
4005	6	−		-1	
4012	6	−		+6	
4015	3			* −	
4025	8			+1	
4030	4			* -2	
46	6			0	
49	3			−	
54	6			+2	
64	7			-5 0	
67	5			-1	

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1925phae.proj.10952

	ε Aur	(i)	(ii)	(iii)
4072	6			0
77	7	+2		0
4101	12			+1
4110	5w			—
? 4113	4w			—
4123	4w			—
28	6			+4
32	5			−1
61,63,67	8w			+2
>				−4
472	10			+4
477	9			+5
85	3			
87	3			
92	3			
98	3			
4202	3			
4205	3			
4215	7			0
27	6			−2
33	7			+4
42	6			+3
47	7			+3
	4w			
	4w			
	4w			
	4w			
	4w			
	4w			
	4w			
4290	7			0

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1925phae.proj.1095P

	ξ aw	(i)	(ii)	(iii)
4294	7w			—
4297	7			—
4350	8			+1
4308	6w			0
4315	9			+3
4321	7			+4
4326	7			0
4331	6w			+2
4333	3			
4337	6			—
4340	10			+2
4352	8			+1
60	(2)			-2
68	4			-1
70	4			-1
4375	8			+2
43835	9			+2
4390	3			—
4395	8			+2
4400	7			+1
4405	7			—
4417	9			+2
4422	3			—
44351				
4444	9			-4
4450	5			+2
4455				+2
69	6			-4
82	7			+2
89	6			0
91-4	3w			+1
4501	5			—
08	5			—
15	4			—
20-22	5w			—

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	Σ Aur	(i)	(ii)	(iii)	
4528	4			—	
34	6			0	
41	4			—	
45	3			—	
50	7			+2	
56	7			+1	
59	3				
64	6				
72	6				
76	3				
84	7				
86	5				
4619	7w				
30	6				
35	6				
57	4				-3
64	3				+1
68	4				-2
70	4				
4789	3				
84	4w				
4756	3				
64	3				0
80	4				
4805	4				
24	4				+1
36	4				
4848	4				
4855	3				
4861	8				

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u 1 prism

X 4050 ~~ω~~ Carinae Q 3 D 5 edge of plate X4
AGC 14910 Poor spectrum
Comparison α for X 7116

3958	6	+2	
3961	6	+2	Spectrum very difficult
3970	11	-3	& quite burned out
82	4	-	beyond 4340
97	4	0	
40035	5	0	wrong star
12-14	6	0	(as expected)
4026	3	+1	This is u Carinae (K0)
4030	8w	0	
4041	3	0	
4046	7	0	
4049	4	+1	
4054	5	0	
4064	5	0	
4067	4	0	
4072	~~7w~~ 5	0	
4077	7w	0	
4083	4	-1	
4101	5	-4	
4134	4	-1	
4144	5	-1	
4215	4	-	
4227	5	-2	
	G strong		
	4315 abs.		
4326	6	-1	
4340	6	-4	

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X4050 U Carinae Q3 D4 center of plate.
~~AGC~~ 15004 Same comp. Lines sharp, poor

	U Car	Ex
3933	11	−4
3970	13	0
3997-8	5	+2
4005	5	+2
4012-14	5	−
4026	6	−
4031	6w	+1
4046	4	0
4064	4	+2
4067	4	+2
4072	6	−
4077	7	+4
4083	7w	+3
4101	9	0
4119	3	−
23	3	−
28	3	−
4144	5	−
4172	5	+3
477	4	−
4215	5	+3
4227	7	0
4233	5	−
4240	4	−
47-50	6	−
61	5	−
72-4	5w	−
4290	5	+2
94-7	3	−

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	U Car	Gx
4300	8	G band
4308	5	obscured
4315	7	by plate background in α Tr.
4321	4	
4326	8	+3
4331.3	3 w	
4340	10	+1
4352	7	–
4360	7	–
4368	7	+4
4375	7	+4
4383	8	+3
95	5	–
99	5	–
4408	6	–
-35	6 w	–
4444	6	–
69	5	–
81	5	–
89	4	–
4501	4	–
4508	4	–
4668	5 w	+1
4765	5	–
4824	5	–
4861	9	0

No G in U Car

Background obscures comparison.

U Car Not good beyond 4363

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λ4733 x Carinae ✓ Q5 D4 Comp α For λ7116

K	15	0
3948-51	7	+4
3970	15	+2
~~3982~~	5	—
3987	4	—
3995	4	—
3997-8	4w	—
4003	3	+1
4005	4	0
~~4005~~	~~5w~~	—
4012	4	—
4014	4	—
4018	3	—
4022	3	—
4025	7	+4
4031	4 →	+1
4041	4	—
4046	6	0 w
	~~4w~~	—
	~~5~~	—
4049-50	4	
4053	5w	
4064	7	+4
66	4	+2
72	5	+1
77	8	+3
84	5	+2
90-92	4w	—
96-98	4w	—
4101	8	0

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	x Carinae	Sx
4106	3	
4110	7	
13-14	3	
18	7	+4
22	7	+4
28	7	+4
32	7	+4
34	5	–
37	7	+2
49	6w	
54-6	6w	
61-3	6w	
67	3	
4172	9	+4
77	8	~~+4~~
85-7	5	–
91	5	–
98 ~~420 2~~	5	+1
5	(4	+2
6	4	+2
8	(4	
10	4	
~~12~~	4	
4215	6	+2
4227	7	+2
4233	5	–
4240	3	–
4247	6	~~+3~~
51	3	+3
54	3	

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	x Carinae	Ex
58	3	
60	3	0
4272-4 ~~4290~~	8w	+3
4290	6	+1
94-7	5	
4300-3	5+5	+2
08-9	5	0
4315	8	+5
4321	3	
4325	5	0
4331	3	-
4333	3	-
4340	10	0
44	3	-
52	6	0
68	5	-
72	6	-
75	6	+2
4383	9	+4
85	3	
95	5	+2
99	6	+2
4405	3	-
4408	4	-
4415	9	+4
23	4	-
4444	9	+4
4450	4	-
4454	-	4
69	6w	
81	6	+1

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	x Cav	
89	5<	+1
91-94	5	+2
4505	5	+2
4508	5	
4515	4	
20	4	
23	4	
25	4	
28		
4534	5	
41	3	
44	3	
50	3	
54	5	
64	5	
72	3	
4584	6	
96	5w	
4613	3	
16	3	
19	6w	
29	6	
35	6	
46-8	6	+1
57	6	
63	3	
4668-70	7	+2
	4	
	3	
	3	
	4	
	4	
4765	6	

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1925phae.proj.109SP

	x Cen	
72 80 80	3 3	
99	3	
4805	3	
4808	3	
4824	6	
4840	5	
4855	4	
4861	7	-1

good beyond Hβ but no std.

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1925phae.proj.1095P

Comp. α For x6261

X 4733 DM 3216 ✓ 1 prom QB & D2 Very faint

		Ex	
			No estimates
4077	6	+	possible
4101	8w	−	
4110		+	
4144	6?	+	
4172	6?	+	
4215	5	+	
4227	8	−	
4290	5	+	
4300	6	+	
4315	−?		
4340	10	0	
4352	6	0	
4375	7	0	
4383			
4668	5?	0	

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1925phae.proj.1095P

Comp α Tor X6261

X5739 W Sagittarii Q 3 D 1 Very faint. No estimates. Edge of plate

Ex.

4215 +1
4227 0
4247 +1
4272 +1
4290 -1 ?

Lines in W Sgr rather sharp

G band fairly strong.

4315 +3
4321 +3 (lines in α Tor)
4325 0
4331 +3 " " " "
4340 0
4352 +1
62 0
68 -
75 +1
83 +1
99 +2
4508 +2
15 +1
44 0
4668 0
4765 +1

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1925phae.proj.1095p

1 prism

X5909 W Sagittarii. Comp. α for X6261 Q3 D2

Very faint. Lines rather wide & hazy but spectrum good. Near edge of plate

4077	7	+1
4083	5w	0
4101	11	0
4110		+1
4144	6?	0
4172	6w	0
4215	4	0
4227	6	-2
4272	6	-1
4290	5	0
4300	5	0
4308	3?	-2
4315	4	+2
4326	4	-2
4340	11	-1
4375	5	0
4454	-	-3

Only the more conspicuous lines can be seen.

too faint

C 3870 useless

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1925phae.proj.1095P

✓ 1 prism

C 2396 ρ Cassiopeiae. Q 5 D 3 very good
Comp α Fornacis × 6261

3945	7	+
3961	5	0
3970	16	+2
3982	6w	+1
91-5	6w	+
97-8	6w	0
4005	5w	-1
4025	5w	+2
4031	8w	0
4041	4	-3
4046	5w	+2
4064	5	+1
4067	4	0
4072	4	0
4077	7	+2
4083	5	+1
4110	6w	—
19	4	—
22	5	—
28-34	8w	+3
37	3	0
44	5	+1
49	5w	+
5416	5w	+
62	7w	+7?
72	8	+2
77	7	+
4215	5	+2
27	7	+1
33	7	+7

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	ρ Cas	
4247	5w	
50		+
61	5w	0
72-74	8w	+3
~~4290~~ 4288	3w	+
~~4290~~ 4290	5	-1
~~4290~~		
4294-7	4	+
4300-5	6	+2
4308	4	~~-1~~ -2
4315	6	+
4321	4	+
~~4326~~	5	-1
4331	4	+
4340	12	-1
4344	3	+
4352	7	+3
60 ~~4355~~	4w	+
68 ~~4360~~	5	+2
75 ~~4368~~	5	+2
83 ~~4375~~	7	+3
4395	5	+
98	4	+
4408	3	+
15	~~0~~	+
35	3w	-1
4444	8	
54	0	-3
69	8w	+2
81	6	-
89	6	-

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ρ Cas

4508	4w	
4515	3	
34	6w	+1
? 35	~~5~~	+
64	~~3~~	
72	5	
84	5	
95	6w	
4619	4	
29	5	
57	4	
4668	6	+2
4765	5	+
4861	7	0

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√1 prism

C 2620 d Draconis Q 5 D 3 good

Comp α 7or X7116

3933	16	+3
44	6	+3
	7w	+4
3961	6	+3
3970	15	+2
3979	4	
3982	7	+4
3991-5	5w	
3997-8	8	+3
4005	7	−1
4012-14	4w	
4022	5	
4024	5	
4031	8w	+1
4041	4	0
4046	6	0
4054	5w	+1
4062	5	+1
4067	3	−1
4072	3	−1
4077	8	+2
4087	6w	0
4096	3	0
4101	10	0
4110	6w	+
18	6	+1
22	6	+3
28	6	+1
44	6	0
4172	6	+2
77	5	+3

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1925phae.proj.1095f

4215	4	0
4227	7	-1
4232	6	+4
~~4761~~	5w	+1
61 ~~72~~	6w	-1
72	6w	0
90	6	0
4294-7	3	+
4300-3	7w	0 no G band
4308	3	-3
4315	6	+3
4321	3	+
4325	5	-1
4331	3	+
4340	10	+0
4352	5	0
4360	3	+
4368	5	+3
4375	5	+2
4383	6	0
95	5w	+
99	4	+
4505-8	6	+1
4575	6	+1
55	0	4
69	5w	+
81	5	0
89	5	+2
4668	6	+1
4765	6	+
4861 ~~4874~~	5	0

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1 prism /

C 5132 35 Cygni Q 3 D 3 lines clear, sp very irregular X
Comp α For X7116

3933	14	0
3970	14	0
400	6	+1
4005	5	-1
4077	7	+2
4083	3	-1
4101	9	0
4144	4	-1
41727	6w	
4215	3	-1
4227	5	-1
4233	4	+
4290	4	
4300	5	+2
4308	3	-3
4315	4	+
4340	10	+1
4368	6	+2
75	6	+1
4668	6	0:
4765	4	+
4861	7	0

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/

ar X8843 K Pavonis Q 3 D 3 lines hazy. Out of focus.
Comp α For X6261

4215	4 w	0
4227	6 w	0
4261	4	-1
4272	5	0
4290	6	+1
	G band apparently	
4326	5 w	-2
4340	12	+1
4375	7	+1
4668	7	+1
4861	10	+1

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1 prism ✓

X 11998 S Muscae Q 4 D 3 lines clear + sharp

Comp 72 CMa X 11433

3997	6	+2
4005	4	-1
4025	4	+2
4031	5w	+2
4041	3	-1
4046	5	-1
4054	3	+
4064	5	-1
4068	4	-1
4072	2	-2
4077	7	+3
4083	5	0
4096	3	+
4101	8	0
4110	4	+
4118	4	+1
4128	4	-1
4134	4	+
4144	6	+1
4154-6	4w	+
62	4	+
72	7w	+3
77	6	+
87	3	0
91	4	0
97	4	0
4210	4	+
4215	5	+3
4227	7	0

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1925phae.proj.10950

4233	5	+
36	4	+
40	4	+
42	~~3~~	-1
4247	5w	0
72 ~~54~~	5	+1
74 ~~64~~	3	0
~~74~~	7	+3
90 ~~44~~		
4305	3	
4306 ~~3~~	8d	+4
4308	~~4~~	0
4315	6	+3
4321	3	0
4326	6	-1
4330	3	0
4340	11	+1
4344	3	+
4352	6	+1
58	5	+2
68	5w	+2
75	6	~~0~~ +3
79	3	+
83	6	0
90	3	+
95	4	+
99	5	+
4405	3	+
4408	5	+
4415	6	+1
4422	3	0

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	S Muscae	
4435	3	~~0~~ ?
4444	6	+1
50	4	+2
55	4	~~0~~
62	4	+
69	~~5~~ 4	+
4481	5	0
89	4	+1
95-7	4	+
4501	4	+
08	4	+
15	4 w	+
49	4	-1
54	5	+1
58	3	+
64	4	+
72	4	+
77	3	+
84	5 w	+1
)	3	
	2	
	2	
	3	-1
4663	4	
4668	5	
4765	3	
4824	4	
48	3	
55	3	
4861	10	0

no C band to S Muscae

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1925phae.proj.10950

1 prism ✓

AGC 17062. Plate X12503 Q 4 D 3 lines sharp
Comp 72 CMa X11433

3933	17	? 11433 faint here
44	5	?
61	5	+?
3970	16	+?
82	5	+
87	4	+
98	5	+1
4005	5	−1
4026	3	+
4030	5	+
4046	5	−1
	3	+
	5	+
52	5	0
64	4	0
72	3	−1
77	8	+4
83	5	0
4101	8	0
10	5	+2
18	5	+2
22	5	+2
28	5	+2
34	5	−1
44	5	0
72	6	+2
77	6	+
85	4	+
87	4	+

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1925phae.proj.1095P

AGC 7062

4191	4	+
96	4	+
98	5	+1
4202	3	
05	3	
08	3	
10	3	
4215	4	+2
27	6	0
33	4	0
40	4	+
47	5	+
50	3	-1
72	5 ~~4~~	0
74	3	0
90 ~~72-4~~	6	+1
94	3	+
4300	4	+
02	4	+
4308	3	-3
15	5	+2
21	3	+1
26	6	-1
33	3	+1
4340	11	0
44	3	+
52	5	+1
60	4	+1
68	4	+2
75	5	+2
4383	6	-1

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1925phae.proj.1095p

4390	3	+
95	4	+
99	5	+
4408	4	+
15	5	0
4435	3	-1
4444	6	+2
4455	0	-3
69	4	+1
81	5	0
89	2	-2
4529	2	-2
4534	2	-2
50	4	+
54	4	+
64	4	+
72	4	+
84	4	+
4657	3	+
68	5w	+1
4765	4	+
4848	3	
55	3	
4861	7	0

No G band
in ~~NGC~~ 7062

(This plate has
AOC 16962, excellent
Mb spectrum)

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1925phae.proj.1095P

1 prism ✓

K 12096 S Normae Q 5 D 2 Very faint; esp. faint at violet end. Lines very sharp

Comp 72 CMa X 11433

	S Nor		
			These measures are of small weight
4077	8	+2	
4084	4		
4087	4		
4101	8	0	
10	6	+1	
18	5	+	
28	5	+	
NP 4132?	5	+	
4044	6	-1	
72	8	+2	
77	6	+	
87	5	+	
91	5	+	
98	6	+	
4210	4	+	
4215	5	+3	
4227	6	-1	
33	4		
36	4		
40	4	-1	
42	4	-1	
47-51	5	-1	
58-60	5	-1	
72	5	0	
74	3		
90	5	0	

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1925phae.proj.1095p

	S Normae	
4294	3	0
4300-2	6 w	+1
4308	3	-3
15	5	+3
21	3	0
26	5	-1
31	3	0
40	11	+1
44	3	+
52	5	0
60	4	+?
68	4	+
75	5	+1
83	6	+1
90	3	-1
95-8	5	+
4405	3	
8	4	
4415	5 w	
22	3	-1
69	4	
81	5	
89	3	
4501	4	
08	4	
15	3	
29	3	
34	4	
41	3	
50	4	
54	4	
64	4	
72	4	
80	5	

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1925phae.proj.1095P

S Normae

4653	4		
57	4		
68	4		
4678	5w	Q+1	too faint
4861	8?	0	to measure

X

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X11784 AGC 25456 Q 4 D 3 Lines sharp
Comp 72 CMa X 11433

3933	15	0
3970	14	+1
3998	4	-1
4005	5	+1
4046	5	0
4068	5	-1
4068	3	0
4072	3	0
4077	5	+2
4101	7	0
4144	4	-1
72	6	+1
77	5	+
4215	4	+1
27	5	-2
90	6	+1
94	3	+
4300	5	+1
08	4	-2
4315	5	+3
21	4	
26	5	
31	4	
33	3	
40	8	-1
44	3	+
52	5	+1
60	4	-1
68	4	0
73	6	+2
83	6	0

Only stronger lines to be seen.

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	AGC 25456	
4408	4	
15	5	-1
4435	4	-1
44	5	+1
4481	6	+1
4584	4	+
4668	4	0
4861	8	-1

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1925phae.proj.1095p

✓

35
×7536 o_1 Centauri Q 3 D 3 Lies hazy.
Comp α For ×7116

4077	5	0
83	5	+1
4101	7	-1
10	5	
18	4	
22	4	
28	4	
32	4	
4144	6	+1
62	4	
72	6	+2
77	4	+
4215	4	0
27	6	-1
33	5	+
72	6	+2
90	5	0
4300	6	+1
05	4	⊕
08	~~5~~	-1
15	5	+2
21	4	+
26	5	-2
31	3	+
4340	8	-1
52	5	+
60	4	+1
68	5	+2
75	6	+2
83	6	+1

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	σ Cen	
4395-9	4	+1
4408	4	0
15	5	−1
35	3	0
44	6	+2
54	0	−3
69	6	+
82	5−	0
89	5−	+1

Rest too faint

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✓ 1 prism

C 17063 δ Cephei Q 4 D 3 excellent
Comp C 17200 HP 1522 very faint & hazy lines

3933	14	+2
38	4	+
44	5	0
53	5	+1
56-8	5	+1
61	6	+1
70	13	+1
73	4	+
76	4	+
3983	5	+
87	3	
91	4	
3997-8	6	+2
4003	3	
4005	5	+1
9	2	
12	2	
14	3	+1
18-22	2	
25	4	+2
4028	2	
4030	7w	0
4041	5	
4046	6	0
	2	
	5	
	4	
64	5	
67	4	
72	3	

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	δ Cephei	
4077	7	+3
83	5w	0
96	3	+
4101	8	+1
4110	4w	+
18	3	+
22	3	+
28	4	+
32	4	+
44	4	+1
49	3	+
54-6	3w	+
61-3	3	+
72	6	+
77	5	+
82	3	+
85	3	+
87	3	+
4215	3	+3
4227	7	0
33	3	
36	3	
47-51	4w	
58-60	3	0
72-4	5w	+1
90	5	+3
94		
4300	6^2	+2
4315	5	+
4321	3	+
4326	4	−1
4331	2	+

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	δ Cephei	
4340	11	+2
52	5	+1
62	4	
68	4	
75	5	+1
83	6	+1
95	3	
4408	3	
15	4	
35	3	+1
44	4	
54	0	-3
69	5	
81	5	0
89	4	
4668	6	+2
4765	4	
4825	4	
4848	3	
4855	3	
4861	8	+1

good further to red
(card plate)

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2 prism

C5889 γ Cygni. Q5 D4 Excellent. λ std.
Comp. α Aurigae C5256

	γ Cyg	
3933	30	+15
3944	8	+1
49	3	+2
50	4	+1
51	4	+2
53	8	+1
57	7	+1
58	7	+2
61	6	0
3970	35	+20
73-4	7	+1
76	4	0
77	4	0
79	3	0
82	8	+3
84	7	+2
86	3	
88	3	-1
91	3	
93	3	+2
3996	5	+4
3998	5	+2
4000	3	+
03-4	5w	+
4005	8	+1
? 06.8	0	-3
12	5	+3
14	5w	+2
16	5w	+1

good to v

in wing of 3970 (γ Cyg)

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40 22	4	+
23	4	+
24	7	+3
28	4	+
31	8	+2
32	7	+2
41	7	+1
43	3	0
44	3	+
46	8	0
49	3	+
50	3	+
52	3	+
54	5	+2
64	9	+1
67	8	+1
72	7	-1
74	3	+
77	10	+3
79	3	0
83	4	+1
85	4	0
86	4	0
90	3	0
92	3	-1
96	4	+1
98	4	+1
4101	10	+1
06	3	+
07	3	+
09	4	+
11	4	+

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	γ Cyg	
41 13	3	
15	3	
18	8	+1
20	7	+2
22	3	+
23-23.8	9d	+3
25-6	3	~~+~~ −
28-9 ~~28~~	8	+1
36-7 29	7	+1
40-2 ~~3~~	7	0
42 ~~36~~ 7	9	+1
46	3	
47	3	
49	5	+1
52	3	
54	5	+1
56	5	+1
59	3	
62-3	6	+2
65	4	+
?	2	+
67	4	0
72	12d	+5
77	10	+4
81	4	0
84	5	+1
87	6	+2
91	6w	+1
95	6	+2
98	7	+3

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γ Cyg

2	6	+2
5	7_3	+3
9		
? 10-12	6w	
4215	8	+1
19-20	3	+1
22	3	+
24-5	3	+3
27	10	0
30	2?	0
33	7	+3
36	6	+2
39-40	6w	+2
42	5	+1
47	8	+4
50.09	5	+1
54	3	+
58	4	+1
60	4w	+1
62	2	+
71	7	0
75	6	+1
77-8	3	−1
80-1	3	−1
83	5	+
88	3	
90	9	+3
94	5	+3
96	5	+
00	9	+1
03	9	+3

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	λ Cygg	
4305	5	+1
4308	6w	-2 no G band
4315	8	+5
21	5	+1
26	7	-1
31	5	+1
33	5	+1
37	8	+3
40	10	+1
(Nov. 19) 44	5	+2
48	2	-1
52	7	+1
55	4	+1
58-9	7	+1
67-9	7w	+1
75	8	+1
79	4	+2
85	9	+1
87-8	3	
91	5	+1
95	6	+2
4400	7	+3
05	4	-1
08-9	4	+1
11	3	+
15	5	+
17	5	+1
22	5	+1
27	4w	0
30-3	4w	0
35	5	+1

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	γ Cyg	
44	9	+3
47	3	0
50	5	+2
55	5	0
59	3	+
62	4	0
69	5	+
71	3	+
73	3	+
76	3	+
80	2	+
82	7	0
82.3	2	+
88-9	7	0
94	4	0
97	4	+1
4501	6	+1
08	5	+2
15	4	
18-20	4	
22-5	4w	
28-9	4w	
4534	6	+1
41	5	0
44	5	0
49	6	+1
54-6	7	+2
58	3	+
634	6	+1
68	2	+
72	5	0

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	γ Cyg.	
4576	3	+
80	3	−1
84	6	+3
92	3	+
4600	3	+
13-16	6w	+
19-20	3	+
29	6	+4
~~32-34~~ ~~46-48~~	5w	+
46-9	7w	0
52-5	3	0
57	7w	0
64	4	0
67-70	8w	+1 (2 lines ⊥r not in α Cyg)
78	4	
82	5w	
99	4	1
4703	4	1
08	5	+3
15	4	−1
19	3	0
28-31	5w	0
37	3	+
52-5	4w	
64	7	+1
67-71	3	−1
80	4	+1
4805	5	0
11	5	+1
	3	+

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	γ Cyg	
4824	7	+3
40	3	+
4848	6	+2
55	6	+2
61	9	+1

good to rd
(ord pl)

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2 prism

X8211 ρ Puppis Q5 D4 Excellent
Comp α 7Tr X 8142 stronger Raw comp

3933	20	+5
36-8	8	+
3944	8	+
61	8	+
3970	18	+3
3997-8	8w	+3
4003	4	+
4005	8w	0
12-14	4	+2
~~18, -22~~ ~~24, 28~~	5w	+
24	5	+2
28 30	5	+1
31	5	+1
41	4	+
46	6	-1
48	3	+
50	3	+
54	5	+
59	5	0
63	5	0
67	6	+1
72	4	-1
75	3	0
77	7	+2
? 83	5	+
87	6w	-1
93	3	-1
4101	11	0

Lines not so sharp as γ Cyg

ρ Pup in rather poor focus until 4101

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	ρ Pup	
4110	3	+
11?	3	0
4118	5	+3
22	4	/
28	3	/
28	4	/
31	3	/
32 ~~38~~	5	/
34 ~~32~~	4	/
37 ~~34~~	4w	/
~~37~~ ?	3	/
4144	5	−1
46	3	
47	3	/
49	4	/
from 50	3	/
52	4	/
S.S 54	4	/
56	3	/
59	4	/
61	3	
63	2	
4167	4	
4172	8w	+2
77	5	+
79	5	+
82	5	
85	5	
87	5	
91	5	
96	5	
98	6	+2

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	p	Pup	
4202	4		
05	4		
07	3		
08	3		
10	3		-1
12	2		
?	2		
15	5		+3
17	3		
19	4		
22	3		
24	3		
27	6		-2
	3		
33	6		+2
36	6		+2
40	4		
42	4		
~~47~~	~~5~~		
47	7w		
57	6		
53	3		
54	5		
58	5		
4261	6		-2
72	5		-1
75	4		0
? 80	4		0
90	8		+2
94	4		+

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p	P-up	
97	4	+
4300	9	+1
02	9	+1
	4	
4305	4	-2
4308	4	
4315	7	+
17.0	3	
17.6	3	
21	6	
26	7	-1
31	6	+
33	5	+
4337	6	
4340	10	+1
44	6	+
?	3	
52	8	+2
55	4	+
59	5	+
67	3	+
68	4	+
70	4	+
71	3	+
75	8	+2
85	5	+
90	6	+
95	6	+
4398	3	+2
4400	6	+2

79 = 4
83 = 9

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1925phae.proj.1095p

	p	Pwp	
4405		5	+
08		5	+
11		4	+
4415		5	0
17		5	+1
22		4	+
— ?		3	+
27		4	+
30		4	+
35		5	0
44		10	+2
~~47 50~~		~~7 00~~	
	?	3	
	?	3	
~~55~~		5	0
~~62~~		4	+
		3	+
		3	+
		3	+
		3	+
		3	+
		6 w	+2
474		4	+
47~~50~~		4	+
50		6	+1
56		5	+
62		6	+
? 64		2	
		2	
69		6 w	

wrong section

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1925phae.proj.1095P

	ρ Pup	
4473	3	
~~76~~	4	
81	7	0
?	3	
89	5	
91	5	
94	4	
97	4	
4501	5	0
08	4	+
15	3	+
20	3	+
22	3	+
25	3	+
28	3	+
31	3	+
34	6w	+2
41	3	+
44	3	+
49	5	+1
54	5 #	+
58	3	+1
64	4	+
72	4	+1
4689	5w	
29	3	
34	4	
57	6	+2
63	6	+2
68-70	6	0

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	ρ	Pwp	
	4698	3	+
	4703	4	+
	09	4	+
	14	3	+
?	4754	4w	0
	4765	5w	0
	4824	4	
	48	2	
	55	3	
	4861	11	0

good a little to r.
(ord pl)

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1925phae.proj.1095P

× 8660 κ Pavonis Q3 D3 lines very hazy
Comp α For × 8142 This is (partly at least) plate quality only solvent lines measured

4065	8	−1
4068	7	−1
4072	8	−1
4077	10	+2
83	8w	0
4101	11	+1
4144	8	0
4172	9	+1
4215	6	+2
4227	9	+1
4290	7	+1
4300	9w	+2
4308	5	−2
4315	6	+3
26	10	0
31	4	+
52	6	0
60	5	+2
68	4	+2
75	5	+1
83	7	0
4444	8w	+1
4469	6w	+1
81	8w	+1
89	7	+2
4657	5	+1
63	5	+1
4668	7	+1
4765	5w	+2
4861	9	0

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1925phae.proj.1095P

λ 8274 δ Canis Majoris Q5 D4 excellent spectrum
Comp α Aurigae, same D, Same Q, same
disp. λ 8219
Wave lengths from Lockyer's γ Cyg list

Subsequent identifications *		δ Ola	Excess	Kayser
Ca+	3933	30	+10	
al	44	7	+1	
La+ Fe, fe	50-51	8d	+2	Y 12,12, 50.35 Fe 4,- 49.95 Ca 4,- 48.91 La 12,20 49.10
Ti	56	5	+	
Ti	58	4	+	
al	61	5	+	
Ca+, H	70	25	+5	
Fe, Cr	76	3	-	Cd -,6 76.6 Cr 9,7 76.68
Fe	77	4	-	Cd -,6 77.8 Fe 5,2 77.746
Cr Co Fe	79	3	-	-
Ti 3981		8	-	
Cr Fe	84	3	-	Hg 6,0 84.11 Fe 4,- 83.98
? Mn	87	2	-	Mo -,6 86.25 Fe 4,- 86.18
La +	88	3	-	La 10,15 88.52
Ti	89	3	-	
Co	95	4	-	Co 10,10 95.31
Fe	97	6	+2	Sc 10,- 96.61
Ti	98	6	-	
- Fe	4000.1	3	-	Zr 8,12 98.96 Ti 10,6 98.65 V 10,4 98.75
-	4003	5w	0	-
Fe	4005	6	+2	
Fe	09	4w	-	Fe 4,- 09.71 Ti 7,4 09.14
Ti +	12	6	-	
Fe	14	5	-	Sc 6,8 14.52 Fe 4,0 14.53
Un, Fe	17	3	-	-
Mn	18	3	-	
Fe	22	4	-	Fe 4,2 21.872 Cu 15,10 22.70

* List in Mem RAS 54, 212. Known SR in ink

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1925phae.proj.1095P

		SCMa	Excess	
—	4023	4	-	
Ti, Ti+	4025	8	+4	
Ti+	28	4	-	
Mn	4030	9	+1	
Mn	33	5	-	
Mn	34	4	-	
Mn	35	3	-	
Mn	41	7	+2	
La?	43	4	-	La 8,15 42.92
Fe, Fe	44	3	-	K 10,10 44.15
Fe	46	8	-1	
Mn	48	5	-	
—	50	4	-	La 6,10 50.09
Fe	52	4	-	-
Ti+	54	6	-	
Ti	55	3	-	
Mn	56	3	-	
Mg	57	3	-	
Co, Mn	58	3	-	
(Ti)	61	3	-	
Fe	63	9	+2	
Fe Fe p Ni Fe	67	7	+2	Fe 4,0 67.28 La 6,8 67.37 Fe 4,0 66.99
Fe	71	7	-1	
?Fe	73	6	-	Zr 8,4 72.70
—	75	3		Fe 4.0 74.80
Sr+	4077	10	+3	
Mn, Mn	79	4w	-	
Fe	80	3	-	Ru 12,10 80.62
Ti, Mn	82	3	-	
Mn	83	5	+2	
Fe	85	5		Fe 4,0 85.01
La?	86	5		{ La 10,15 86.70 { Co 9,8 86.32

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1925phae.proj.1095p

		δ CMa	Excess	Kayser
Fe	4089	3	-	Zr 6,14 90.51
-	90	4	-	↓ V 10,10 90.59
Fe,V	92	4	-	Co 8,10 92.40
-	94	2	-	Cd -,7 94.8
Fe,Fe	96	4	-	V 8,5 95.49
~~V~~Fe	98	4	-	Fe 5,0 98.19 Co 5,0 98.59
V,Fe	4100	2	-	La 5,10 99.53
H	02	10	0	
V	04-5	4w	-	Rb 0,8 03.34
Fe,Fe	06	3	-	{V 10,4 05.2 {Sr 5,0, 05.86
Fe	07	4	-	{Fe 5,0 07.50 {Mo 6,0 07.49
V,Fe	09	5	-	{V 15,10 09.78 {Co 10,10 10.54
V	11	5	-	{Mn 6,10 V 20,0, 11.80 {10.92
-	13	4	-	-
V	15	4	-	V 6,0, 15.17
-	17	2	-	V 15,5, 16.50
Fe	18	4		Co 8,10 18.78 Fe 6,8 18.552
Fe	20	4		Fe 4,0, 20.22
-,Fe	~~23~~	4		La 10,15 23.24 Fe 4,0 22.52
Fe,F,V	28	6	+3	(Cd 0,6, 26.9) {Fe 4,0, 27.62 {V 10,10, 28.10 {Y 15,8, 28.32
Fe+	29	4		
Ba+	30	4		
Fe,Fe	32-34	6w	+1	
Fe(3)	36-7	2λ		-
Fe,Sat	40-2	2		La+ 6,10 41.72
Fe	4144	8	+2	
(Fe)	46	4		nos.R.
Fe	47	4		
Fe	49	6		{Fe 4,0 49.38 {Zr 10,15 49.20
-	50	3		Ce 10,10 49.95
Fe	52	4		La 10,10 51.95

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1925phae.proj.1093P

		δ cm⁻¹	Excess	
Fe	4154	5		Fe 4,10 53.92 Cr 5,10 53.81 Fe 4,10 53.51
–	56	5		Zr 6,10 56.23 Fe 5,0 56.81
Fe, Un	59	3		Fe 4,10 58.80 Co 8,0 60.70 ?
Sr+	4161	6		
Ti	63	6		Ti 4,10 63.65
Fe	65	4		Sc 6,0 65.22 Ce 5,10 65.60
Mg	67	4		
Ti	72	4		Fe 5,0 72.13 Ti 9,10 71.91 Ce 15,20 72.05
Fe+	73	8	+3	
–	75	3		Fe 4,10 74.92
Fe	77	4		3
Fe+	79	8	+4	
Fe	81	7	+1	Fe 4,10 81.76
Ti	84	8	+1	Fe 5,10 84.59 V 9,10 83.44
Fe, Fe	87	8	0	Fe 6,4 87.05 Fe 6,4 87.81
Fe	91	7	–	Fe 6,3 91.442
–	93	3	–	La 7,8 92.34
Fe	95	7	–	Fe 4,10 95.34
Fe	96	8	–	Fe 4,0 96.21 La 10,10 96.55
Fe	98	7		
Fe	4202	7		
Y, V	05	5		V 9,10 05.09 Y 5,5 04.68
Zr	09	4		Zr 6,12 08.96
Fe	10	4		V 8,8 09.84
Zr	12	4		Zr 5,5 11.85 Ag 10,10 12.02
Fe	13	3		–
Sr+	15	8	–1	
–	17	4		Co 9,6 16.9 La 6 10 17.56 Fe 4,0 17.56
Fe	19-20	4w		Fe 5,0 4219.36
Fe	22	5		
Fe, Fe	24-5	4w		Fe 4,0 24.17 4,0 25.46

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1925phae.proj.1095P

		δ	CMa	Ex	
Ca	4227	10		0	
Fe, Fe	29	3			-
Fe, Fe+	33	9			
Fe	36	8			
Fe	39	5			Zr 6,10 39.30 La 10,10 39.40 Fe 5,0 38.81
Fe	40	5			
Cr	42	7			-
(Fe)	45	3			Fe 4,0 45.26 NO S.R.
Sc+	47	10			
Fe, Fe	2(50)	8			
? Co	52	5			-
Cr	54	5			
-	56	3			-
Fe+	58	5			
Fe	60	6		-1	
Cr	62	4			-
-	69	2			La 10,10 69.50 V 8,10 68.63
Fe, Fe	71-2	8		0	
Fe Cr	73	5		0	-
Cr, -	2(75)	7		0	
-	778	4			-
-	80-81	4			-
Fe, Ca	82	5			~~V 8,10~~
-	84	3			V 8,10 84.04 Mn 5,0 84.08
Ti+	88	4			La 10,12 86.97
Ca, Cr, Ti+	4290	10		0	
Ti+, Fe, Sc+	94	9			
Fe+	96	9			
Fe, Ti, Ti+, Ca	99-00	10			
Ca, Fe, Ti+	4300	10d			

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		δ(Mo)	Ex		
Sr					
Ti, Sc+	4305	7			
Ca, Fe, Ti+	08	5			
Y+	.09	6			
Ti+	13	5			
Ti, Ti+, Sc+, Fe	4315	9			
Ti+?	17	5	-		
Ca	18	5			
Sc+, Ti+	4321	8	La 6,5 33.51		
Sc+, Fe	4326	9			
Ti+	4331	8			
?La	4333	7	La 12,12 33.77 La 6,8 34.97		
Cr, Fe, Ti+	4337	8	+3		
(Nov 25)					
H	4340	11	+4		
Ti+, Cr	44	8	+4		
Fe+, Fe, Cr, Cr, Mg	51	11w	+2		NB 2r 4347 not seen
Ca	55	7	-	La 8,10 54.39	
Y+, Cr	58-9	10w	+3	Zr 9,10 59.74	
Ni	62	3	-	Sr 10,0 61.71	
-	64	2	-	Mo 0,8 63.65	
Fe, Ti+	67	5	+2		
Fe+	69	5	+2		
Cr	71	4	-		
Sc+, Y+	74	11	+3	Y 15,20 74.94	
V	79	4	+2	Zr 10,12 79.77	
Fe, Mg+, Fe+	84-5	11	0	V 20,30 84.73 Sc, Cr, La	
Ti+	87-8	5w	-		
Mg+	91	7	+2		
Ti+, V	95	10	+3		
Y+	98	5	-		
Sc+, Ti+	4400	10	+3		
Fe	DL	6	+1	Ni 15,15 01.54	

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1925phae.proj.10950

		& CMa	Excess	
Fe	4408-9	6w	0	V 15,20 08.50
Ti	~~09~~11	5	-	-
Fe, Sc+	15	6	+2	
Fe+	17~~15~~	8	+3	
Y+	22	5	-	V 8,5 21.57 Y 10,10 22.60
Ca	25	3	-	
Fe, Mg+	27	5	-	La 7,8 27.57
Fe	30	5	-	La 10,10 29.90
Ca	35	5	-1	
Fe	42	5	~~+2~~	
Ti+	44	9	+2	
Fe	47	4	-	
Ti+	50	8	-	
Ca	55	6	0	
Fe	59	3	-	
Fe	62	5	-	
Ti	64	5	-1	Mn 6,4 64.68
Fe	66	3	-	Ti 4,0 65.80 Fe 5,0 66.556
Ti+	68	6	-	
Ni Zr	70	5		Mn 6,4 70.14 Ni 10,4 70.48 Zr 4,4 70.55
Fe+	73	5		
Fe	76	4	0	Fe 6,4 76.03
Fe	80	3		Cu 9,0 80.42
Mg+, Fe, Fe.	81,2	7w	0	
-	85	2		Fe 4,0 84.23
Ti Fe+	88-9	7	+3	
Fe+	91~~89~~	6	-	
Fe	94~~91~~	6	-	
-	97~~94~~	6	+3	Zr 5,10 96.96 Cr 8,10 96.86
Ti+	4501 97	7	+4	

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1925phae.proj.1093P

		δ	cMa	Excess	
Fe+	4508		6	–	Zr 5,8 07.11
Fe+	4515		6	–	
Ti	18		5	–	
Fe+	20		6	–	
Fe, Ti	22		6	–	La 10,12 22.37
Ba+	25		5	–	Sm 10,20 24.76 * ?
				–	La 7·8 25.30
Fe, Ti+	28-9		6	–	
Fe	31		3	–	
Ti, Ti+	34		7	–	
Fe+	40		3		Cr 7,7 40.87
	41		6		
Ti	44		7	~~+2~~	
Ti+ Fe+ Ti	49		8	+2	
Ti	52		3	–	
Ba+	54		7	–	Zr 0,6 53.97
Ti, Fe+	56		8	–	
Cr	58		5	–	La 8,5 58.47 Cr 0,10 58.64
Ti+	63		6	+1	
Cr	65		4	–	
Fe	68		4	–	–
(Mg) Ti+	72		1/2	+2	
Fe	74		2	–	–
Fe+	76		4	–	Zr 5,6 75.52
V Fe Ni	80		4	–	V 8,10 80.39
Fe+	84		8	–	
Cr	88		3	–	Cr 0,10, 88.20
Ti+	90		3		
Fe, Cr	92		4	–	
V, Fe	94-5		1	–	V 10,10 94.09 Co 8,– 94.64

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		δ CMa	Excess	
Cr	4600	3		
Fe	03	3		
Ni	05	2		Ni 10,0 04.99 Mn 5,0 05.38
Sr	(4607?)	0	-4	
	?	3	-	
Cr	13	4	-	
Cr	16	5	-	
FeCrFe	19	5	-	Cr 0,10 18.85 V 8,10 19.71
Fe+	20	5	-	La 6,6 19.87
Cr	26	4w	-	
Fe+	29	8	-	
-	32	5	-	-
Cr	34	4	-	Zr 6,8 33.99 Cr 0,7 34.12
-	42	3	-	-
-	?	3	-	
Cr	46	5	0	
Ni	49	5	0	Ni 15,- 48.66
Cr,Cr	52	4	-	
-	55	4	-	La 7,10 55.50
Fe+	57	6	+2	
-,-	60-3	6w		La 5,4 62.51 La 5,8 63.77
Fe+,Ti?	67	7	0	
				< La 5,8 68.91 NVT there?
Sc	70	7		Sc 8,0 70.42 V 8,5 70.48
Cd?	78	4	0?	Cd 8,8 78.152
Ti	82	4	0	Y+ 4,10 82.32
				< Zr 5,10 88.45 NVT there? 7,12 89.80
Ti,Fe	91	4	0	Ti 5,0 91.34 Fe 4,0 91.417
				< La 6,5 92.50
-	99	6		Ti 6,0 98.79
Mg	4703	6		
Ti+	08	7w		
				? Zr 8,10 4710.08

Sr 6,0 diff there is a wide band there

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1925phae.proj.1095P

		δ	C/Ma	Excess	
Ti	4715		5	0	
–	19		4	–	Zr 5,5 19.11
–	28		3		Mn 7.4 27.48 La 7.0 28.39
Fe+	31		6	0	
Fe	34		3		
–	37		5		Fe 6,0 36.768
–	40		3		Zr 8,10 39.47 La 8,4 40.25
–	52		2		– 43.08 La 10,10 48.72 La 6,5
Mn	55		3		May be there Sp too diff
Ti Ni	64		12	+4	-
Fe	71		3		Co 7,5 71.10 Zr 6,10 72.31
Ti+	80		6		
			4		
Mn	83		4		Zr 4.5 84.94
			3		V 5,10 86.52
Y+	86		3		
Fe	98		5 w		
Ti+	4805		6		
?Zn?	11		5		
Y+, Mn	24		9	3	
	?				
	?		4		
Ti	40		4		
Cr	48		8		Cr 0,6 48.24
Y+	55		8		
H	4861		11	0	
					good to w

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1925phae.proj.1095P

δ CMa beyond Hβ X 8948 Measures for approximate λ

		1st image	(from Hβ)	2nd image	
	4	~~7~~ 52170		- 00482	(Hβ off)
	4	410		- 00242	
Hβ	8	52652			
	4	970		00318	
	4	53385		00733	
	5	826		01174	
	3	58897		06245	
	3	59880		07228	
	4	60491		07839	
	2	61462		08810	
	5	62287		09635	
vw	12	62701		10049	
w	8	63094		10442	
	4	63700		11048	
	5	64083		11431	
	8	64332		11680	00249
	8	64578		11866	00186
edge of bd		65327		12675	~~809~~ 745
" "		65596		12944	1078
	7	65668		13016	
	7	65869		13217	00201
	7	66813		14161	00944
	7	67062		14410	
	7	67321		14669	
Edge		67979		15327	
		68220		15568	
	7	68496		15844	
	6	69052			
	8	69887		17235	

b

00238

00800

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2nd image

4	70398	17746		Difference
8	70849	18197	71327	00478
4	71541		72059	00518
7	72072	19420	72528	00456
	[illegible]	3	72720	
	72236	4	72896	
	72412	2	73602	
	73118	8	73874	
	73390	6	74242	
	73758	6	74483	
	73999	5	74771	
	74287	5	75058	
	74574	8	75462	
	74978	6	75611	
	75127	8	76009	
	75525			

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δ CMa X10156. Measures for approximate λ

	8	31157
	7	31588
(Ink mark)	7	31792
	5	31890
	8	32318
	3	33106
	6	33233
	10	34489
	7	35145
	7	35835
	7	36120
	4	36346
	8	36802
	7	37715
	7	37963
Hβ	8	38204 x
	ink 7	49739
	7	49977
	7	50777 x
	6	50949
	6	51104
	8	51326
(5227) ink	8	52224 x
	8	52481
	9	52729
	9	53451
	9	53649
	10	53923
ink —	9	54325
—		54515

54300

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	change of scale zero		Difference
9	54515	54300	00215
4		52442	
5		52564	
4		52703	
6		52836	
4		52936	
9		55069	
10		55377	
10		55588	
8		55778	
10		56103	
(2 faint lines)			
4		56711	
6w		56886	
12		57319	
10		57491	
8		57711	
ink, 10		58708	
	Plate moved		
		57293	00026
		57479	00012
		57699	00012
		58686	00012
		59038	
		59384	
		59523	
		59859	
10		60234	
5		60363	
8		60448	
8		60778	
7		61307	
ink?		6170-	

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See page 208 for correct procedure

Derivation of approximate λ for measured lines in the spectrum of δ CMa, x 10156

Selected lines

Element.	Wave length	Distance from zero
Hβ	4861.33	0.0
Mg	5183.67	12573
Fe	5227.19	16121

Derivation of constants in the formula

$$\lambda = \lambda_0 + \frac{c}{n \mp n_0}$$

$$4861.33 = \lambda_0 + \frac{c}{38204 - n_0} \qquad (1)$$

$$5183.67 = \lambda_0 + \frac{c}{50777 - n_0} \qquad (2)$$

$$5227.19 = \lambda_0 + \frac{c}{54325 - n_0} \qquad (3)$$

from (2) and (3) $\therefore 0043.52 = c\left\{\left(\frac{1}{54325-n_0}\right) - \left(\frac{1}{50777-n_0}\right)\right\} = c\left\{\frac{50777-54325}{54325.50777 - 105102 n_0 + n_0^2}\right\}$

from (1) and (2) $\therefore 322.34 = c\left\{\left(\frac{1}{50777-n_0}\right) - \left(\frac{1}{38204-n_0}\right)\right\} = c\left\{\frac{12573}{50777.38204 - 108981 n_0 + n_0^2}\right\}$

$$c = \frac{322.34\left(50777 \times 38204 - 108981 n_0 + n_0^2\right)}{12573}$$

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$$\therefore 43.52 = \frac{322.34(50177 \times 38204 - 108981 n_0 + n_0^2)}{(54325.50777 - 105102 n_0 + n_0^2)}$$

$$\therefore n_0^2(43.52 - 322.34) + n_0\{(105102 \times 43.52) + (108981 \times 322.34)\} + (43.52 \times 54325 \times 50777) - (322.34 \times 50777 \times 38204) = 0$$

$$\text{or} \quad 278.82 n_0^2 - 3.9704 \times 10^{17} n_0 + 5.053 \times 10^{11} = 0$$

$$\therefore n_0 = \frac{3.9704 \times 10^7 \pm \sqrt{(3.9704)^2 \times 10^{14} - 4(278.82 \times 5.053 \times 10^{11})}}{278.82 \times 2}$$

$$= \frac{3.970 \times 10^7 \pm \sqrt{1.576 \times 10^{15} - 0.564 \times 10^{15}}}{557.64}$$

(1)

$$= \frac{3.970 \times 10^7 \pm \sqrt{1.012 \times 10^{15}}}{557.64}$$

(2)

(3)

$$= \frac{57090}{43660}$$ adopting the positive root.

$$4861.33 = \lambda_0 + \frac{c}{38204 - \frac{43660}{57090}} = \lambda_0 - \frac{c}{18886}$$

$$5183.67 = \lambda_0 + \frac{c}{50777 - \frac{43660}{57090}} \qquad \lambda_0 \overline{*} \frac{c}{6313}$$

$$322.34 = \frac{c}{18886} \overline{*} \frac{c}{6313} = \frac{12573}{6313.18886}\, c$$

$$c = \frac{322.34 \times 6313 \times 18886}{12573} = 1.0005 \times 10^6$$

$$\log c = 6.4853$$

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$$4861.33 = \lambda_0 + \frac{c}{38204 - n_0} \qquad (1)$$

$$5183.67 = \lambda_0 + \frac{c}{50777 - n_0} \qquad (2)$$

$$5227.19 = \lambda_0 + \frac{c}{54325 - n_0} \qquad (3)$$

from (1) $$\frac{1}{c}(4861.33 - \lambda_0) = \frac{1}{38204 - n_0}$$

$$\frac{c}{4861.33 - \lambda_0} = 38204 - n_0 \qquad (4)$$

from (2) $$\frac{c}{5183.67 - \lambda_0} = 50777 - n_0 \qquad (5)$$

from (3) $$\frac{c}{5227.19 - \lambda_0} = 54325 - n_0 \qquad (6)$$

from (4) $$n_0 = 38204 - \frac{c}{4861.33 - \lambda_0} \qquad (7)$$

from (5) $$n_0 = 50777 - \frac{c}{5183.67 - \lambda_0} \qquad (8)$$

from (7) and (8) $$12573 = c\left(\frac{1}{4861.33 - \lambda_0} - \frac{1}{5183.67 - \lambda_0}\right) \qquad (9)$$

from two similar eqns. $$3548 = c\left(\frac{1}{5183.67 - \lambda_0} - \frac{1}{5227.19 - \lambda_0}\right) \qquad (10)$$

from (9) $$c = \frac{1}{3548}\left(\frac{1}{5183.67 - \lambda_0} - \frac{1}{5227.19 - \lambda_0}\right) \qquad (11)$$

From (11) and (7)

$$n_0 = 38204 - \frac{1}{3548}\left\{\frac{1}{(4861.33 \times 5183.67) - \lambda_0 \times 10045.00 + \lambda_0^2} - \frac{1}{(4861.33 \times 5227.19) - \lambda_0 \times 10088.52 + \lambda_0^2}\right\}$$

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131.66
468

2.1195
2.6702
$\bar{1}$.4493

$\bar{1}$.4493
$\bar{1}$.5114
$\bar{1}$.9379

23962
738

2.3795
2.8681
$\bar{1}$.5114

1.0000
.86604
.13396

2.8899
$\bar{1}$.9379
2.8278

1982
672
1310



3.1173
$\bar{1}$.1270
3.9903

$\bar{1}$.4492
3.9312
3.3804

397a08
2401.07
1569.01

3.3804
3.9543
7.3347

2.162×10^7

7.3347
3.8918
3.4429

2772.4
1797) 2466833.21
60228
56490
19110
35160

2772

3040
1569.01
4609.01

2772
1569
4341

2772.4
1569.01
1.41

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e R Tauri

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from (4)

$$c = (38204 - n_0)(4861.33 - \lambda_0) \quad (12)$$

from (12) and (5)

$$\frac{(38204 - n_0)(4861.33 - \lambda_0)}{5183.67 - \lambda_0} = 50777 - n_0 \quad (13)$$

from (12) and (6)

$$\frac{(38204 - n_0)(4861.33 - \lambda_0)}{5227.19 - \lambda_0} = 54325 - n_0 \quad (14)$$

from (13) $(38204 - n_0)(4861.33 - \lambda_0) = (50777 - n_0)(5183.67 - \lambda_0)$ (15)

from (14) $(38204 - n_0)(4861.33 - \lambda_0) = (5227.19 - \lambda_0)(54325 - n_0)$ (16)

(15) gives $1.8572 \times 10^8 - 38204\lambda_0 - 4861.33 n_0 + \lambda_0 n_0 = 2.6323 \times 10^8 - 5183.67 n_0 - 50777 \lambda_0 + \lambda_0 n_0$

or $-0.7751 \times 10^8 + 12573 \lambda_0 + 322.34 n_0 = 0$

0.77489×10^8

or $n_0 = \dfrac{7.7489 \times 10^7 - 12573 \lambda_0}{322.34}$ (17)

7.751

$\log 38204 = 4.5821088$ $\quad$ $\log 50777 = 4.7056670$

$\log 4861.33 = 3.6867551$ $\quad$ $\log 5183.67 = 3.7146374$

8.2688639 $\quad$ 8.4203044

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substituting in (17)

$$\left\{38204 - \frac{7.751\times10^{7} - 12573\,\lambda_0}{322.34}\right\}(4861.33-\lambda_0)$$

$$= (5227.19-\lambda_0)\left\{54325 - \frac{7.751\times10^{7} - 12573\,\lambda_0}{322.34}\right\}$$

or ~~$1.8572\times10^{8} - 4861.33\lambda_0 + 39.005\lambda_0^2 + \lambda_0^2($~~ (×39.005)

$$(38204 - 240460 + 39.005\,\lambda_0)(4861.33-\lambda_0)$$
$$= (5227.19-\lambda_0)(54325 - 240460 + 39.005\,\lambda_0)$$

or $(202256 - 39.005\,\lambda_0)(4861.33-\lambda_0) = (5227.19-\lambda_0)(186135 - 39.005\,\lambda_0)$

or $(4861.33\times202256) - (4861.33\times39.005)\lambda_0 - 202256\,\lambda_0$
$= (5227.19\times186135) - (5227.19\times39.005)\lambda_0 - 186135\,\lambda_0$

---

log 38204 = 4.5821088
log 4861.33 = 3.6867551
~~0.8953537~~
8.2688639

log 54325 = 4.7349997
log 5227.19 = 3.7182683
8.4532680

7.7489 7.8893401
2.5083142
5.3809259

log 7.751×10^{7} = 7.8893577
log 322.34 = 2.5083142
5.3810435

log 12573 = 4.0994389
log 322.34 = 2.5083142
1.5911247

240395

antilog 240460.

log 202191 3.6867551 / 5.3057621 / 8.9925172

log 4861.33 = 3.6867551
log 202256 = 5.3059014
8.9926565

3.7182683 / 5.2696764 / 8.9879447

log 5227.19 = 3.7182683
log 186135 = 5.2698280
8.9880963

log 4861.33 = 3.6867551
log 39.005 = 1.5911247
5.2778798

log 5227.19 = 3.7182683
log 39.005 = 1.5911247
5.3093930

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9.82918 202191
or $9.8323 \times 10^8 + 1,89620\lambda_0 - 202256\lambda_0$
$= 9.72623 \times 10^8 + 203890\lambda_0 - 186135\lambda_0$

0.10295 186070 202191
or $10^8 \times 0.1027 = \lambda_0(-203890 + 186135 + 202256 - 189620)$
$= 30391\lambda_0$

1.0295 5249
$\therefore \lambda_0 = 1.027 \times 10^7 / 30391$

$= 337.56$ 1961.32

from $n_0 = \dfrac{7.751 \times 10^7 - 12573\lambda_0}{322.34}$

240395
$n_0 = 240460 - 39.005\lambda_0$
$= 240460 - 13183$ 240395 − 76502
$= 227277$ 163893

$\log 1.027 \times 10^7 = 7.0115704$ 7.0126264 7.0126264
$\log 30391 = 4.4827450$ 4.4827450 3.7200766
$\log \lambda_0$ 2.5288254 2.5298814 3.2925498

$\log 39.005 = 1.5911247$ 1.5911247 1.5911247
$\log \lambda_0$ 2.5288254 2.5298814 3.2925498
4.120101 ~~4.061243~~ 4.1210061 4.8836745

13183 13214

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$$1857225.32 - 38204\lambda_0 - 4861.33 n_0 + \lambda_0 n_0$$
$$= 2632112.59 - 5183.67 n_0 - 50777\lambda_0 + \lambda_0 n_0$$

$$-77488960 + \lambda_0 \times 12573 + n_0 \times 322.34 = 0$$

$$n_0 = \frac{77488960 - \lambda_0 \times 12573}{322.34}$$

$$\frac{c}{4861.33 - \lambda_0} = 38204 - n_0$$

$$\frac{c}{5183.67 - \lambda_0} = 50777 - n_0$$

$$\frac{c}{5227.19 - \lambda_0} = 54376 - n_0$$

$$n_0 = 240395.1 - 39.005\lambda_0$$

$$(38204 - 240395.1 + 39.005\lambda_0)(4861.33 - \lambda_0)$$
$$= (50777 - 240395.1 + 39.005\lambda_0)(5183.67 - \lambda_0)$$

$$\text{or } (-202191 + 39.005\lambda_0)(4861.33 - \lambda_0)$$
$$= (-189618 + 39.005\lambda_0)(5183.67 - \lambda_0)$$
$$-982917660 + 982917656$$
$$= \lambda_0(189616.17 + 202189.04)$$

$$\lambda_0 = -4 \div -(12572.348)$$

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$(38204 - 240395.1 + 39.005\lambda_0)(4861.33 - \lambda_0)$
$= (5227.19 - \lambda_0)(54325 - 240395.1 + 39.005\lambda_0)$

$(-202191! + 39.005\lambda_0)(4861.33 - \lambda_0)$
$= (-186070.1 + 39.005\lambda_0)(5227.19 - \lambda_0)$

$\therefore -982917660.163 + 9726237660.19$
$= 1427.03693\lambda_0 +$
$-10293900. = 1427.03693\lambda_0 + 1612.00\lambda_0$
$-\lambda_0 \times 17548. = -10293900.$
$\lambda_0 = 0.05414693 +$

$- 2782.4$
$n_0 = 240395.1 + 2288.08 = 237663$
$= 238109.6$ ~~243683.2~~

~~238107 238107~~
~~243683.2~~

$C = (38204 - 243683)(4861.33 + 58.66) = 1010954625$
$= (50777 - 243683)(5283.67 + 58.66) = 1011276q$
$= (54325 - 243683)(5227.19 + 58.66) = 1000q179$

$C = 199459 \times 4791.27 = 955661$
$= 186886. \times 5118.62 = 955663$
$= 183338. \times 5157.14$

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δ CMa × 10156. Third line misidentified

$\lambda = \lambda_0 + \frac{c}{n - n_0}$

$\lambda_0 = 5562.49$

$c = -1.036 \times 10^7$

$n_0 = 23415.8$

n (reading of measuring machine)	$n - n_0$	$\frac{c}{n - n_0}$	λ
31151			
31588			
31792			
31890			
32318			
33106			
33233			
34489			
35145			
35835			
36120			
36346			
36802			
37715			
37963			
38204			[4861.33]
49739	26323	-3935.72	5168.92
49977	26561	-3908.04	5172.45
50777			[5183.67]
50949	27533	-376.27	5186.82
51104	27688	-374.17	5188.33
51326	27910	-371.19	5191.30

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52224	28808	-359.62	5202.87
52481	29065	-356.44	5206.05
52729	29313	-353.42	5209.07
53451	30035	-344.93	5217.56
53649	30234	-342.66	5219.83
53923	30507	-339.59	5222.90
54325			[5227.19]
54515	31100	-332.47	5230.02
54657	31242	-331.65	
54779	31364	-330.31	
54918	31503	-328.85	
55051	31636	-327.47	
55151	31736	-326.44	
55284	31869	-325.08	
55592	32177	-321.96	
55803	32388	-319.87	
55993	32588	-318.69	
56318	32903	-314.86	
56926	33511	-309.15	
57001	33586	-308.46	
57534	34119	-303.64	
57706	34291		
57926	34511		
58923	35508		
59241	35826		
59587	36172		
59726	36311		
60062	36647		
60427	37012		
60566	37151		
60651	37236		
60981	37566		
61510	38095		
? 61993	38488	-269.17	5293.32

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(1) $(4861.33-\lambda_0)(38204-n_0)=c$

(2) $(5183.67-\lambda_0)(50777-n_0)=c$

(3) $(5227.19-\lambda_0)(52224-n_0)=c$

from (1) and (2) $1.857222513 2\times10^8 - 3.8204\times10^4\lambda_0 - 4.86133\times10^3 n_0$ (4)

(1) and (3) $= 2.632112159\times10^8 - 50777\lambda_0 - 5183.67 n_0$

$1.875\ 1.857222513 2\times10^8 - 3.8204\times10^4\lambda_0 - 4.86133\times10^3 n_0$ (5)

$= 2.729885477\times10^8 - 52224\lambda_0 - 5227.19 n_0$

(4) gives $-7.748896\times10^7 + 1.2573\lambda_0\times10^4 + 3.2234\times10^2 n_0 = 0$ (6)

(5) gives $-8.726252\times10^7 + \lambda_0\times 1.4020\times10^4 + 3.6586\times10^2\times n_0 = 0$ (7)

Multiply (6) by 1.08639952

$-8.074334\times10^7 + 4.579268\times10^4\lambda_0 + 3.35876\, n_0\times10^2$

1:4020 and (7) by 1.2573

$-1.097161\times10^8 + 4.599966\times10^4\lambda_0 + 2.91650\, n_0\times10^2 = 0$

Subtracting

$-2.8973\times10^7 + 1.076\times10^6\lambda_0 + 08.074\, n_0\times10^2 = 0$

$n_0 - 36816.68 n_0 = 13326.7$

$1.07564\times10^6 = 08.07502\, n_0$ $\quad n_0 = 13320.6$

38903
24883
14020

$(4861-\lambda_0)(38204-13320.6) = (5227.19-\lambda_0)(52224-13320.6)$

71826 83 133206
5899161 50777
3081844 82429

$(4861-\lambda_0)\ 24877 = (5227.19-\lambda_0)\ 38897$

$\lambda_0(14020) = 5227.19\times38897 - 4861.33\times24877$

3.6867551
3957580
.0825531

$= 203322\times10^8 - 120936\times10^8$ 20335537 − 12096447

$= 8.2386\times10^7$ 8238890

9158534
1467480
7691054

$\lambda_0 = 5876.32$ 2733.14

5876.32 − 4861.33	=	1014.99
5876.32 − 5183.67		692.65
5876.32 − 5227.19		649.13

13327
50777
37450

50777
13327
37450

24877 24883 00646176
3957986
4022597

37450 37544 8406738
3741065
2146203

38897 38903
24877

8406738
5734578
4139656

8406738
5734578
4139656
8723317
5899101
4022478

2600485

log 52224 7178701
log 52219 7182683
1.4360384

272985
185722
087263

52224
38204
14020

log 12573 0994389
9408301
1.0402690

0994389
3652745
4647134

0994389
6633149
6627538

log 1042 017867 017867
8892395 5083142
9071072 5261819

4619935
0938277
3681658

0318123
9070887
1247236

1402 1467480 1467480
8892395 5083142
1.0359875 6550622

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133206 — 38204 = 95002

133206 — 52224 = 81022

4.5×10^8 $\quad$ 4.2×10^8

4.618360×10^8

4.2357738×10^8

.383187

~~4861.33 — 383187~~

4861.33	5783.67	5227.19
2733.14	2733.14	2733.14
2128.29	2450.53	2494.05
95002	82429	81022
20218	20199	202072

20211 for .5 Å difference

$n_0 = 133206$

$\lambda_0 = 2733.14$

$c = -2.02 \times 10^8$

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Derivation of constants in the Hartmann Corne formula (Stratton)

1	λ_1
2	λ_2
3	λ_3
4	$\lambda_2 - \lambda_1$
5	$\lambda_3 - \lambda_2$
6	n_1
7	n_2
8	n_3
9	$n_2 - n_1$
10	$n_3 - n_2$
11	(4) ÷ (9)
12	(5) ÷ (10)
13	(11) ÷ (12)
14	$\bar{1}$ − (13)
15	(6) × (13)
16	(8) − (15)
17	(16) ÷ (14) = n_0
18	(17) − (6)
19	(17) − (7)
20	(17) − (8)
21	λ_1
22	(11) × (19)
23	(21) − (22) = λ_0
24	(22) × (18) = C_0
25	(24) ÷ (20)
26	23 + 25 = λ_3 = check on calculation

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X 4070 γ Vel

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