

Telescopio Nazionale Galileo Instrumentation

**High Accuracy Radial velocity Planet Searcher for the Northern
hemisphere
(HARPS-N)**

Thorium-Argon Atlas

Spectral range: λ (3854-6911) Å

(valid for data acquired after November 12, 2012)



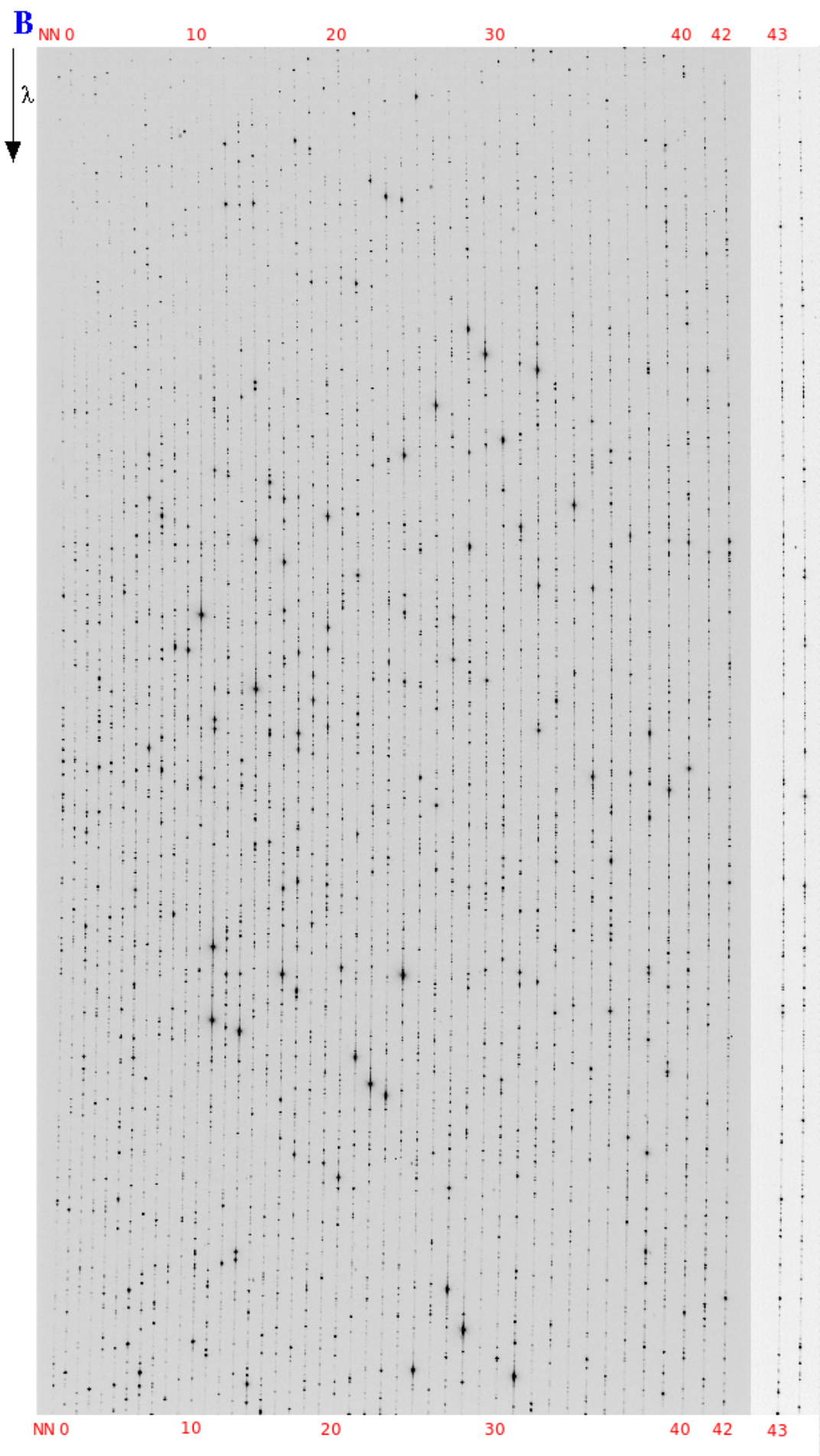
W. Boschin

R. Cosentino

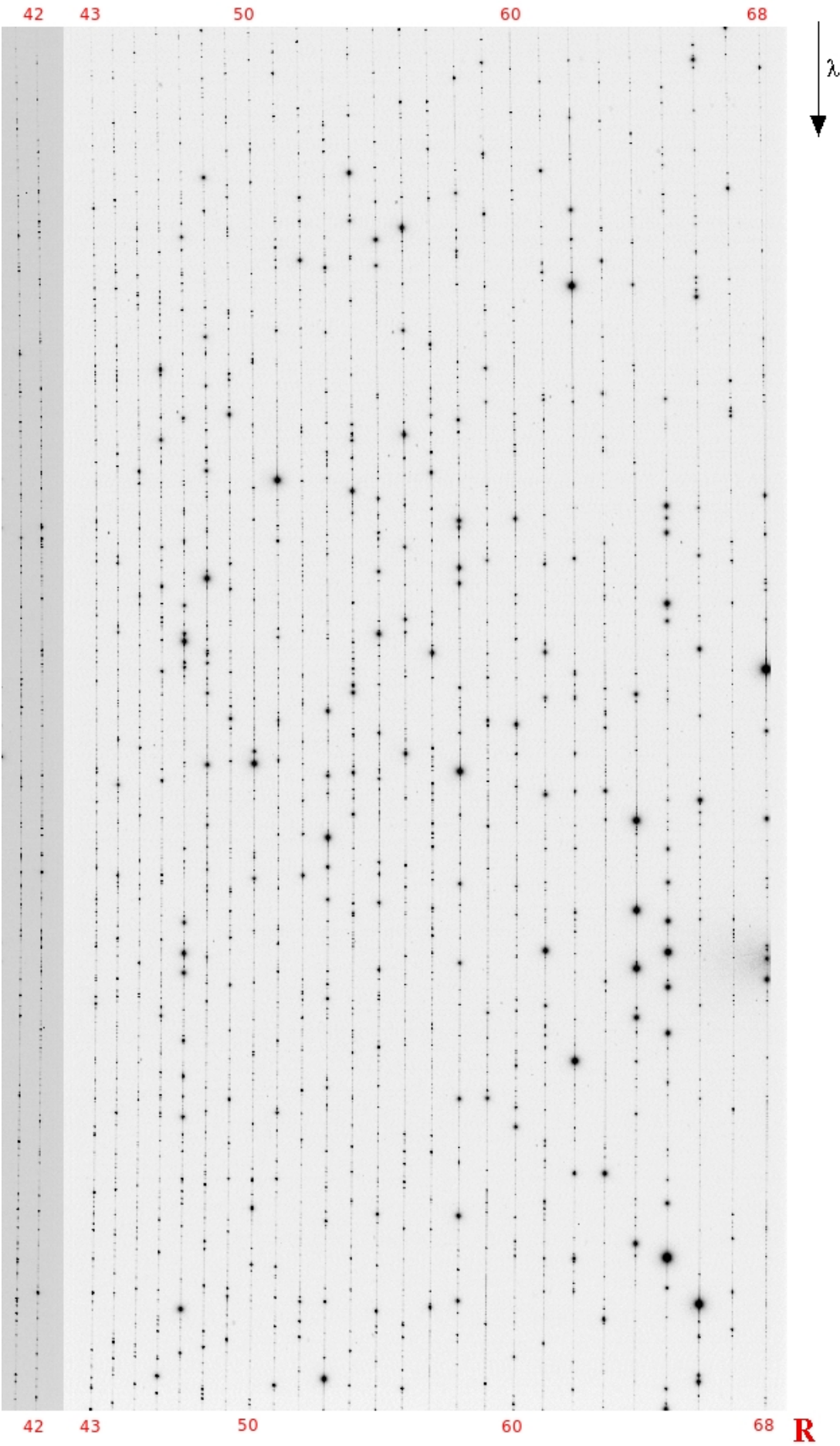
*Fundación G. Galilei-INAf, Fundación Canaria
Rambla J. A. Fernández Pérez 7, 38712 Breña Baja (San Antonio)*

April 2013

Thorium-Argon lamp taken with fiber **B** (blue side)



Thorium-Argon lamp taken with fiber **B** (red side)

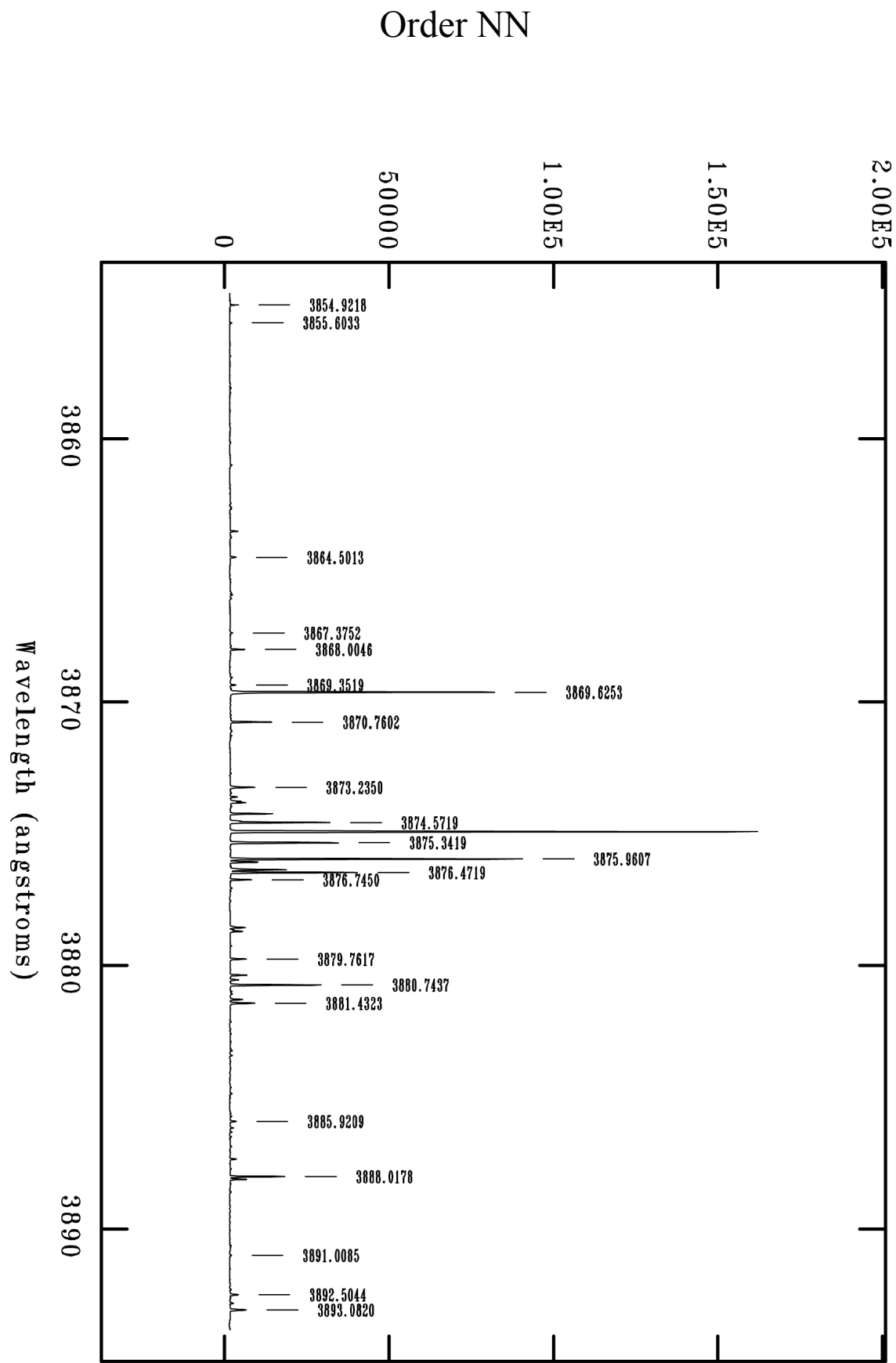


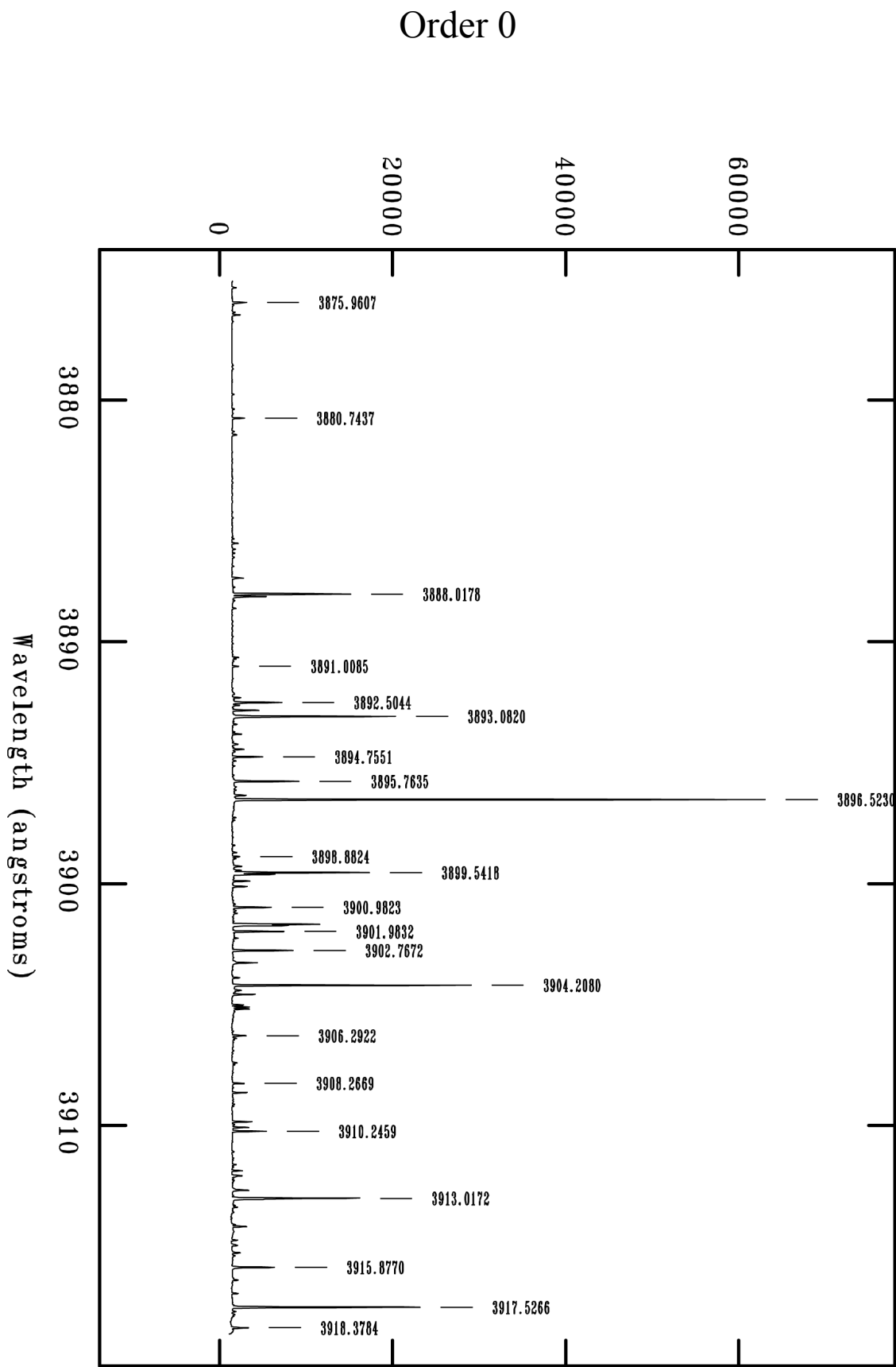
Order	Wavelength range (Å) (^{**})	Central wavelength (Å) (at Y=2056 pix)	Average dispersion (Å/pixel)	Page
NN*	3854.49 - 3893.85	3874.17	0.009574	7
0	3875.08 - 3918.64	3896.86	0.010596	8
1	3899.91 - 3943.76	3921.83	0.010667	9
2	3925.06 - 3969.20	3947.13	0.010736	10
3	3950.54 - 3994.97	3972.75	0.010808	11
4	3976.34 - 4021.13	3998.74	0.010896	12
5	4004.20 - 4047.52	4025.86	0.010536	13
6	4028.99 - 4074.32	4051.66	0.011025	14
7	4055.86 - 4101.47	4078.67	0.011094	15
8	4083.05 - 4128.91	4105.98	0.011154	16
9	4110.26 - 4156.89	4133.57	0.011342	17
10	4138.42 - 4185.15	4161.78	0.011369	18
11	4166.99 - 4213.82	4190.40	0.011392	19
12	4195.82 - 4242.87	4219.34	0.011447	20
13	4224.77 - 4272.33	4248.55	0.011569	21
14	4254.30 - 4302.20	4278.25	0.011651	22
15	4284.26 - 4332.49	4308.37	0.011733	23
16	4314.62 - 4363.21	4338.92	0.011820	24
17	4345.43 - 4394.37	4369.90	0.011904	25
18	4376.68 - 4425.97	4401.33	0.011991	26
19	4408.37 - 4458.04	4433.20	0.012082	27
20	4440.54 - 4490.57	4465.56	0.012169	28
21	4473.18 - 4523.58	4498.38	0.012259	29
22	4506.30 - 4557.07	4531.68	0.012349	30
23	4539.91 - 4591.08	4565.50	0.012446	31
24	4574.04 - 4625.59	4599.82	0.012538	32
25	4608.67 - 4660.62	4634.65	0.012637	33
26	4643.84 - 4696.19	4670.02	0.012734	34
27	4679.55 - 4732.30	4705.93	0.012833	35
28	4715.82 - 4768.98	4742.40	0.012931	36
29	4752.63 - 4804.10	4778.37	0.012519	37
30	4790.04 - 4844.06	4817.05	0.013140	38
31	4828.04 - 4882.50	4855.27	0.013246	39
32	4866.65 - 4921.54	4894.10	0.013353	40
33	4905.88 - 4961.22	4933.55	0.013462	41
34	4945.75 - 5001.55	4973.65	0.013574	42
35	4986.27 - 5042.53	5014.40	0.013685	43

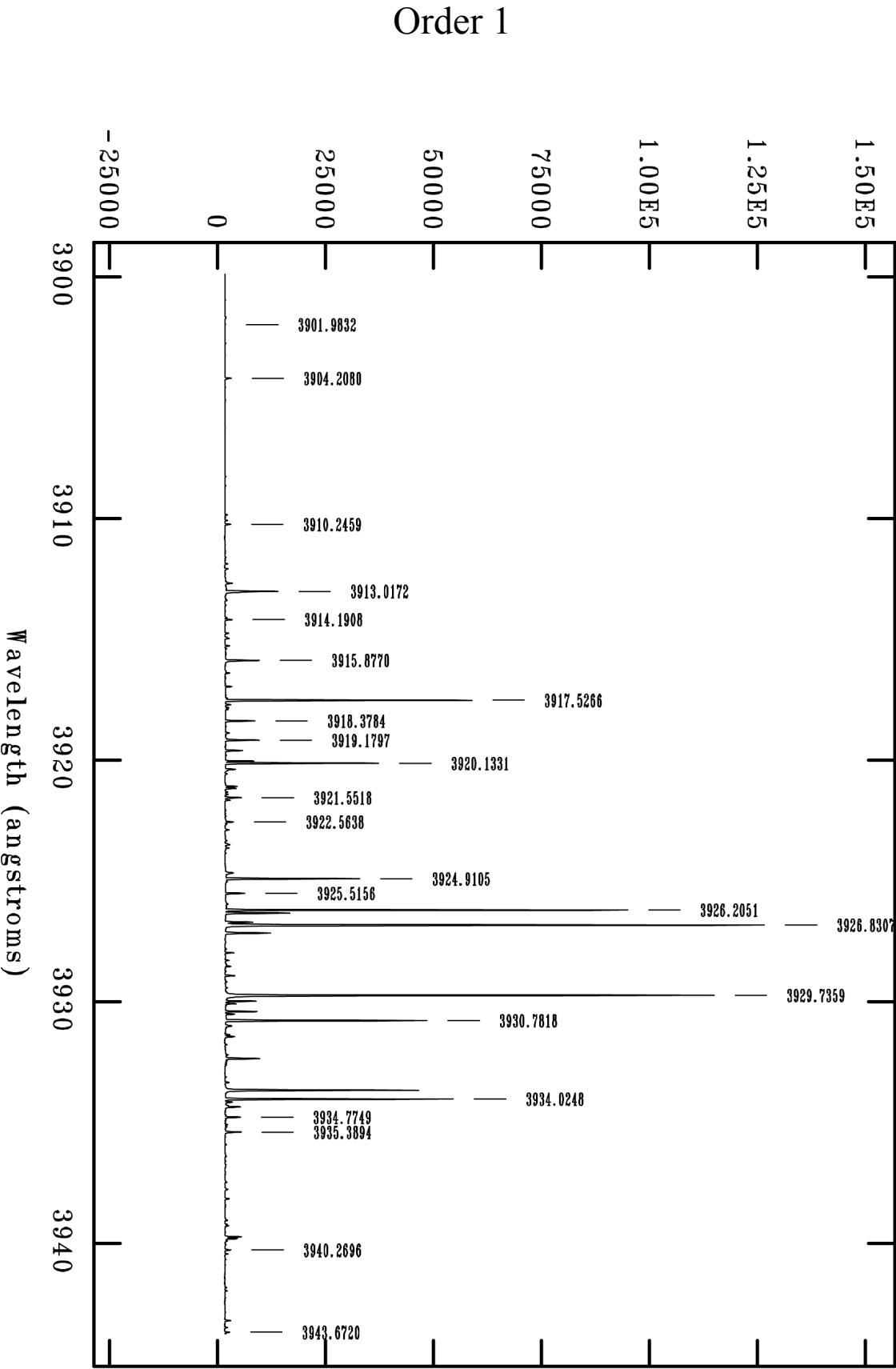
Order	Wavelength range (Å) (^{**})	Central wavelength (Å) (at Y=2056 pix)	Average dispersion (Å/pixel)	Page
36	5027.46 - 5084.19	5055.83	0.013801	44
37	5069.34 - 5126.55	5097.95	0.013916	45
38	5102.84 - 5169.61	5136.23	0.016244	46
39	5155.22 - 5213.41	5184.32	0.014155	47
40	5199.27 - 5257.96	5228.62	0.014277	48
41	5244.07 - 5303.27	5273.67	0.014400	49
42	5289.65 - 5349.37	5319.52	0.014527	50
43	5336.04 - 5396.28	5366.16	0.014654	51
44	5383.23 - 5444.02	5413.63	0.014786	52
45	5431.28 - 5492.61	5461.95	0.014919	53
46	5481.86 - 5542.08	5511.97	0.014648	54
47	5529.97 - 5592.40	5561.19	0.015187	55
48	5580.70 - 5643.73	5612.22	0.015334	56
49	5632.35 - 5695.97	5664.16	0.015476	57
50	5684.97 - 5749.19	5717.08	0.015623	58
51	5738.57 - 5803.41	5770.99	0.015771	59
52	5793.20 - 5858.66	5825.93	0.015923	60
53	5848.88 - 5914.97	5881.93	0.016076	61
54	5905.64 - 5972.38	5939.01	0.016234	62
55	5963.51 - 6030.91	5997.21	0.016393	63
56	6022.53 - 6090.60	6056.57	0.016558	64
57	6082.73 - 6151.50	6117.12	0.016728	65
58	6144.14 - 6213.60	6178.87	0.016895	66
59	6206.81 - 6276.98	6241.90	0.017068	67
60	6270.77 - 6341.66	6306.22	0.017244	68
61	6336.06 - 6407.69	6371.88	0.017423	69
62	6402.73 - 6475.12	6438.93	0.017608	70
63	6470.81 - 6543.97	6507.40	0.017795	71
64	6540.36 - 6614.30	6577.33	0.017987	72
65	6611.42 - 6686.17	6648.80	0.018184	73
66	6684.04 - 6759.61	6721.83	0.018384	74
67	6758.28 - 6834.68	6796.49	0.018587	75
68	6834.17 - 6911.45	6872.82	0.018798	76

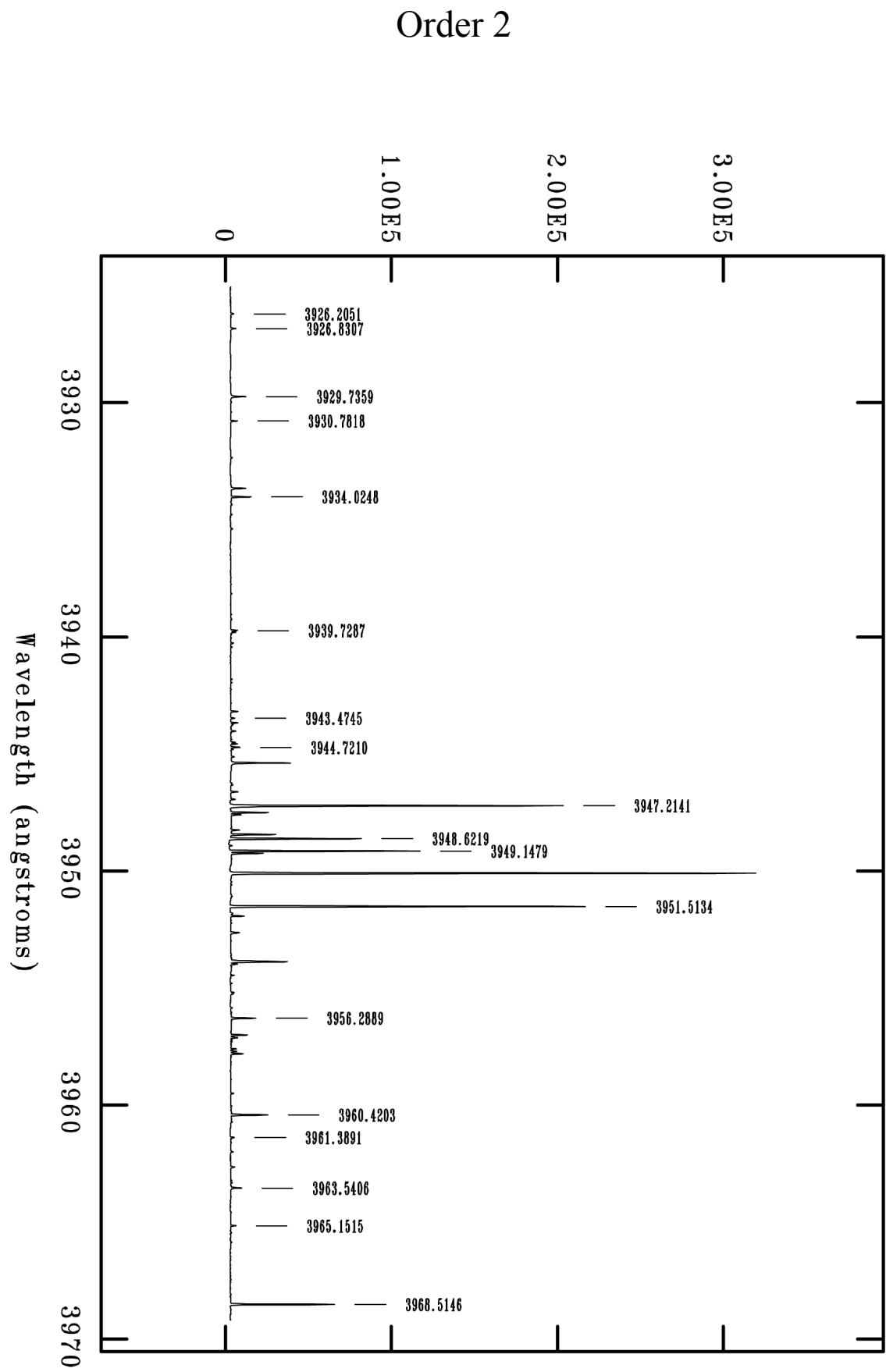
*: order **NN** is "not numbered" by HARPS-N team

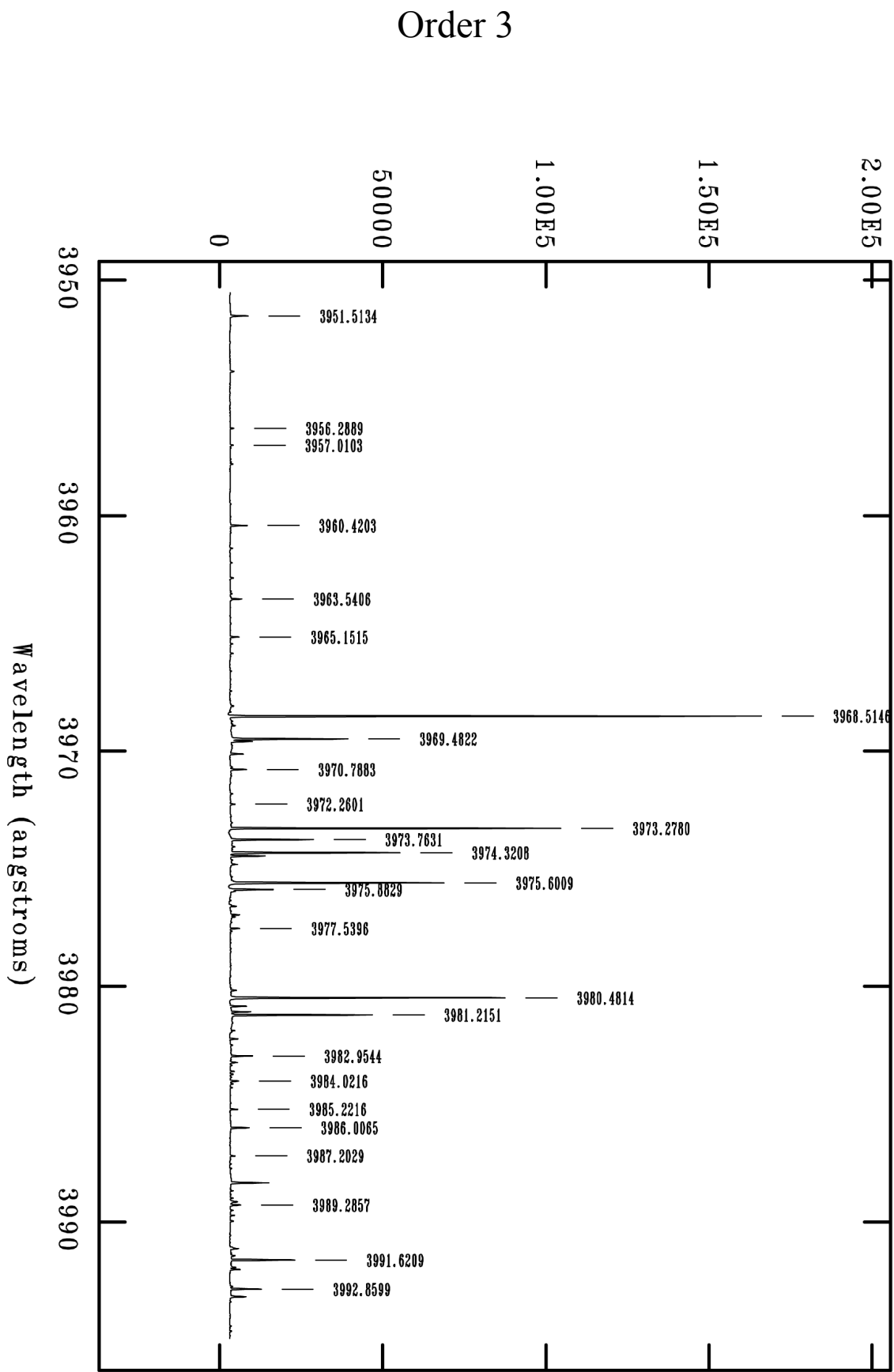
.: computed using **vacuum Thorium-Argon lines from Lovis & Pepe 2007, A&A, 468, 1115



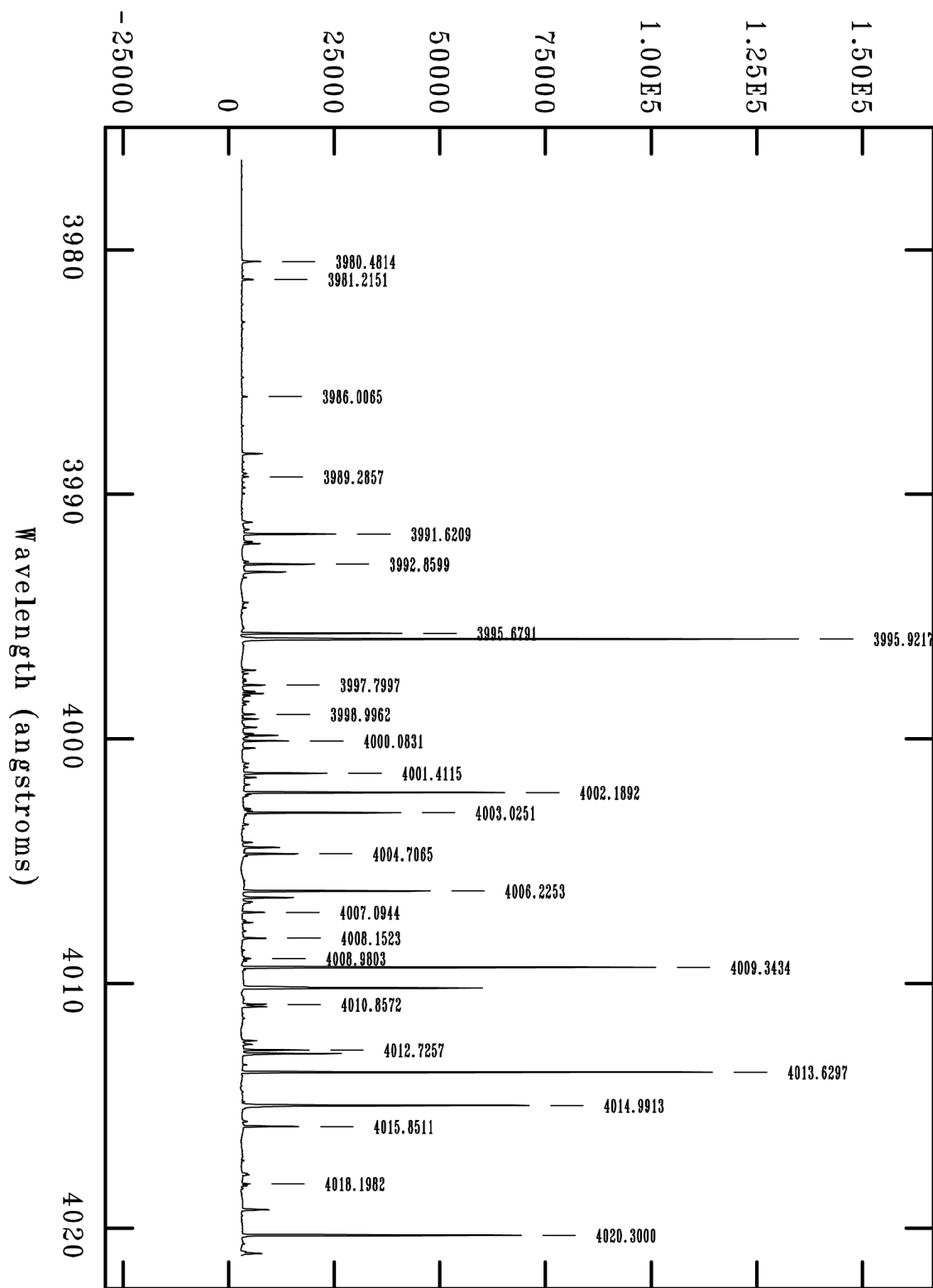


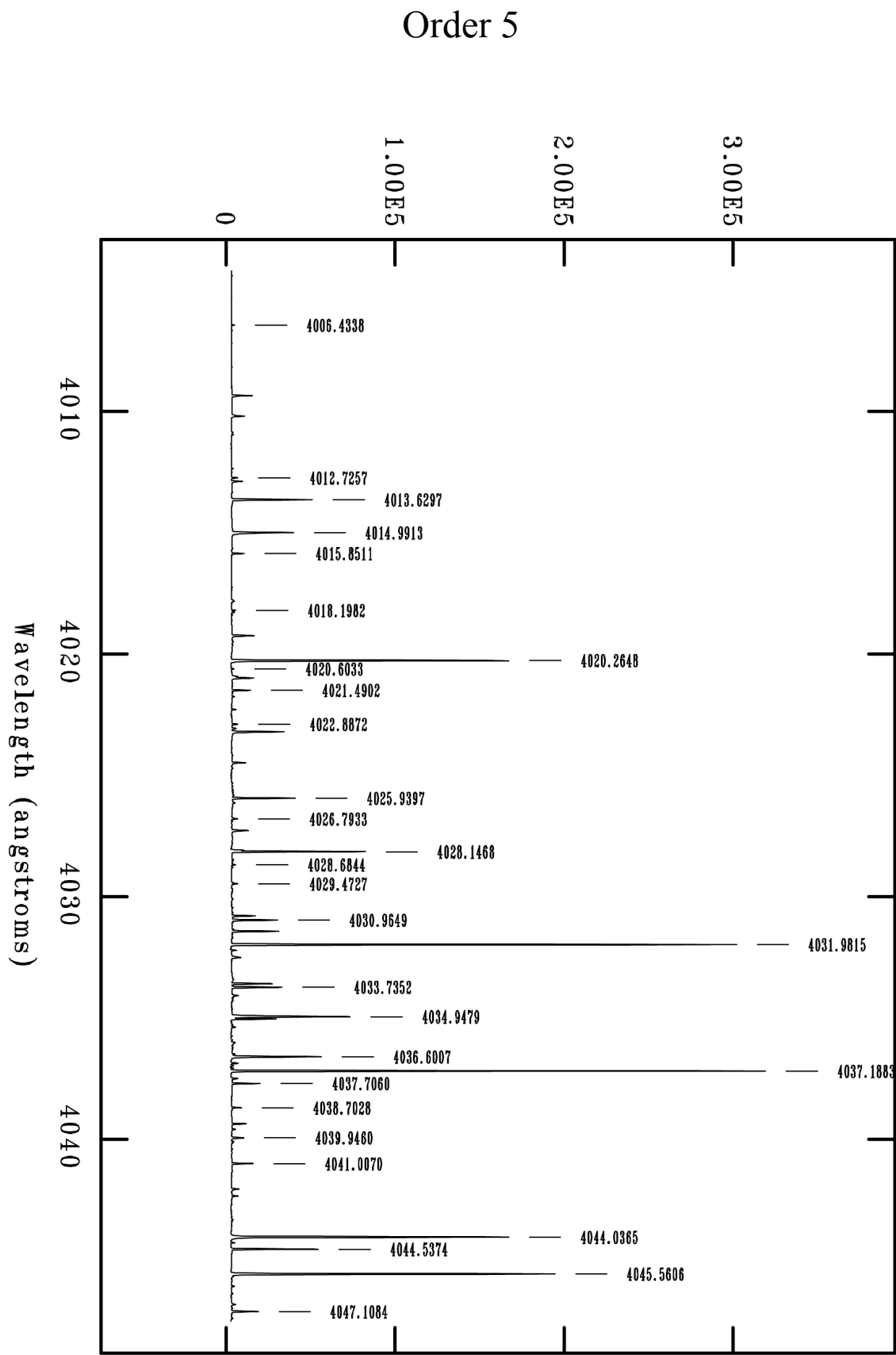


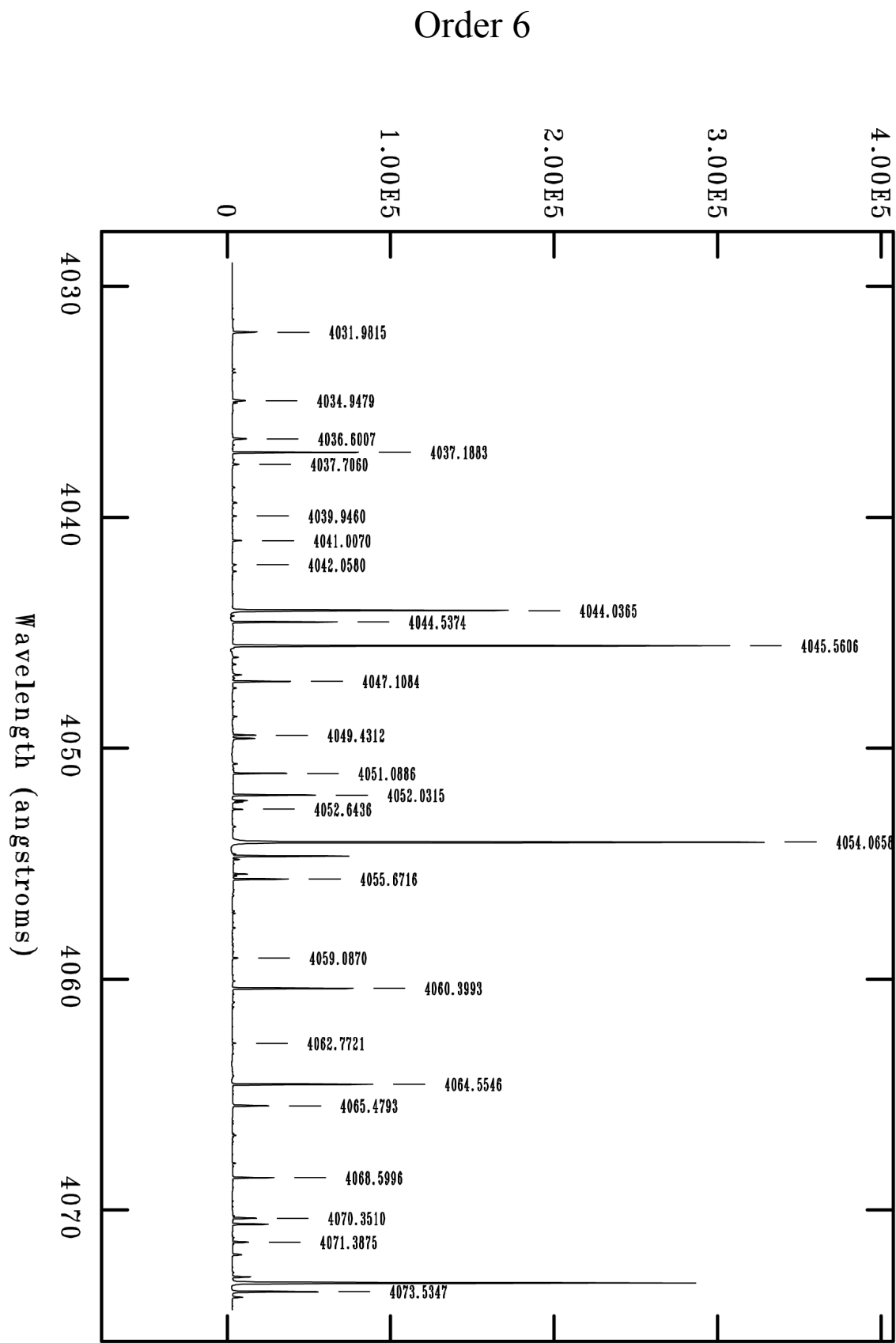


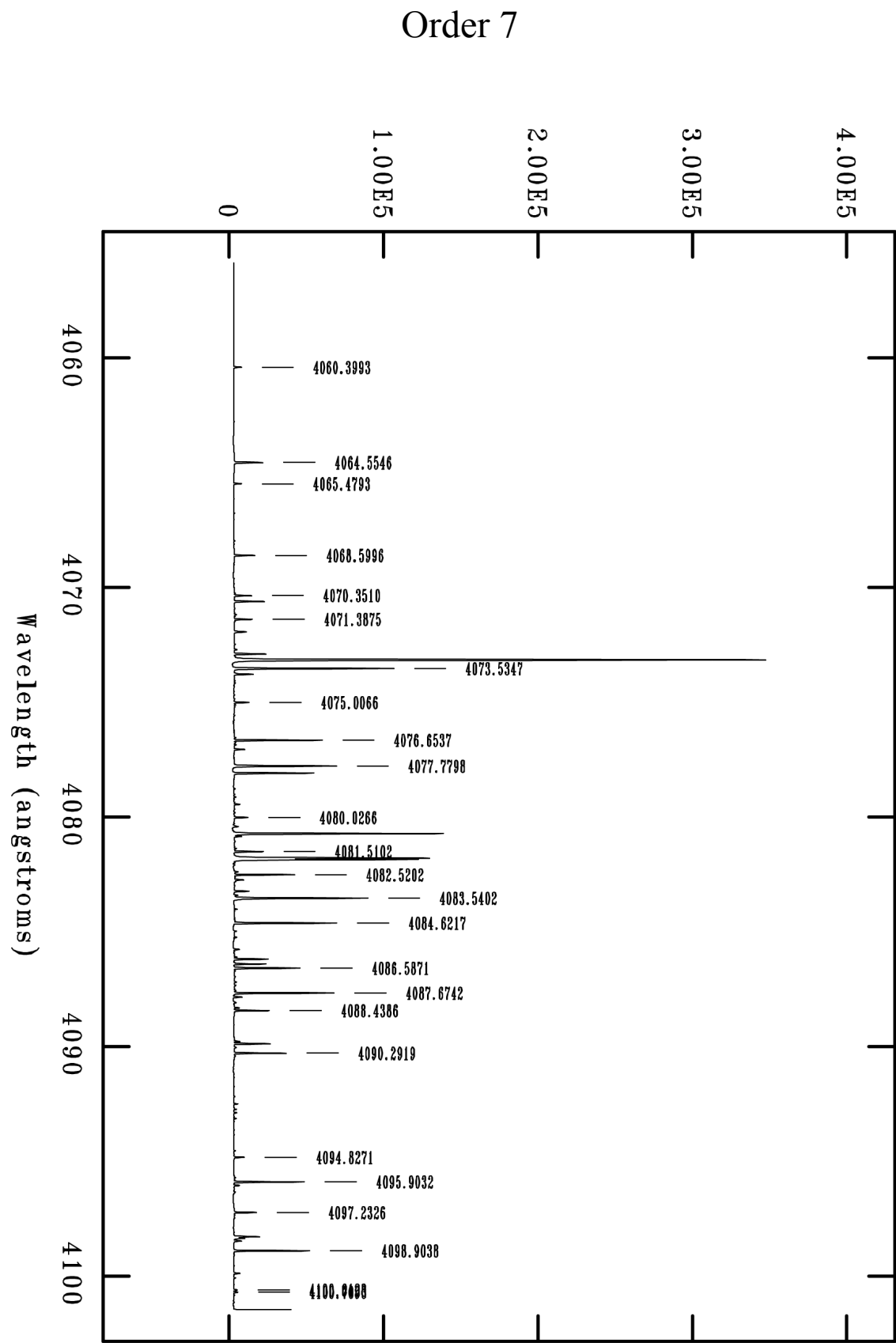


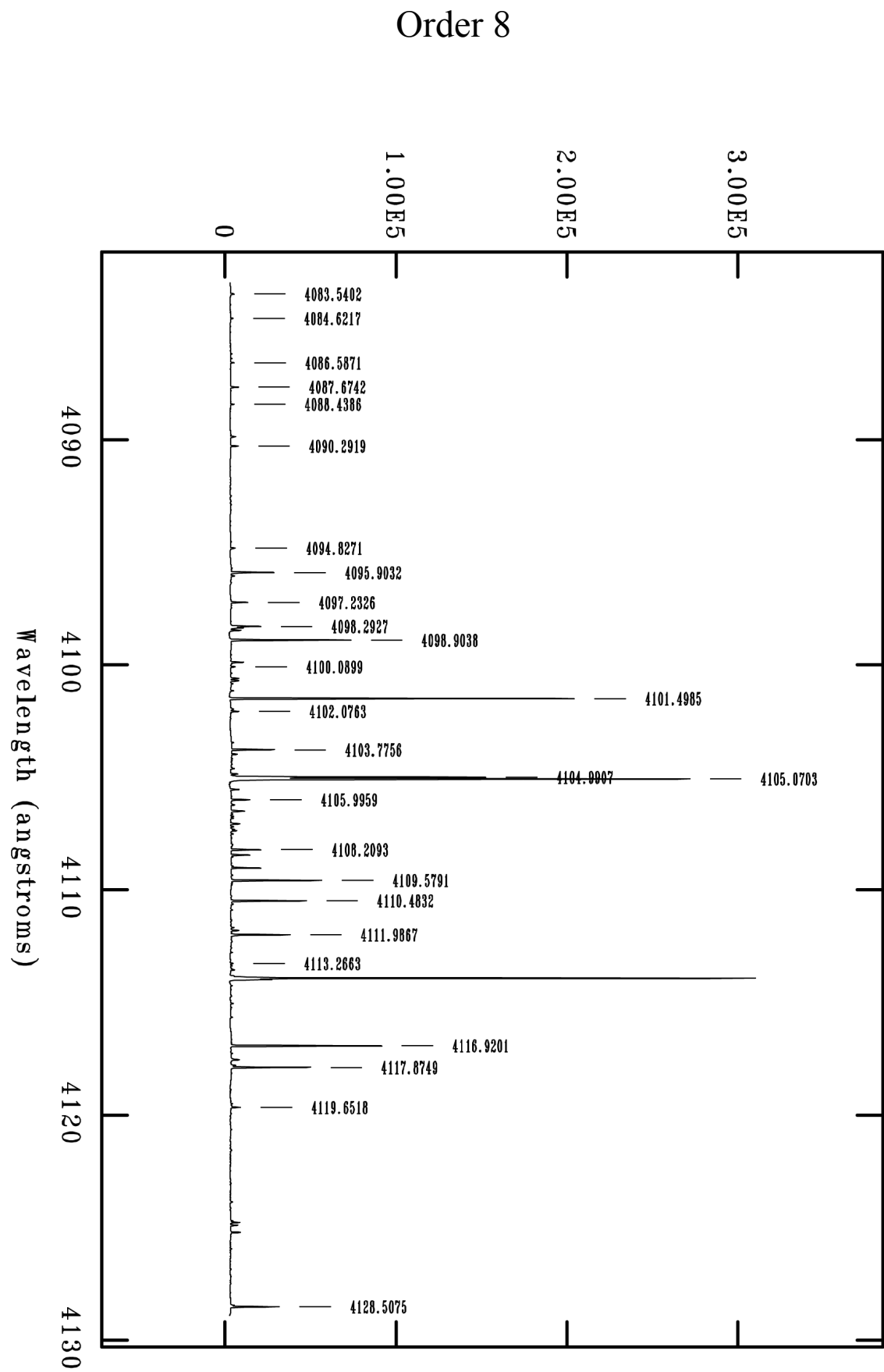
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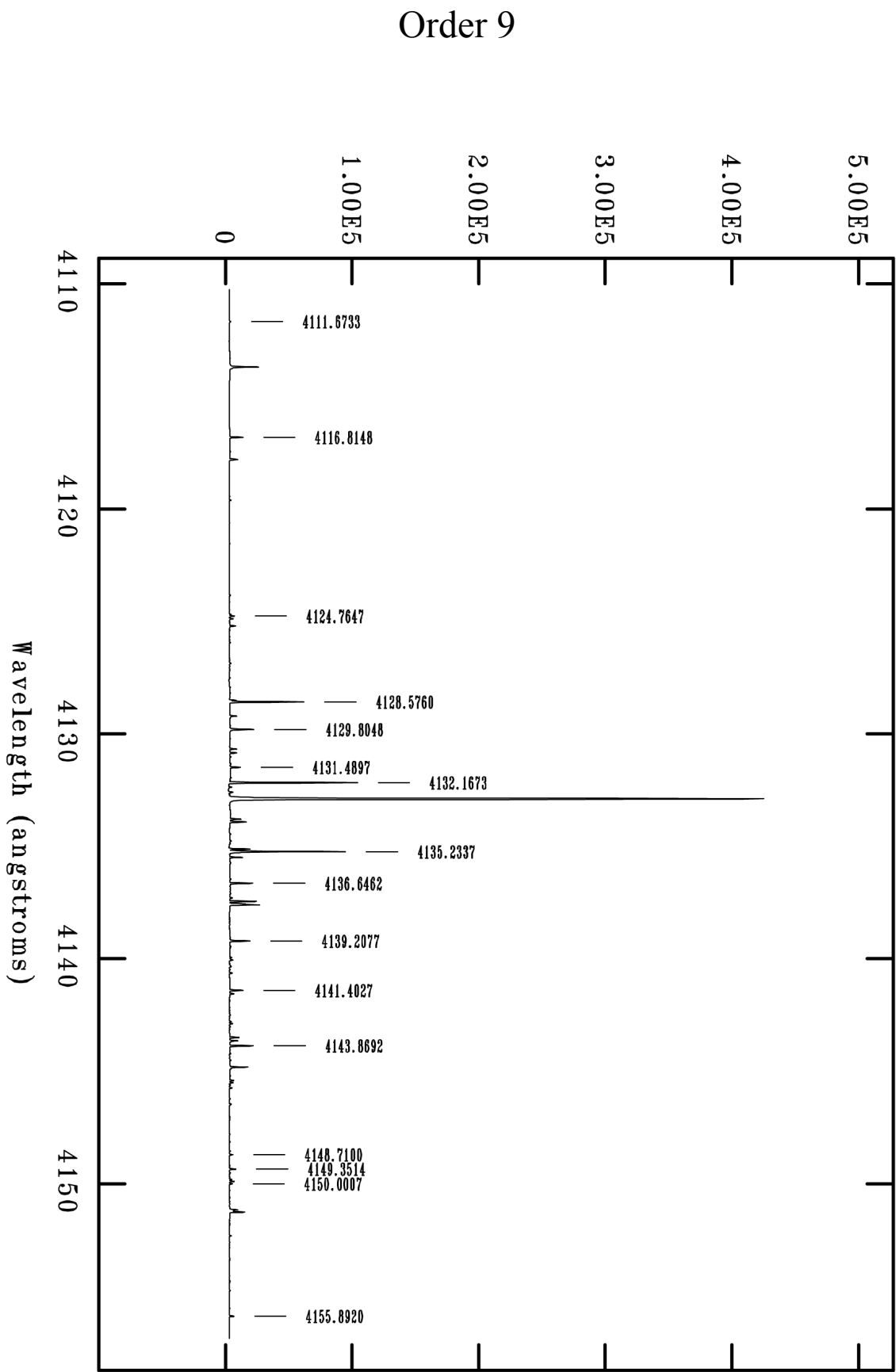


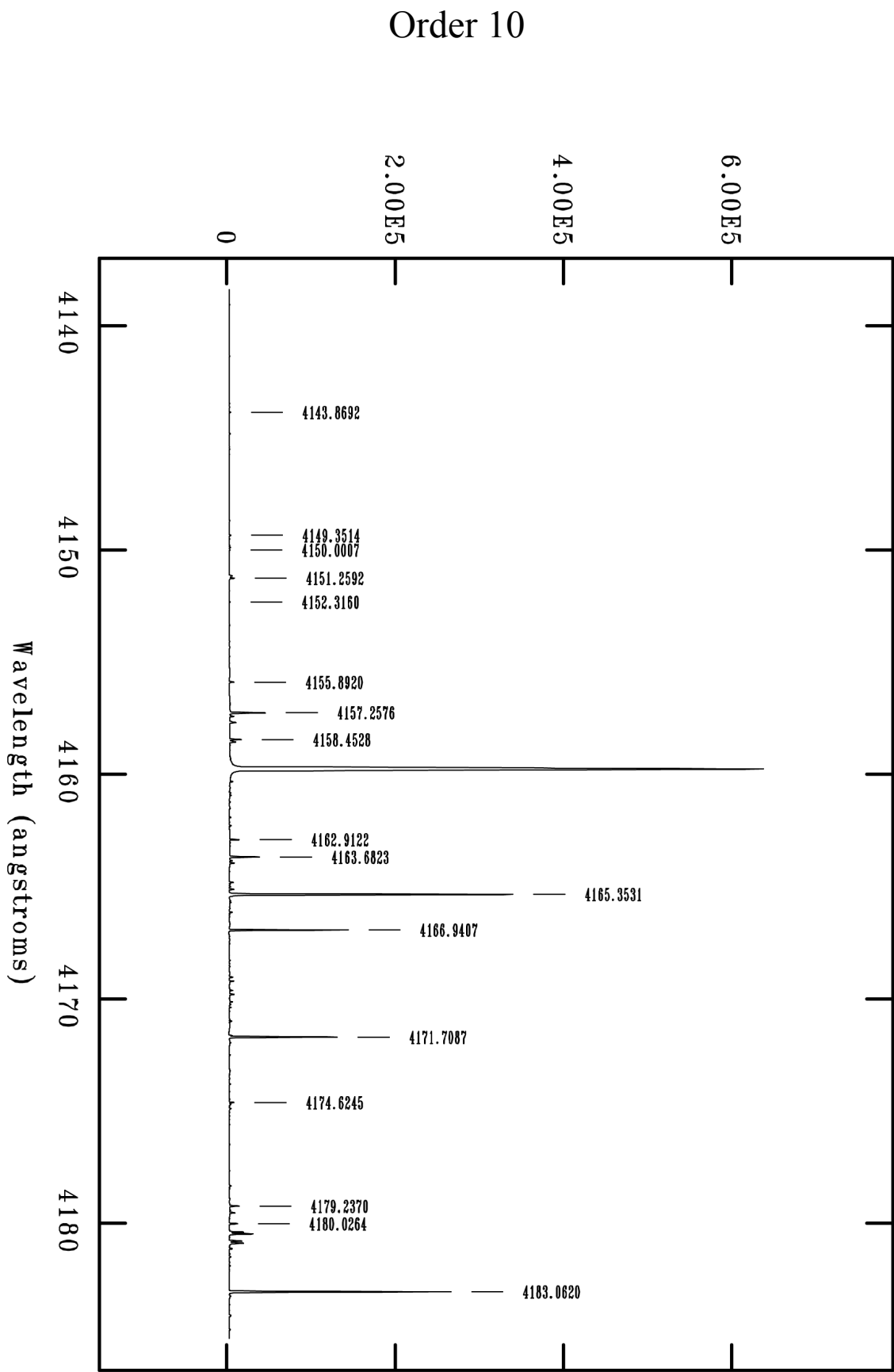




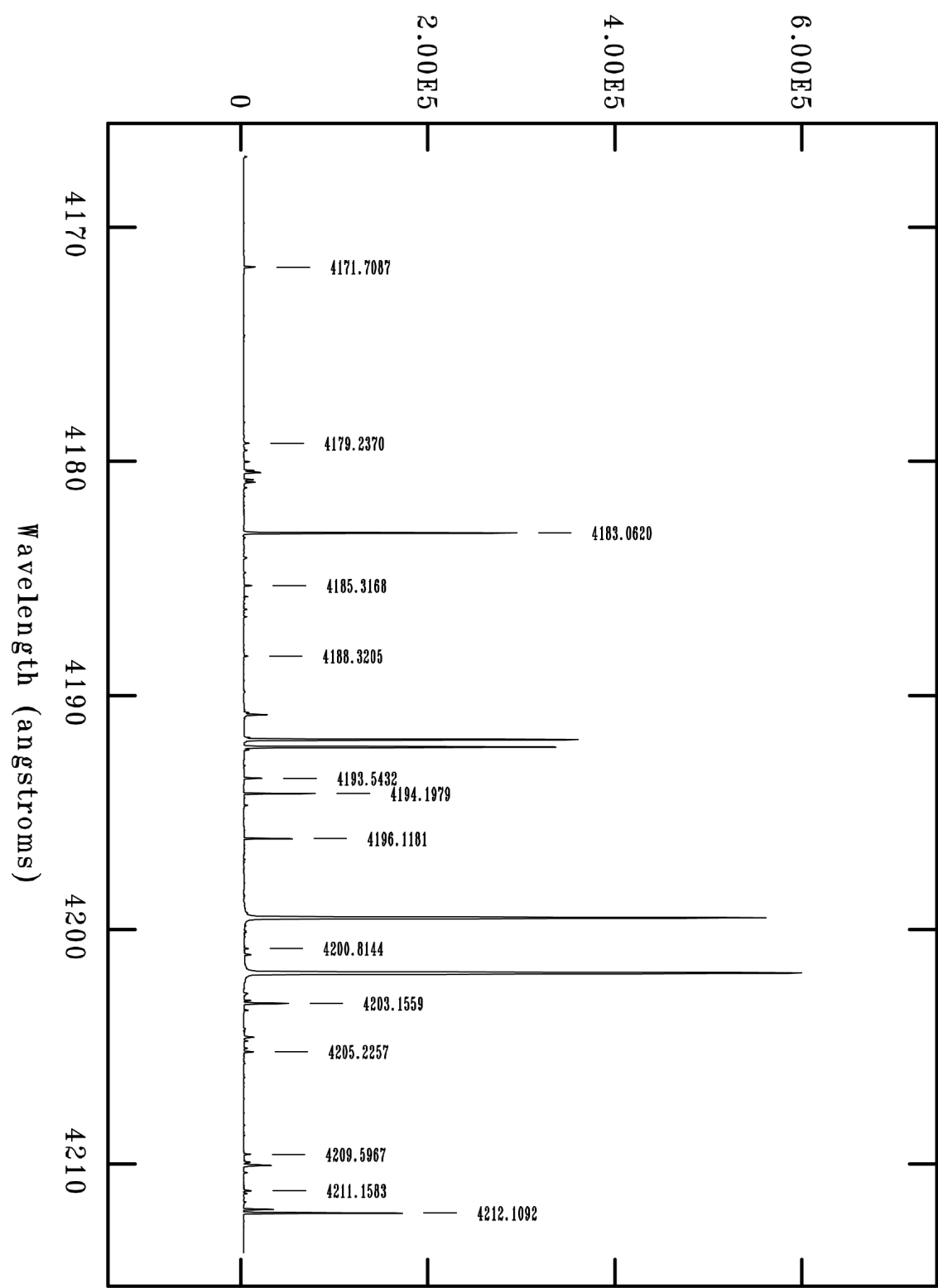




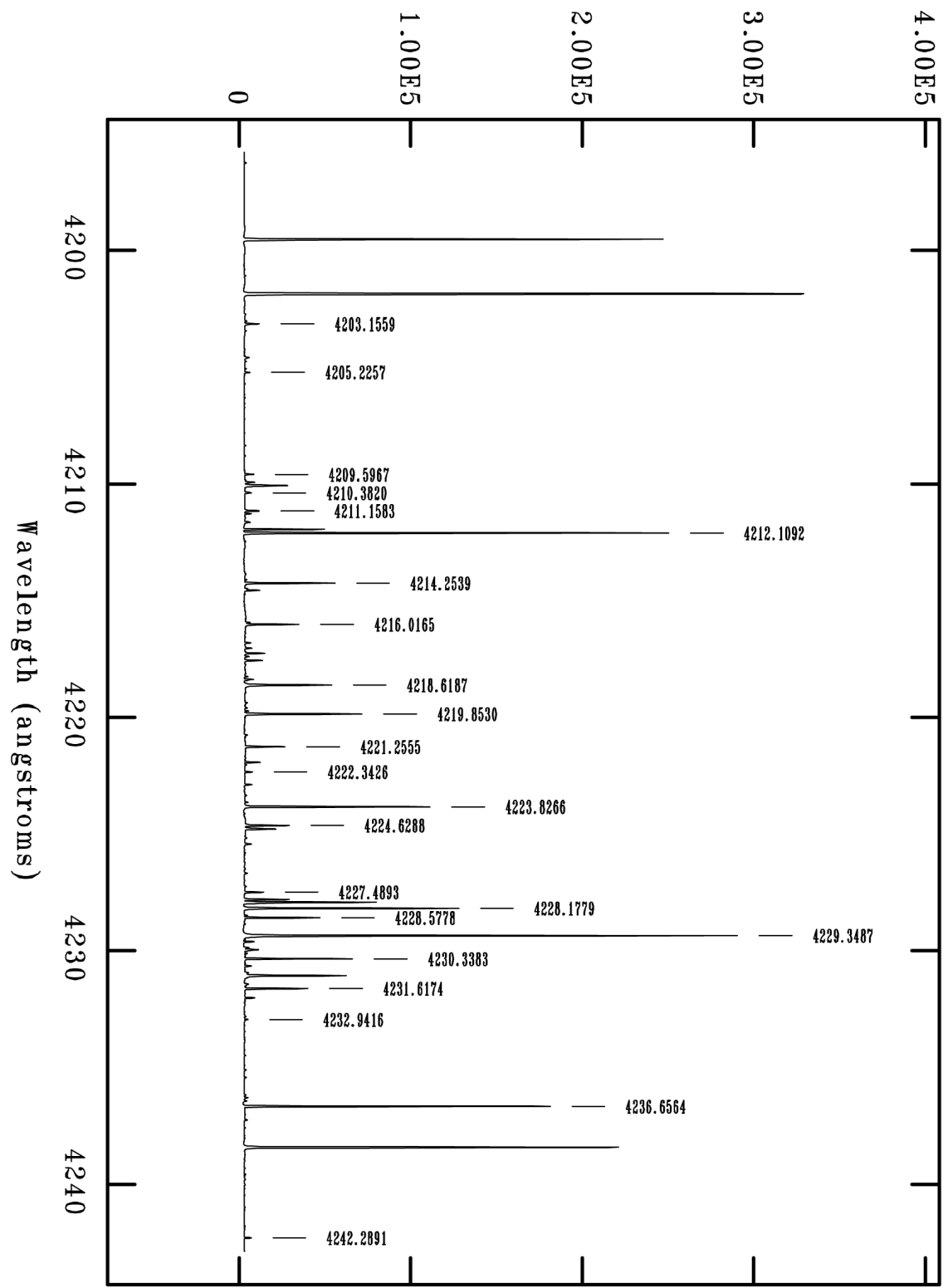




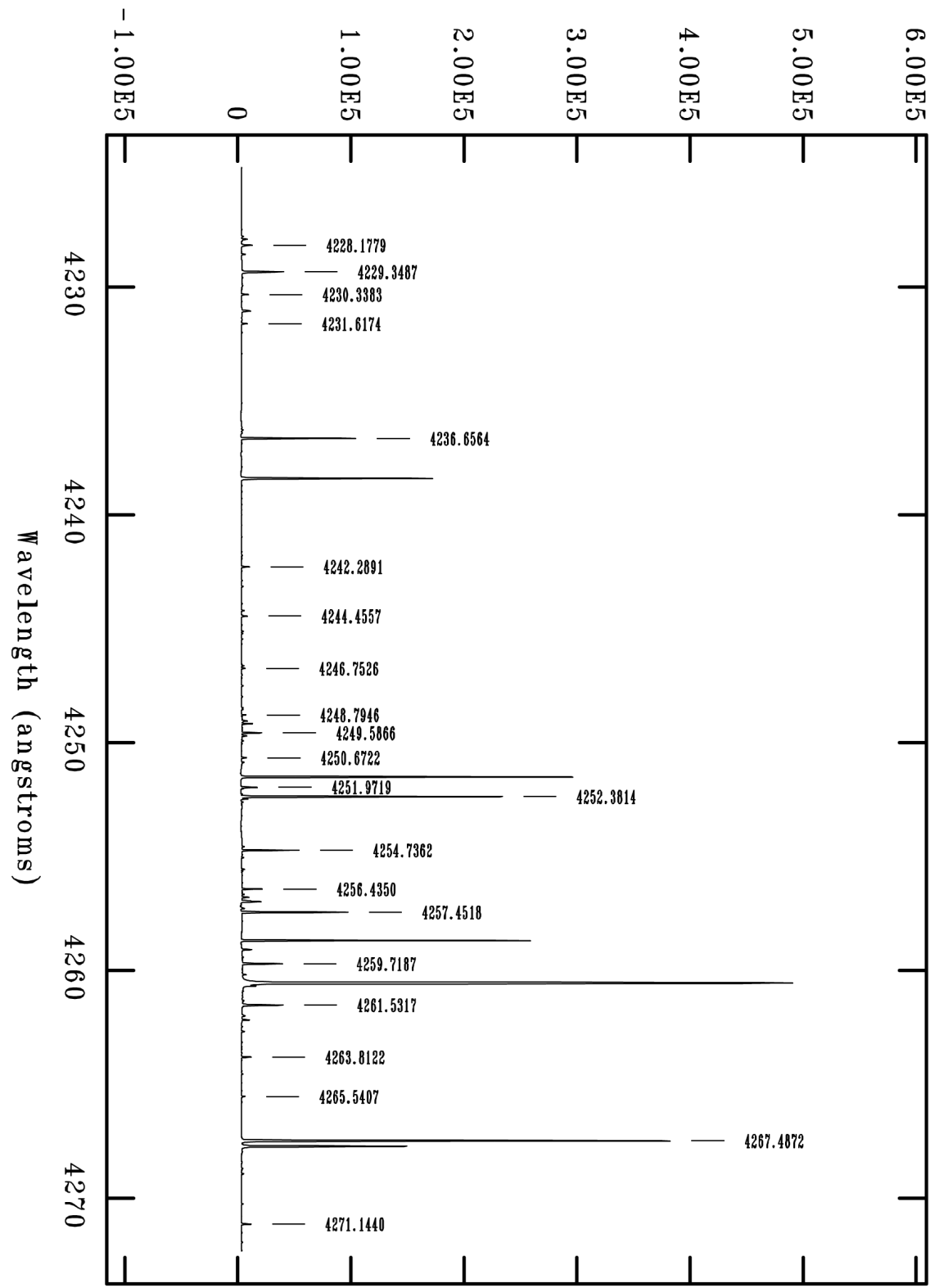
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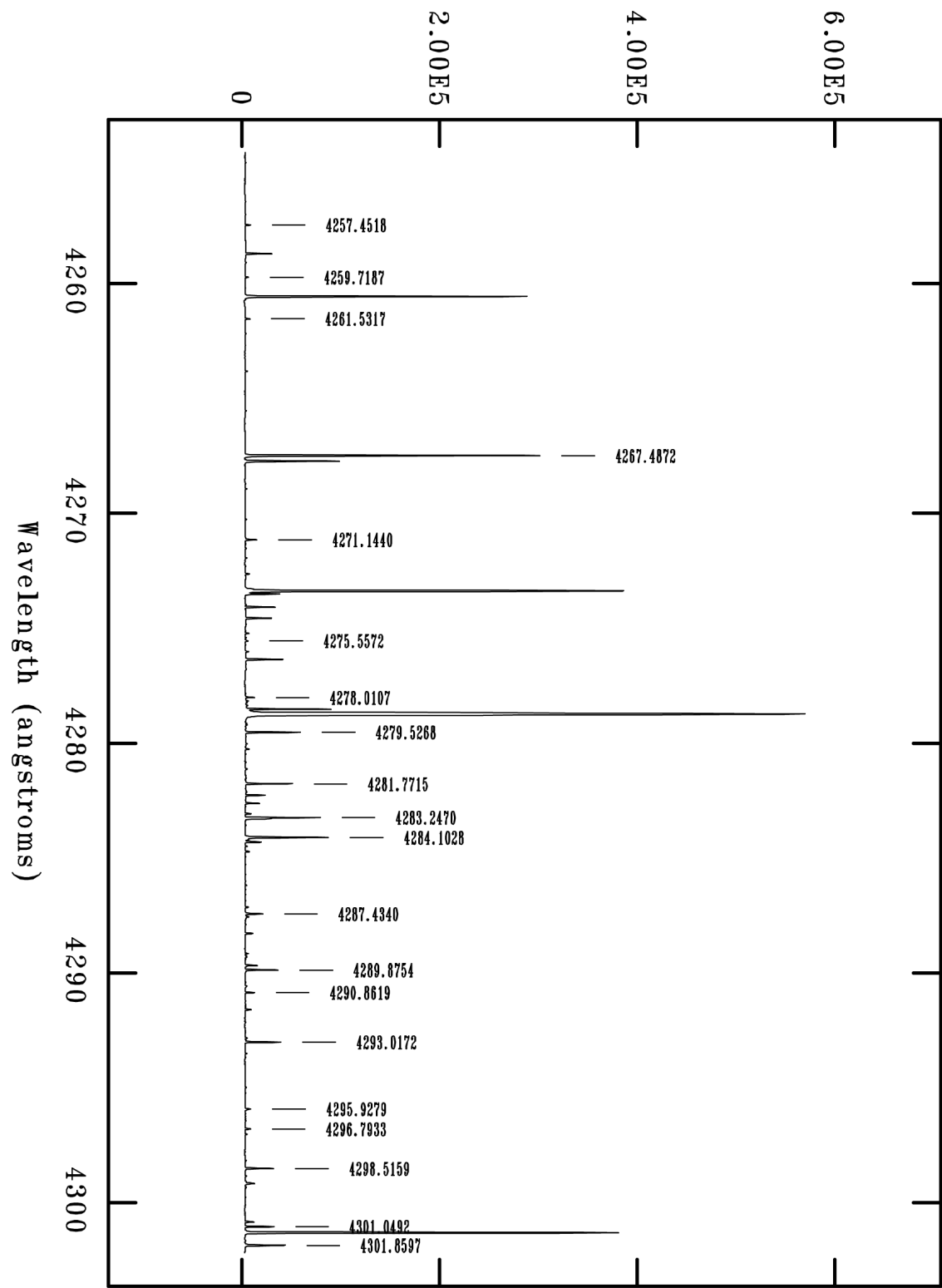
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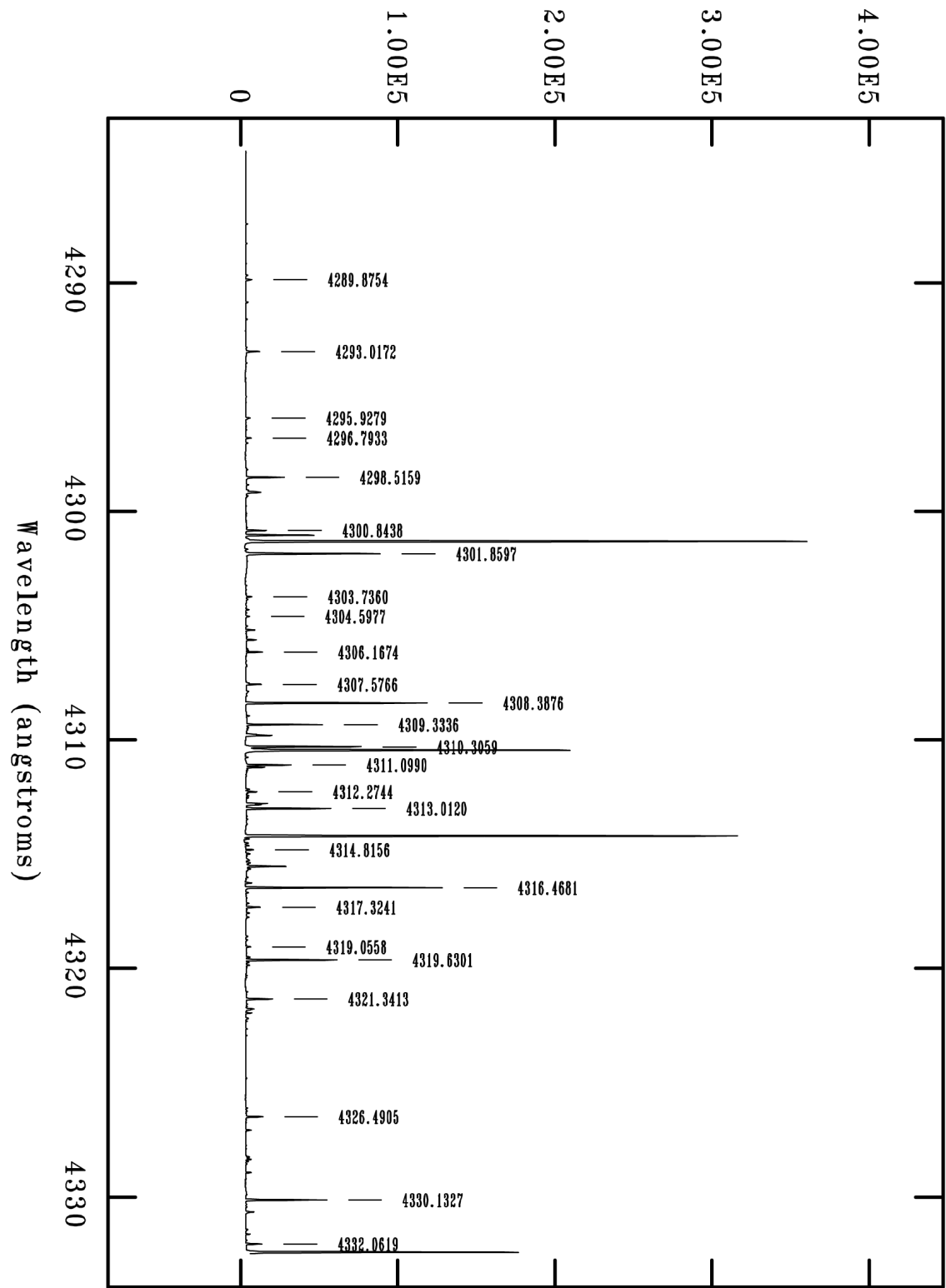
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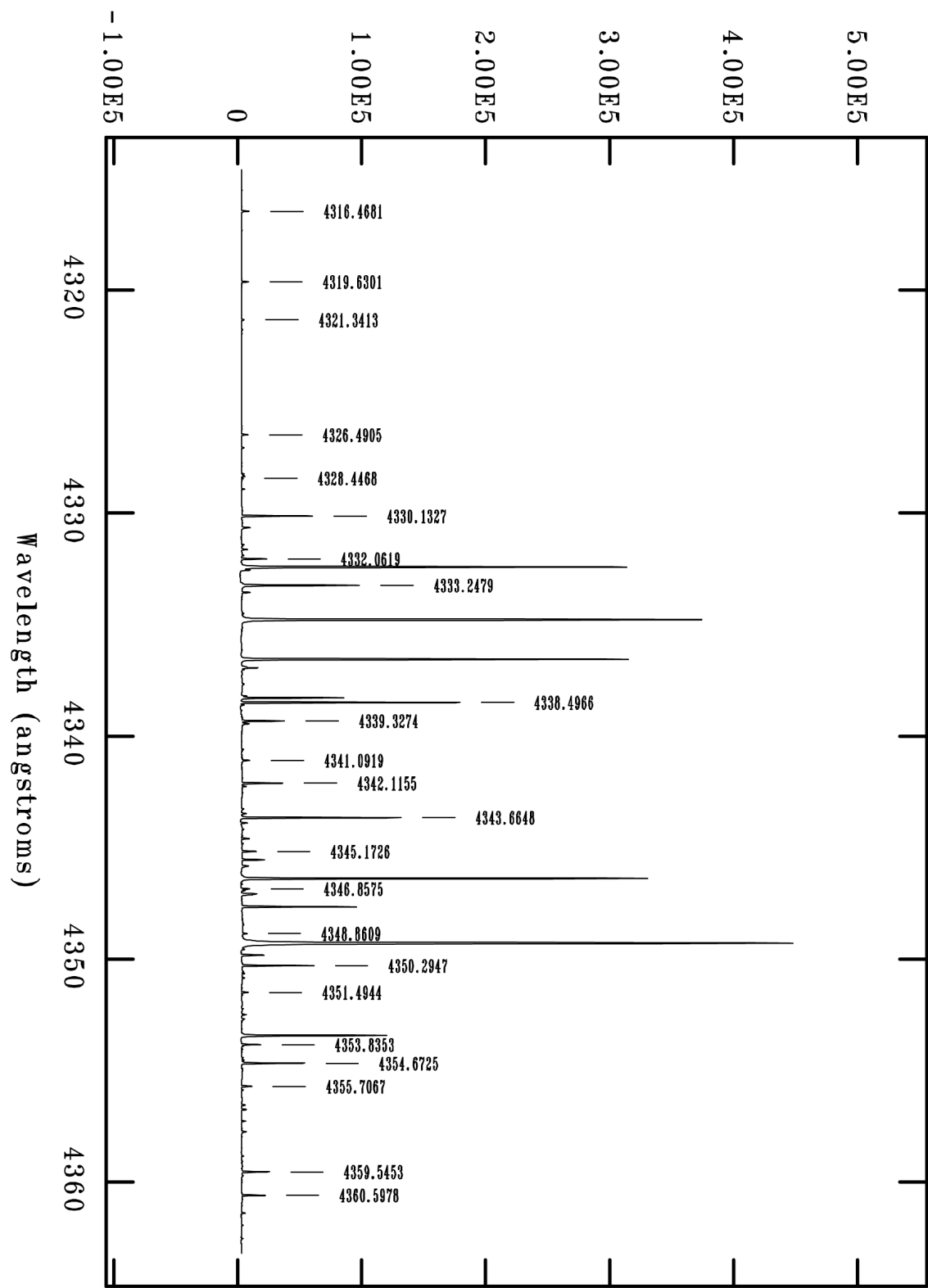
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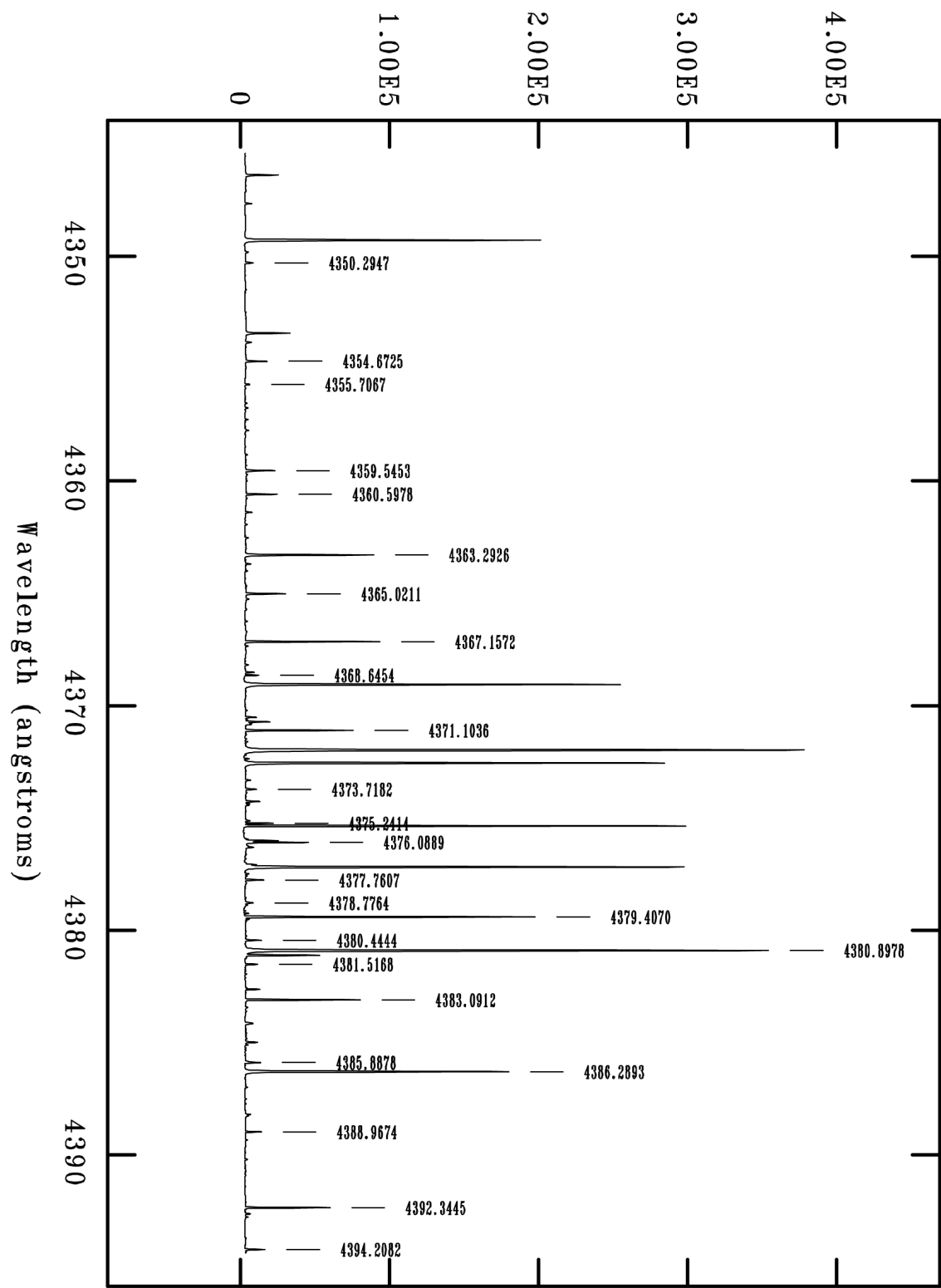
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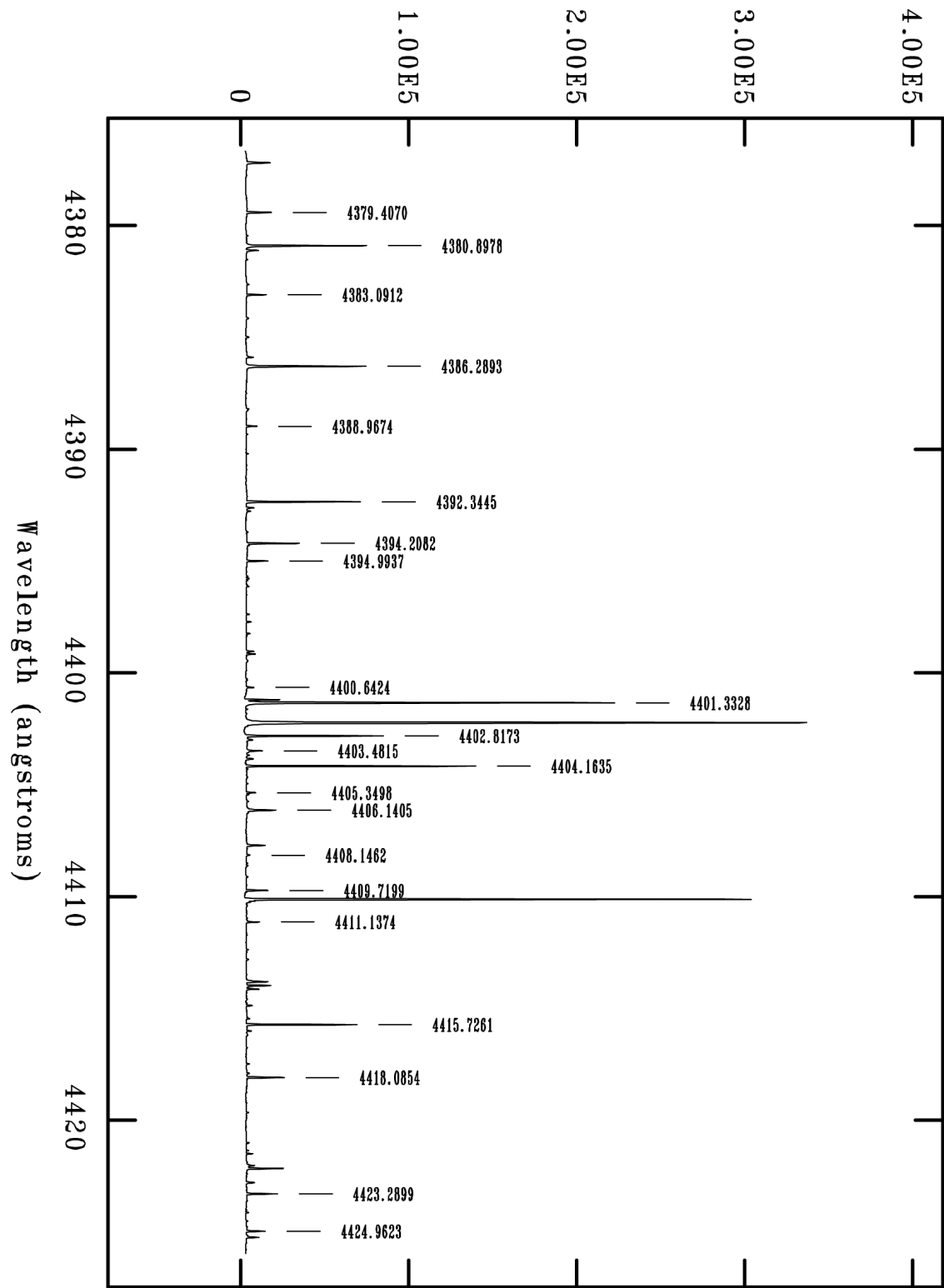
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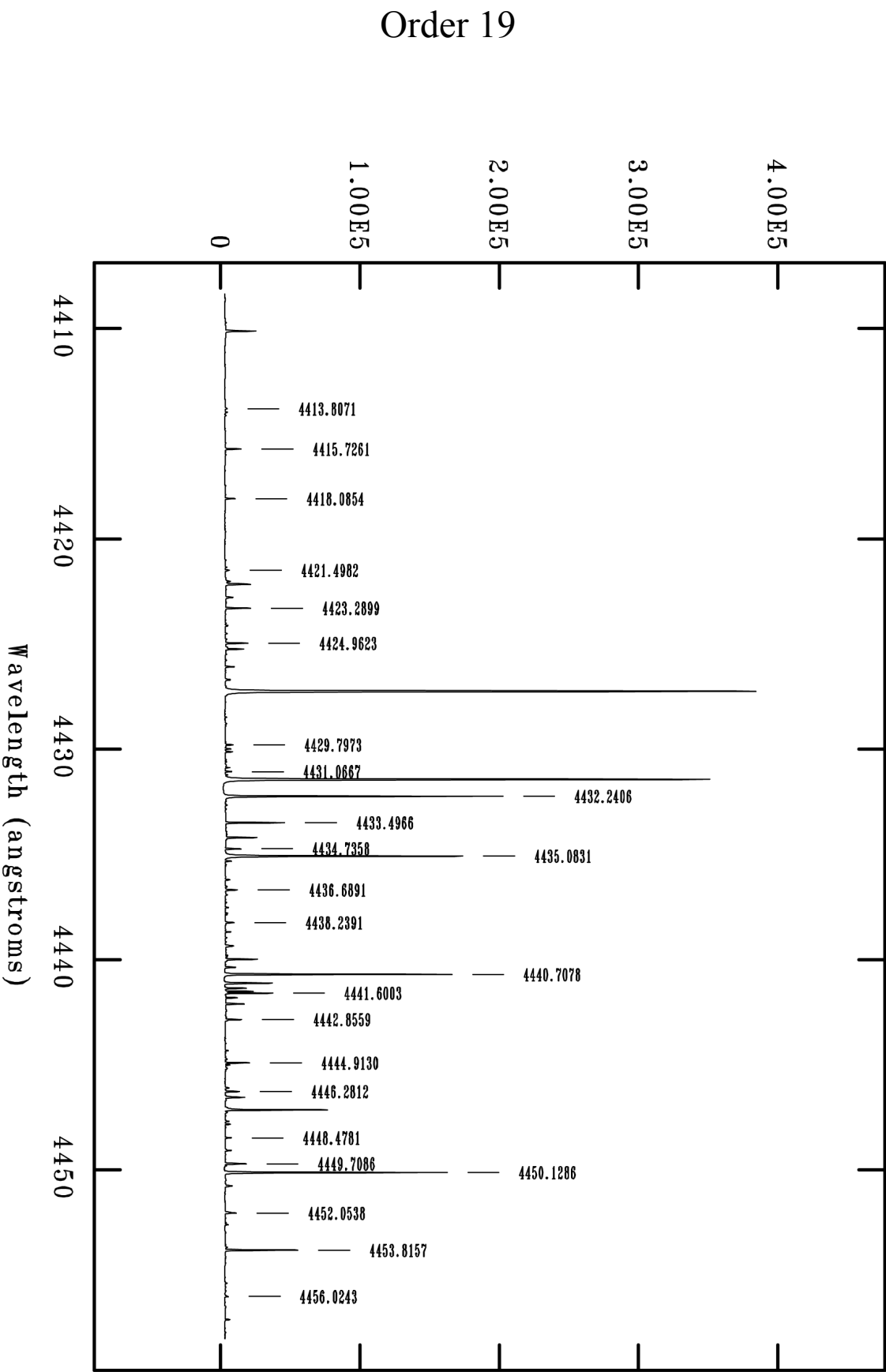


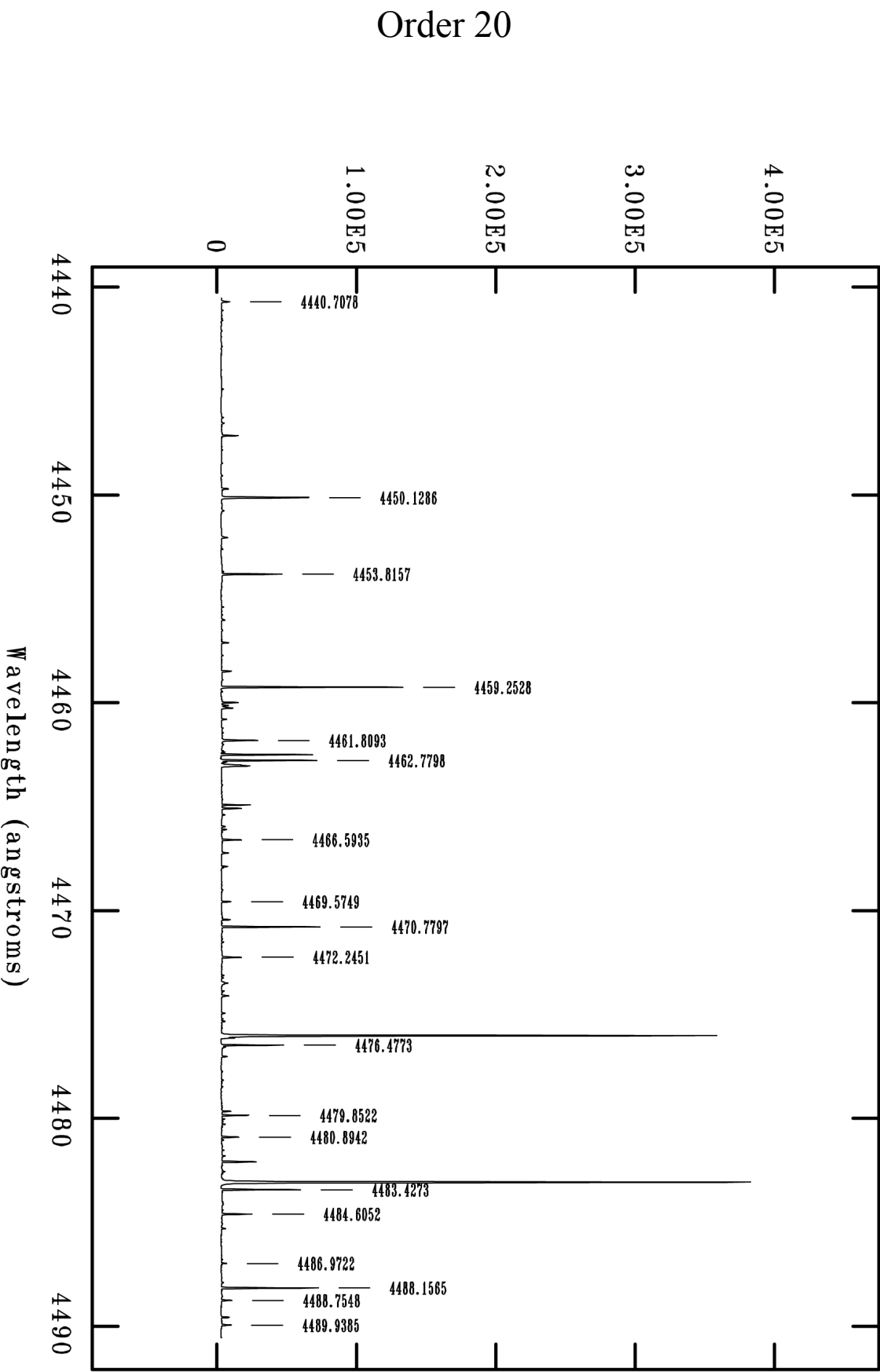
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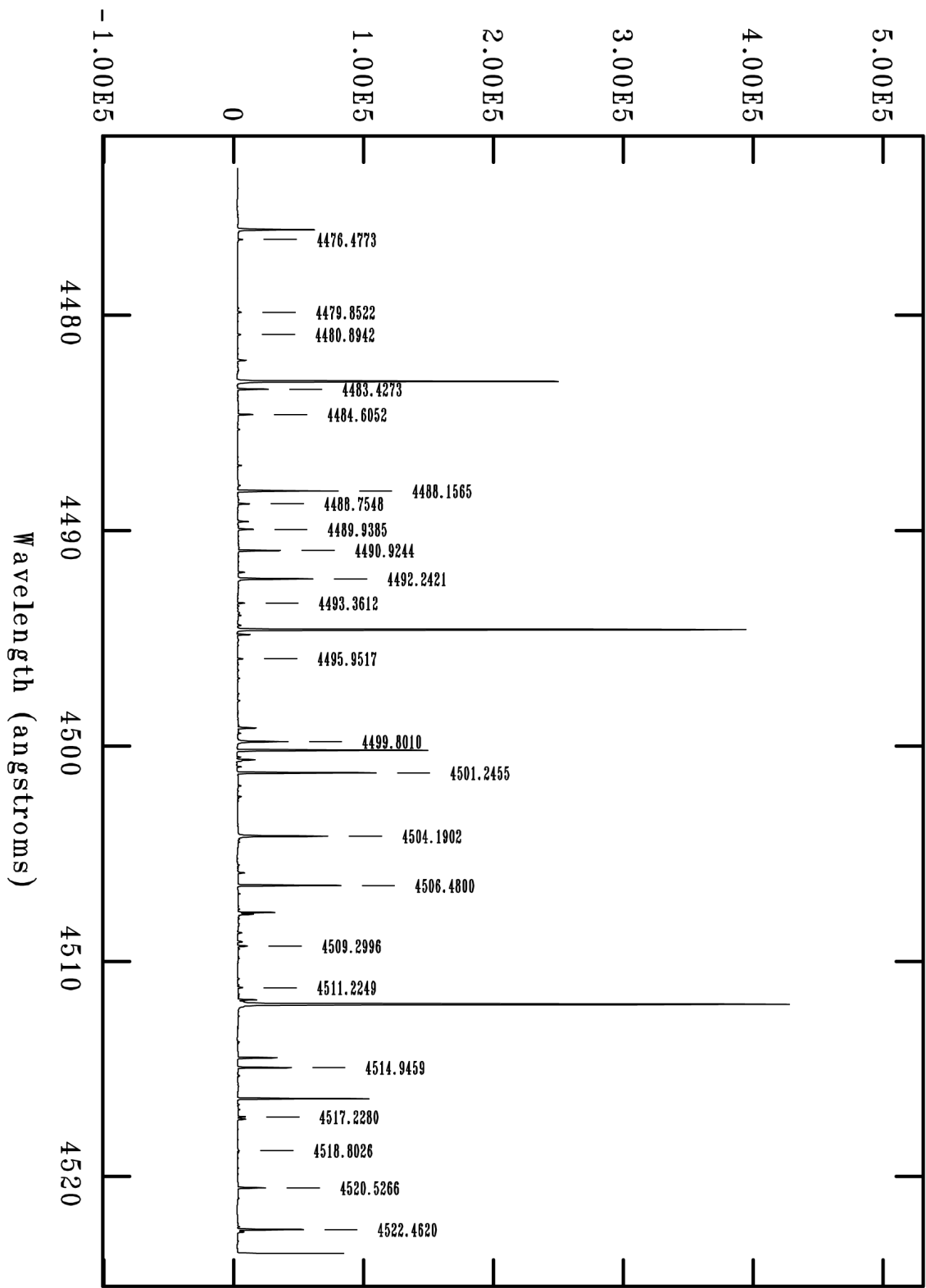
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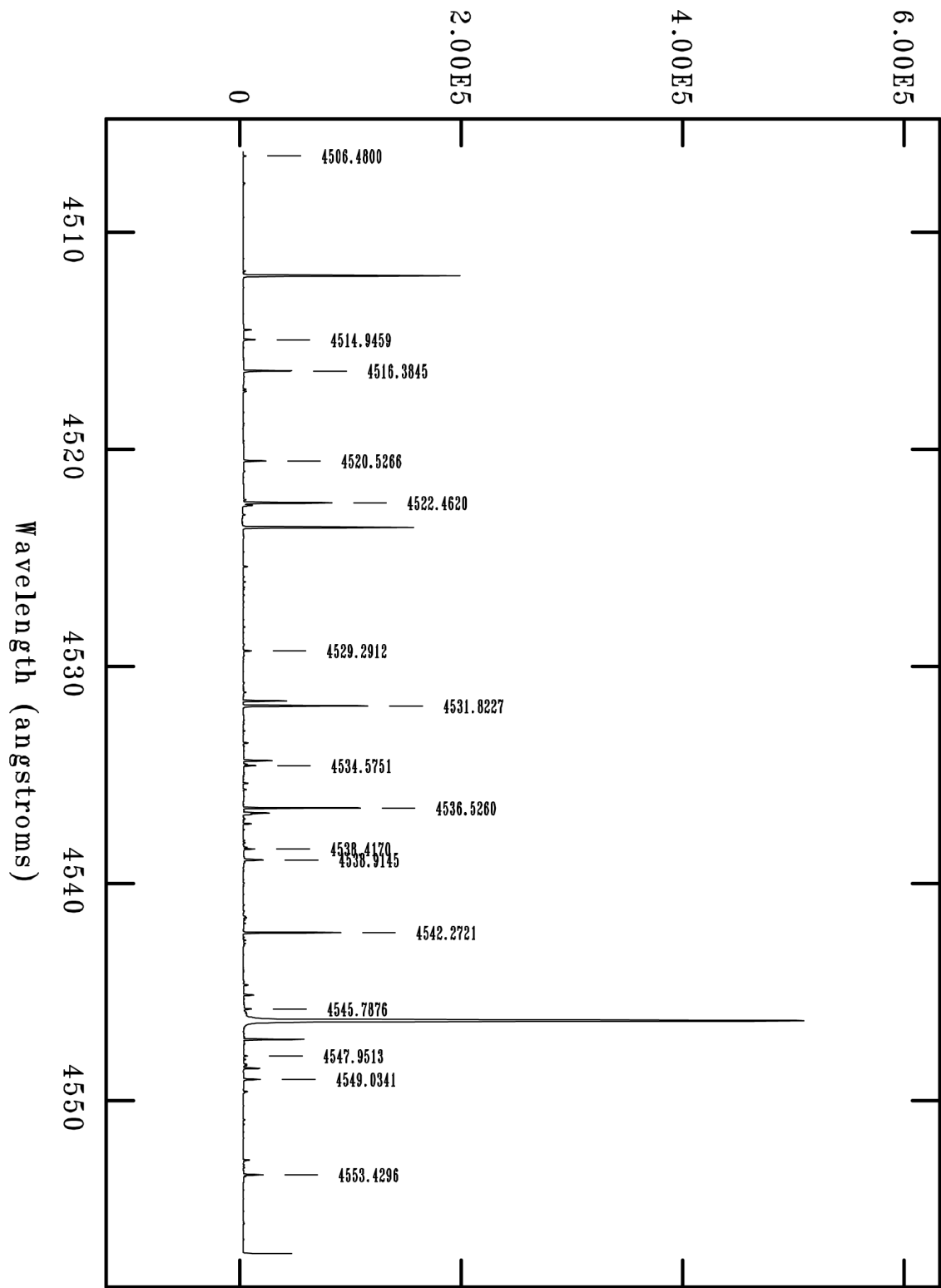




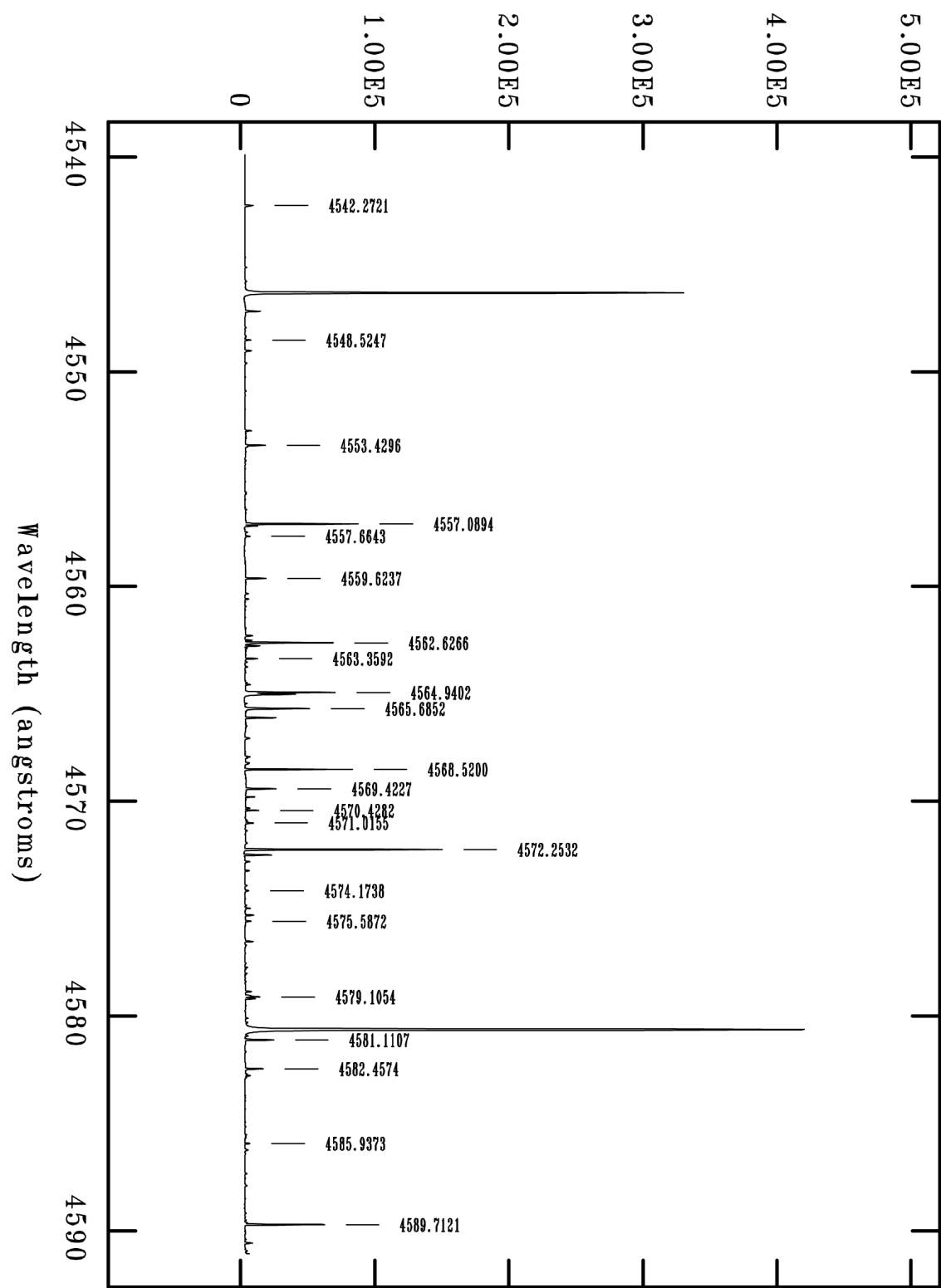
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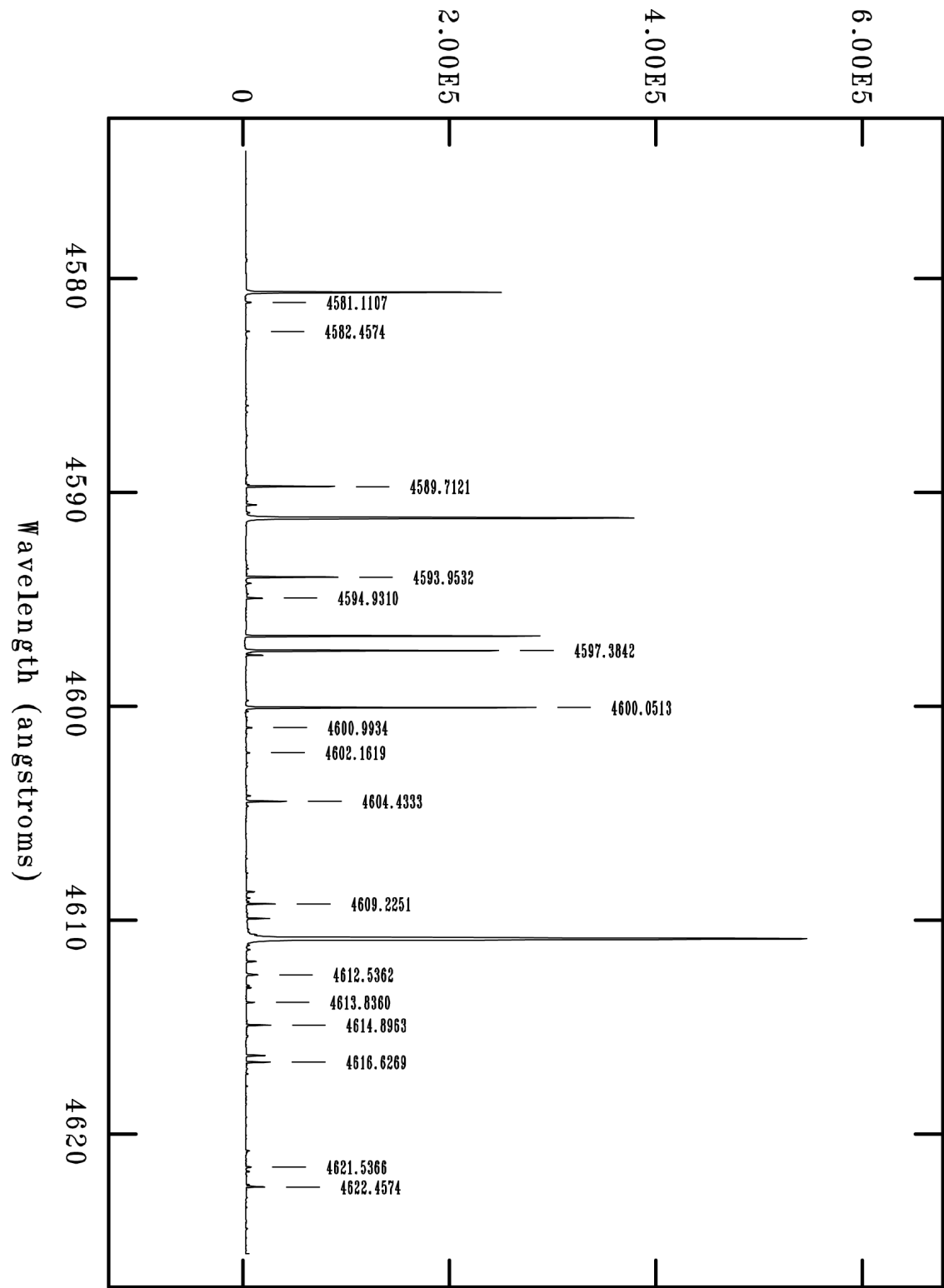
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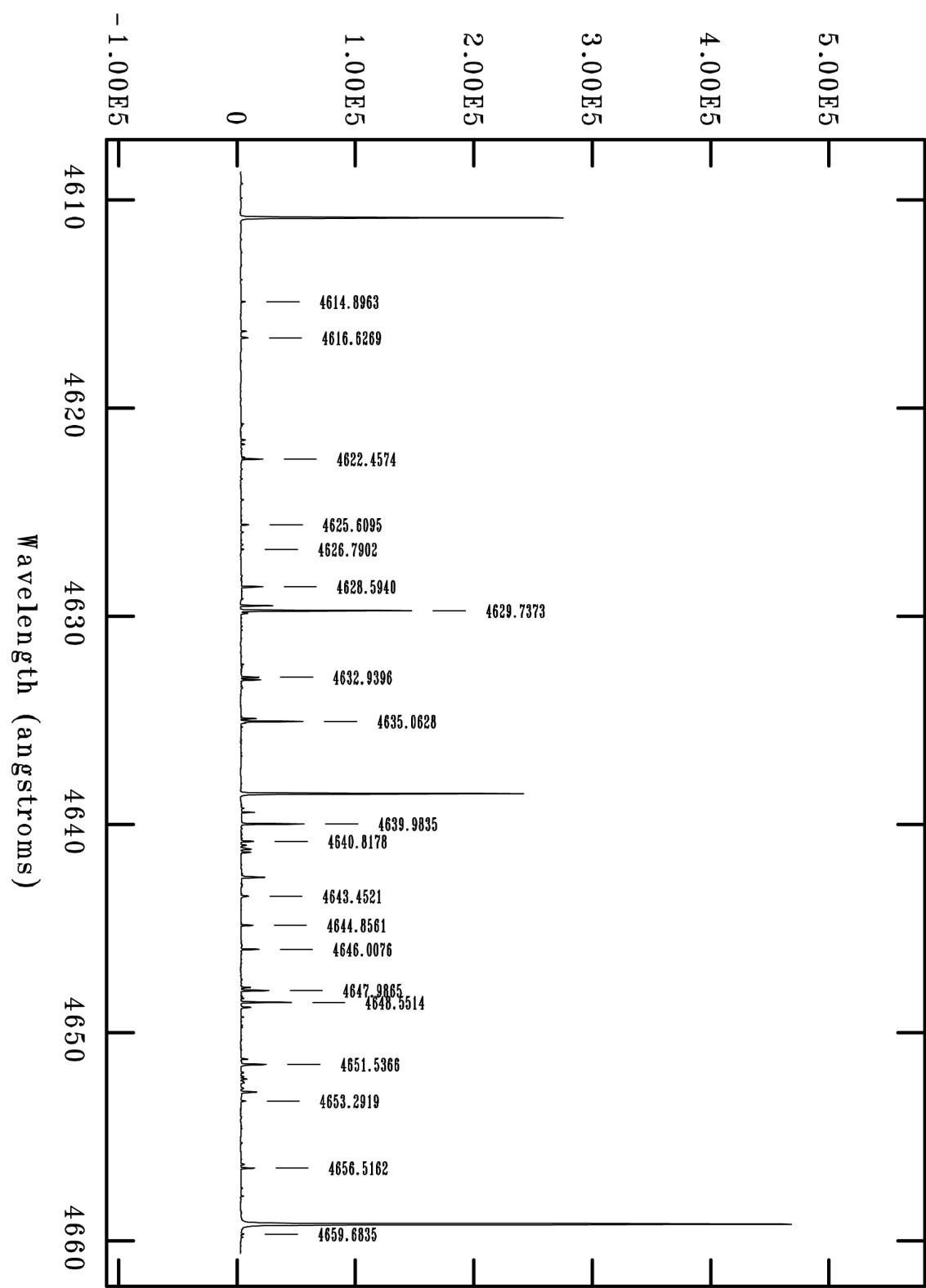
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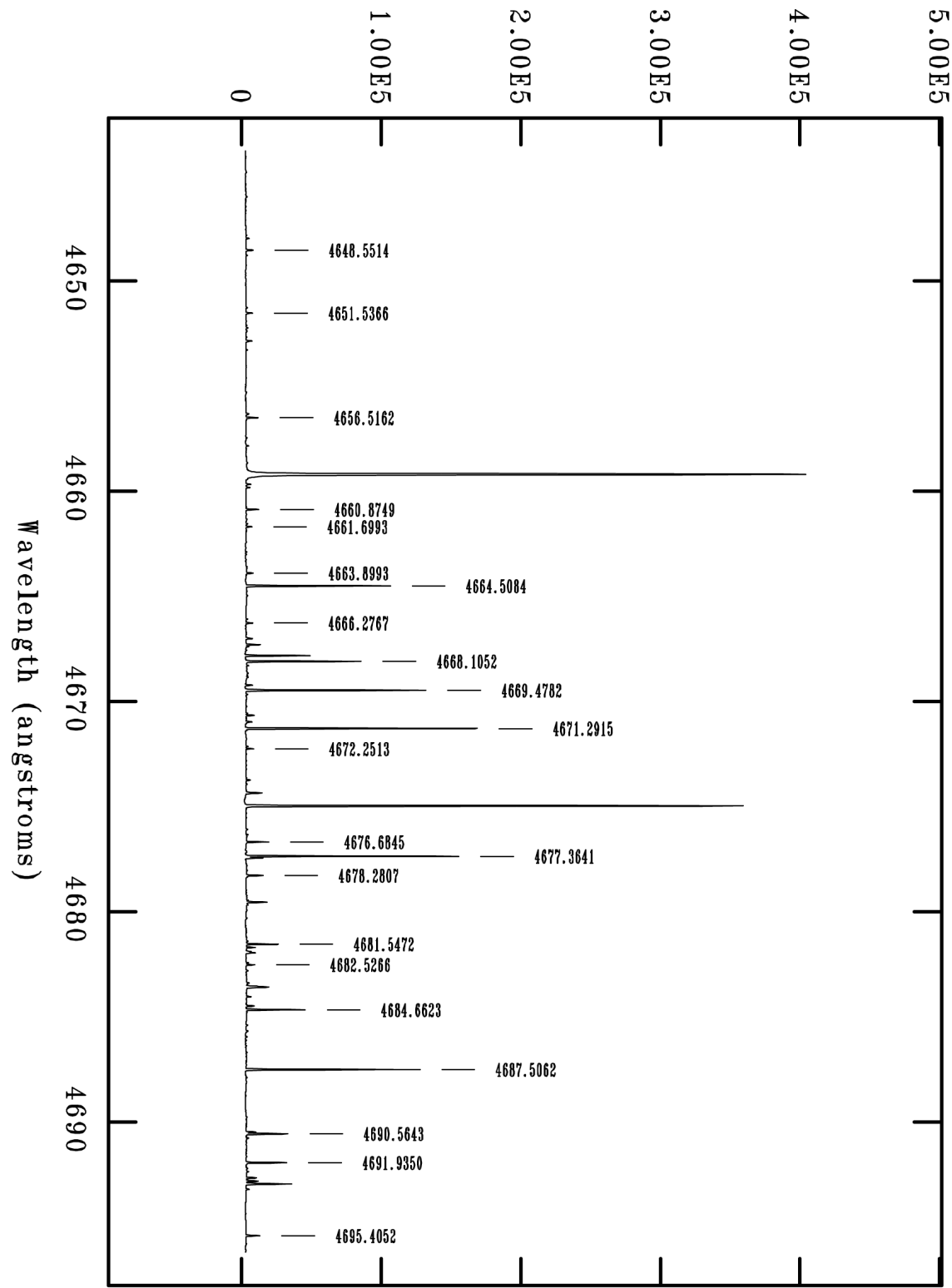
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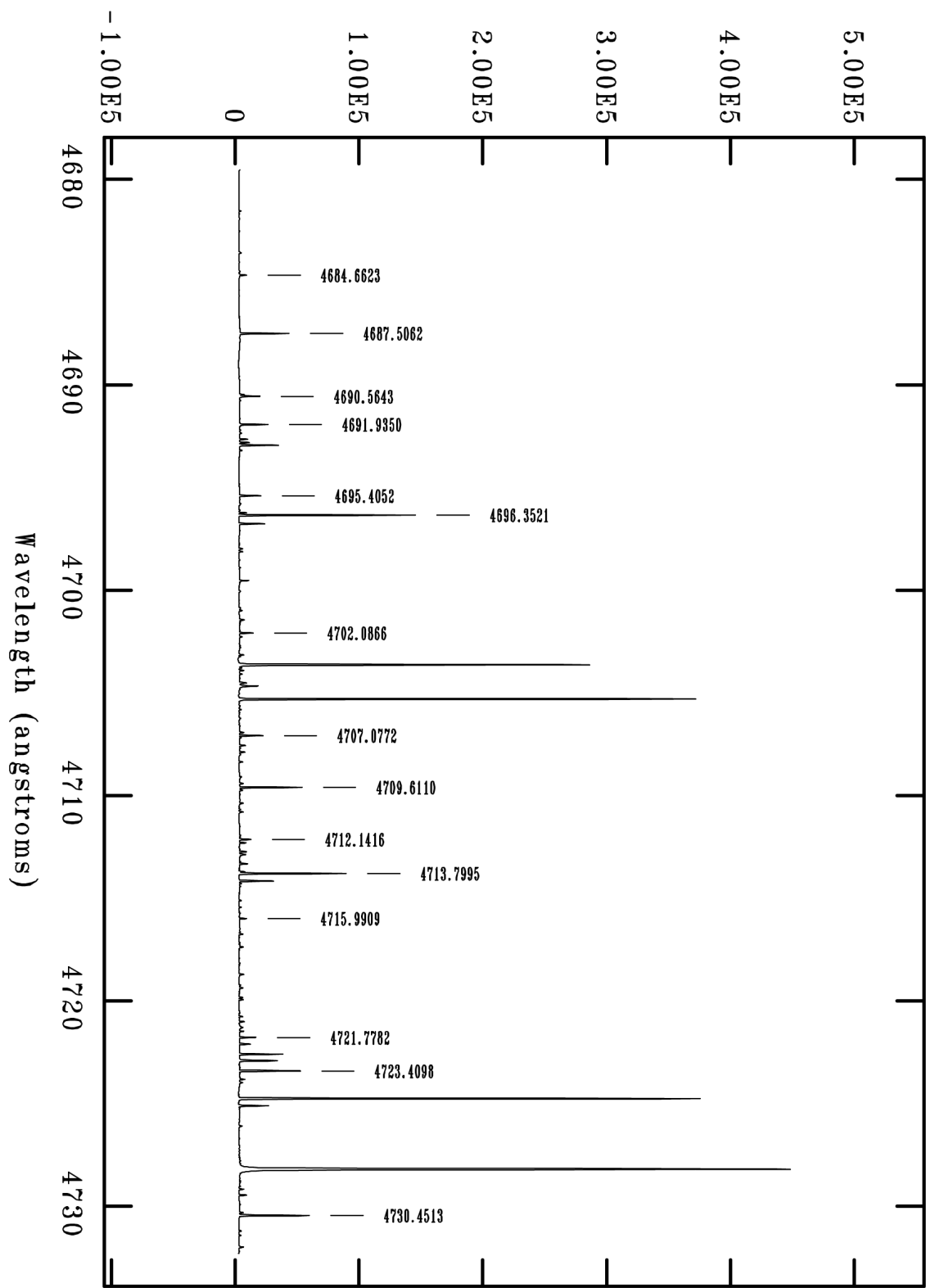
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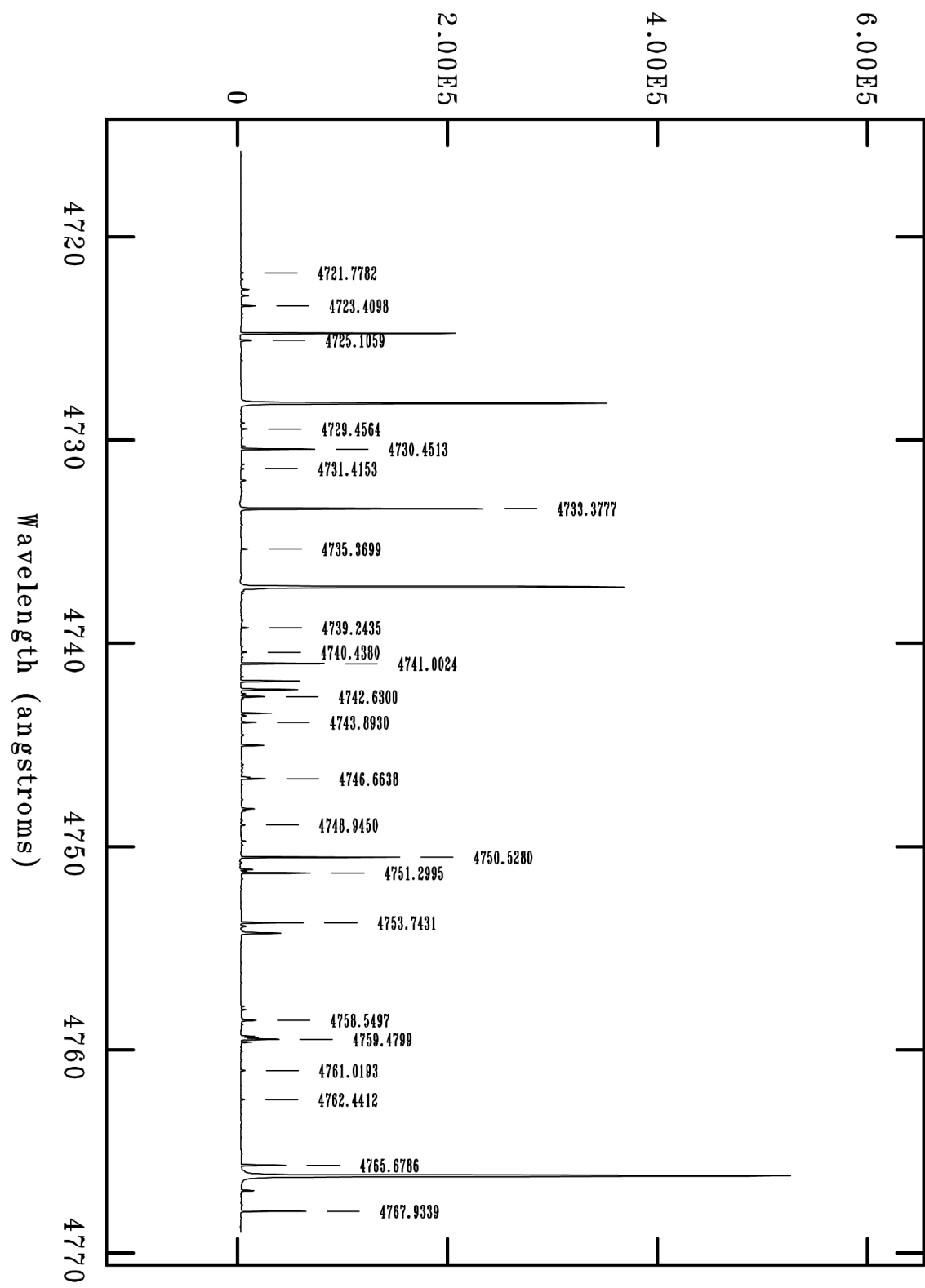
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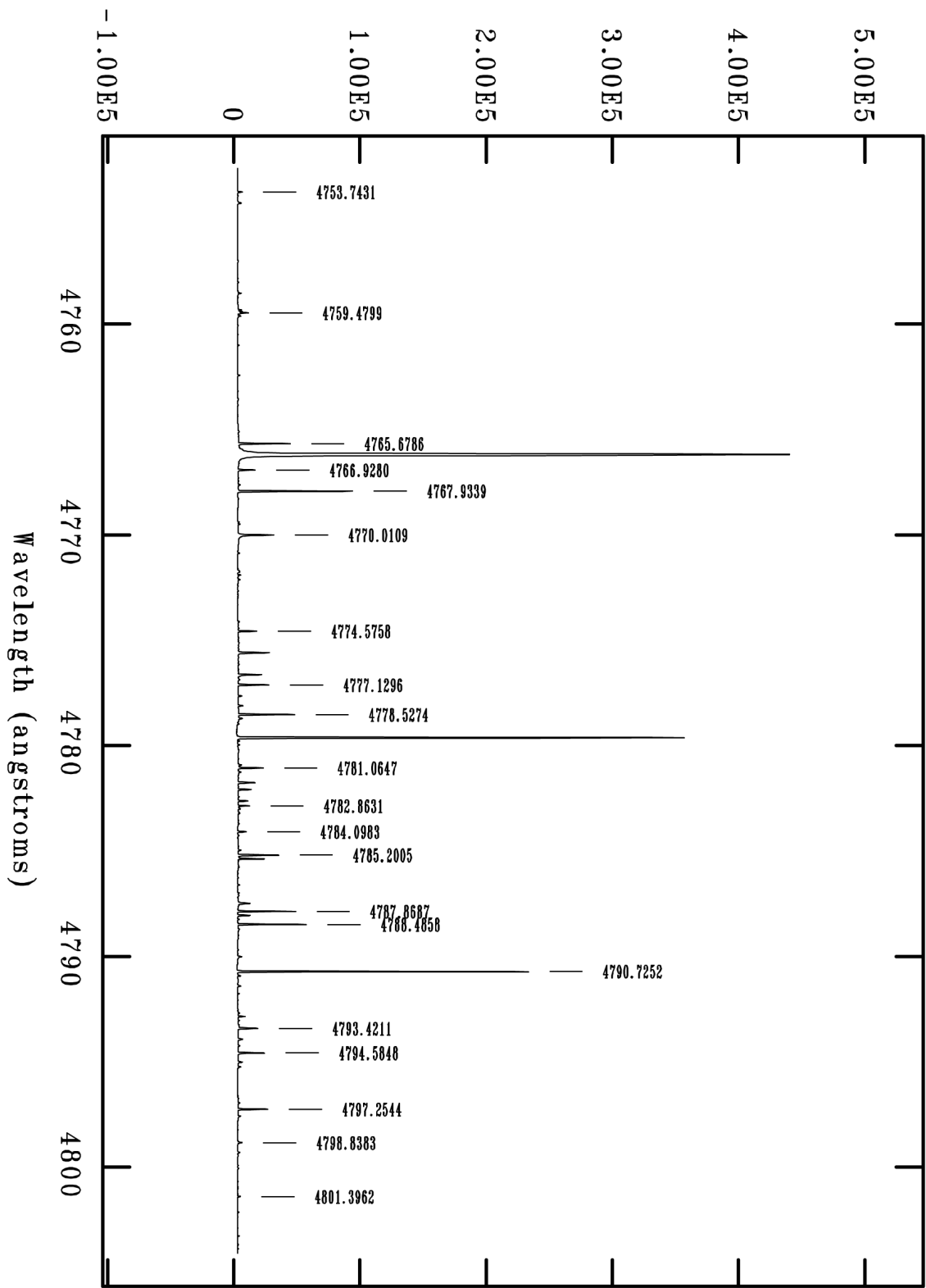
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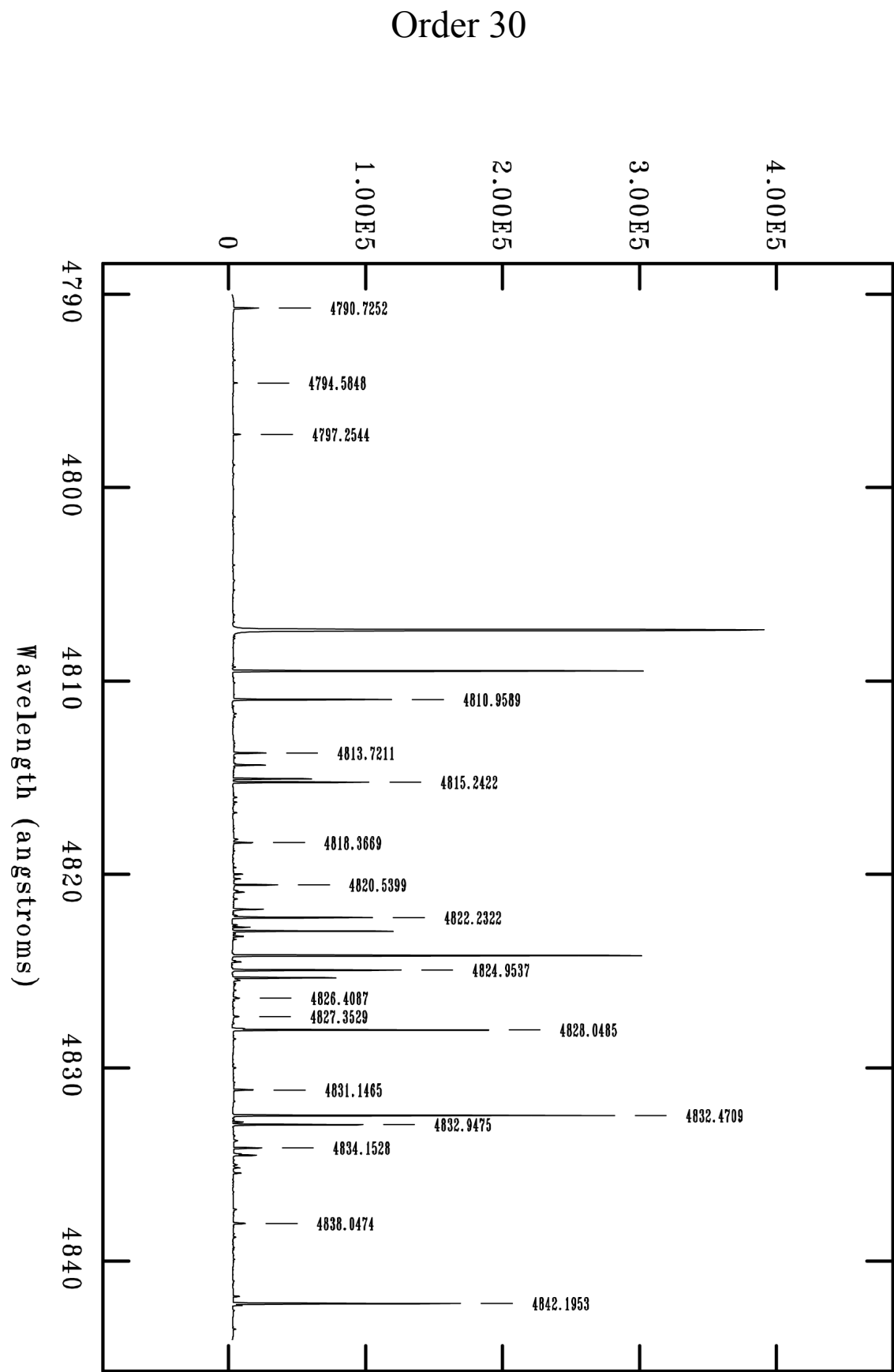


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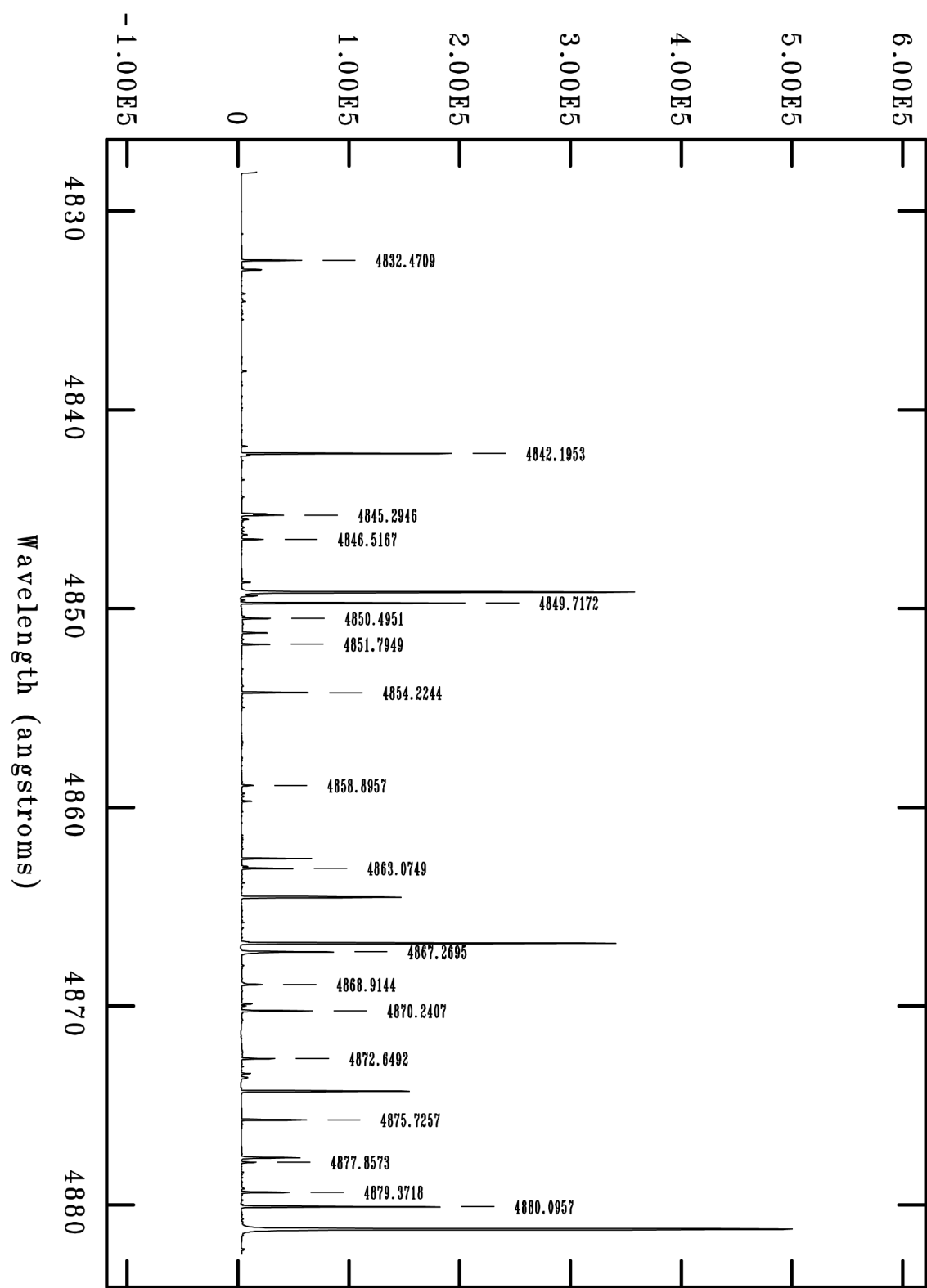


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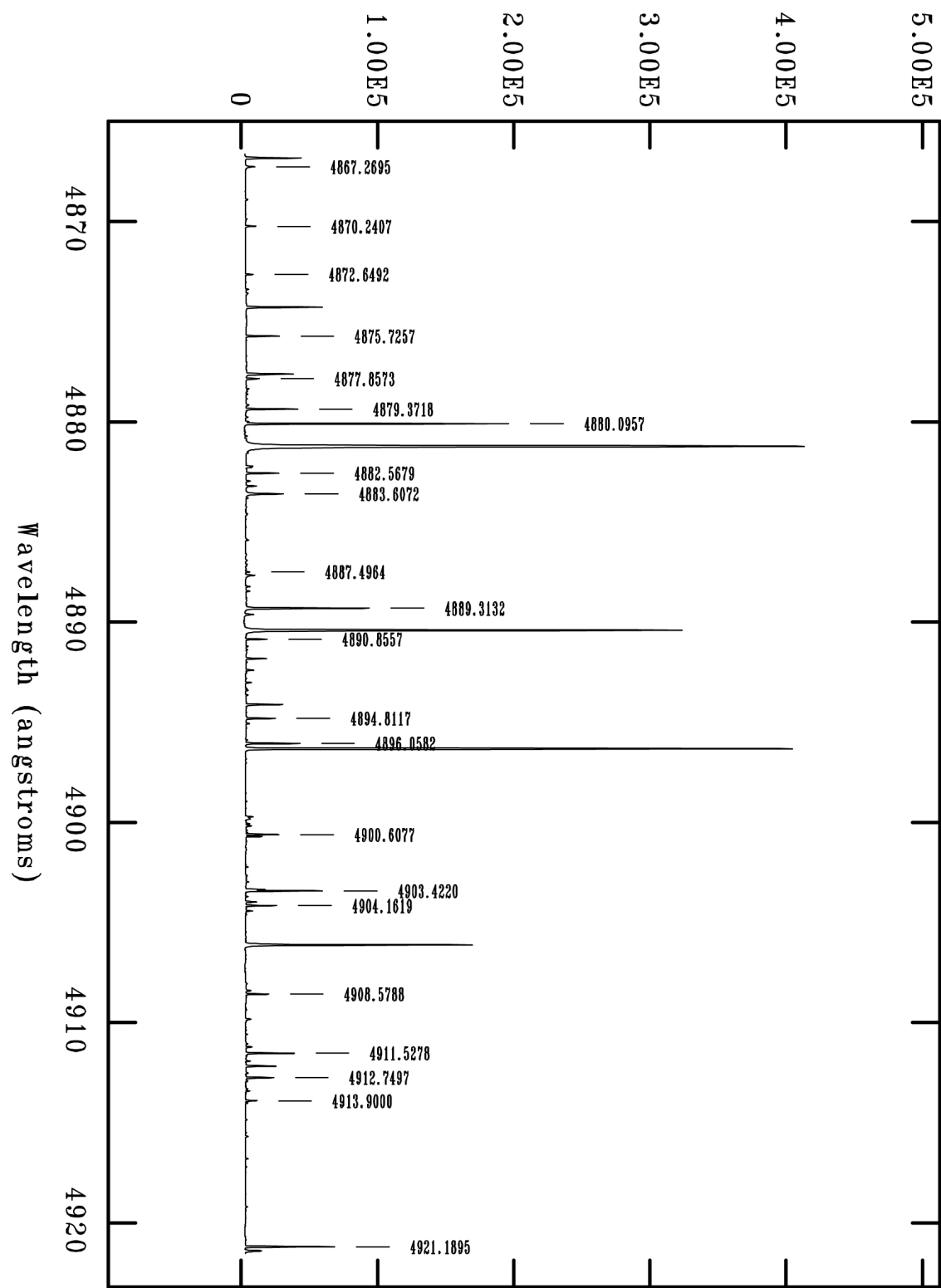




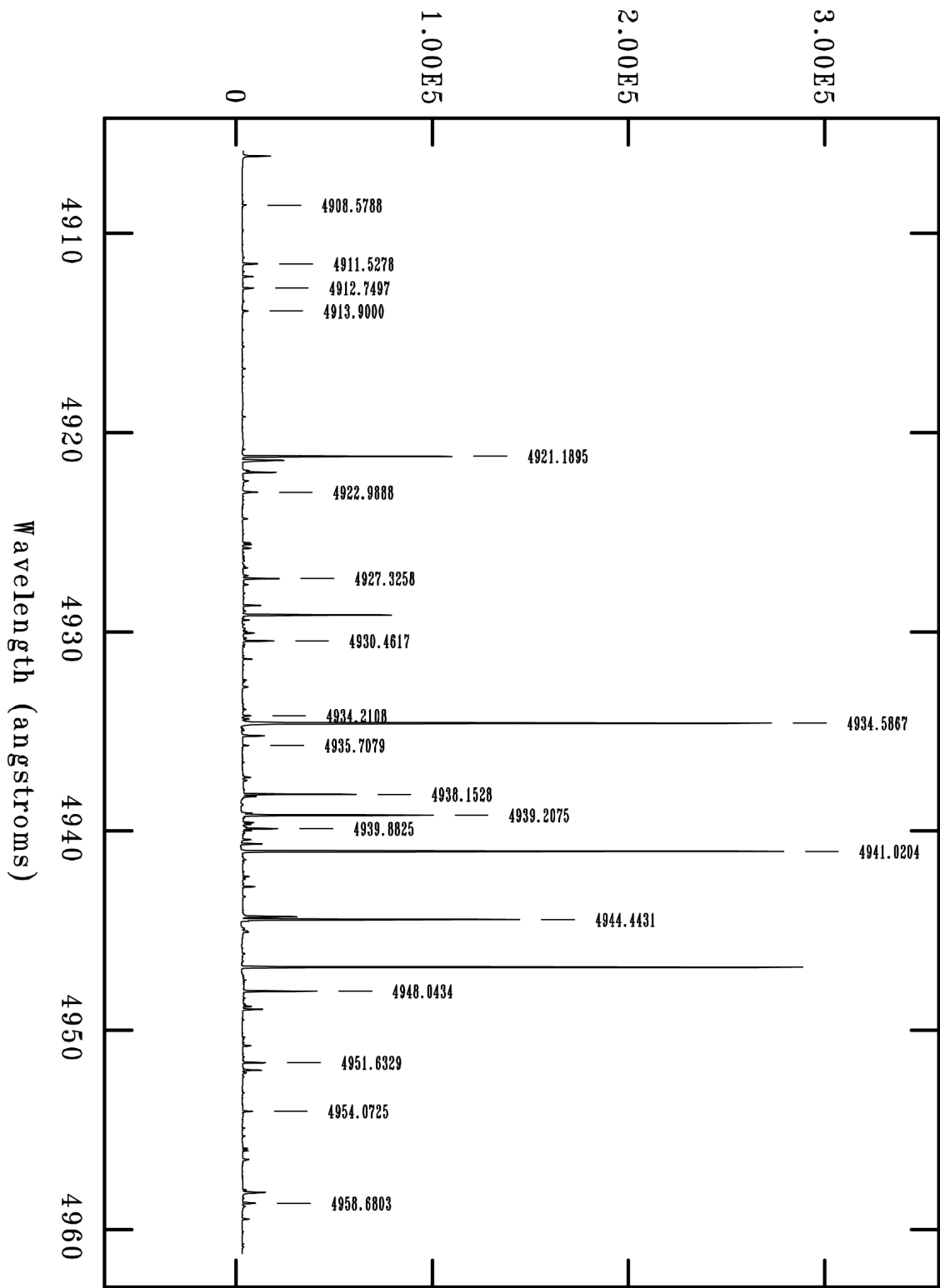
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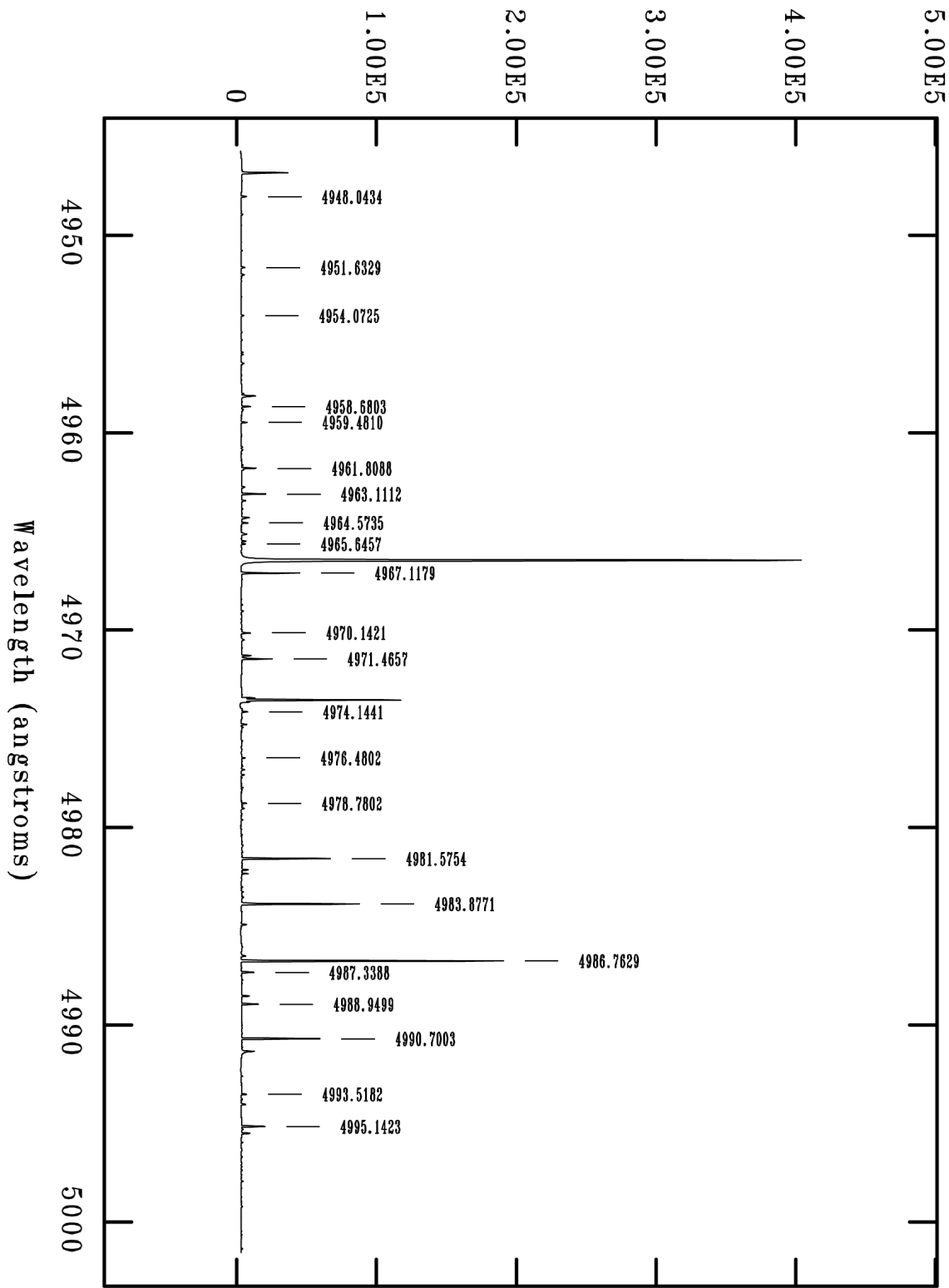
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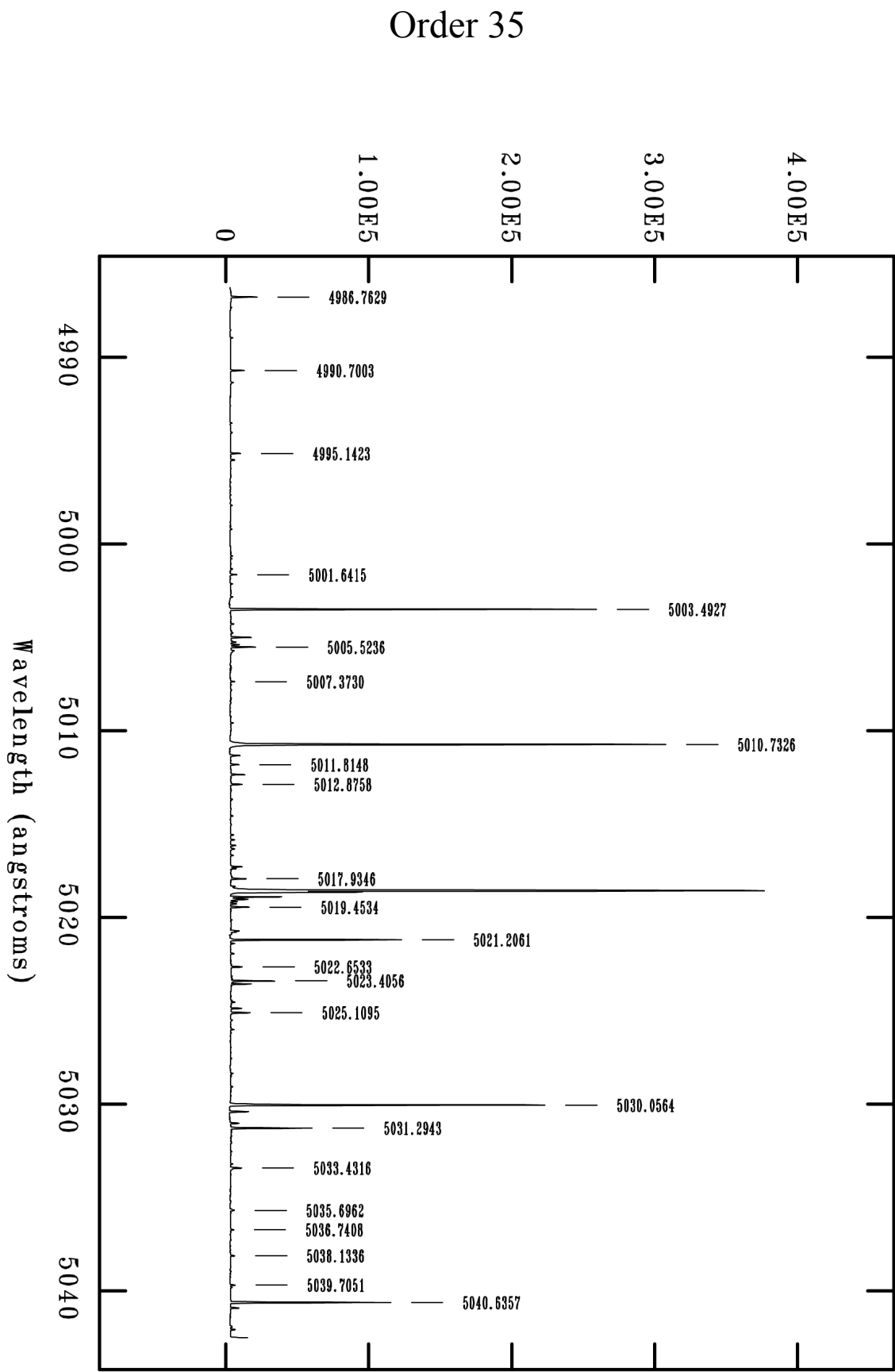


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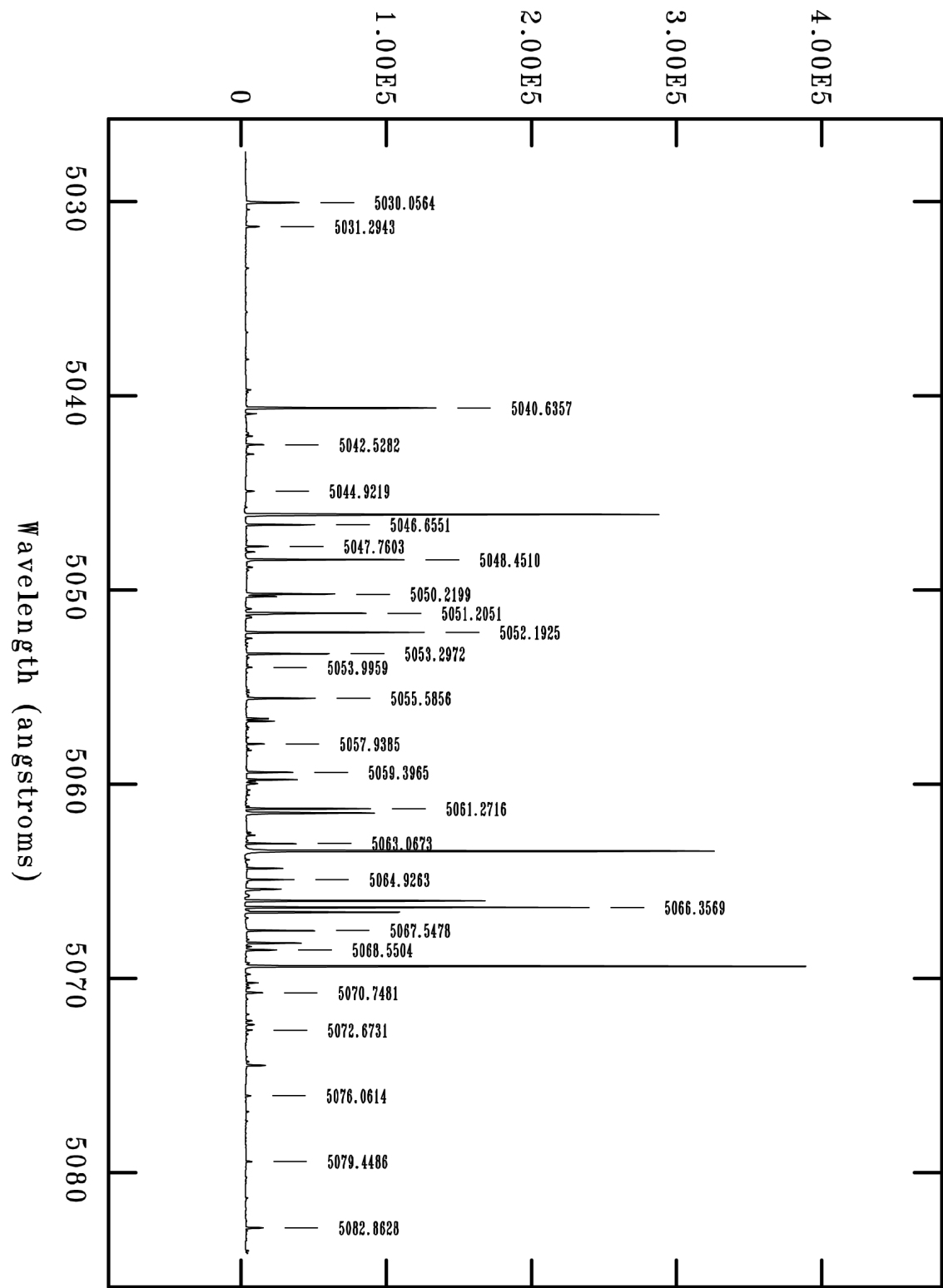


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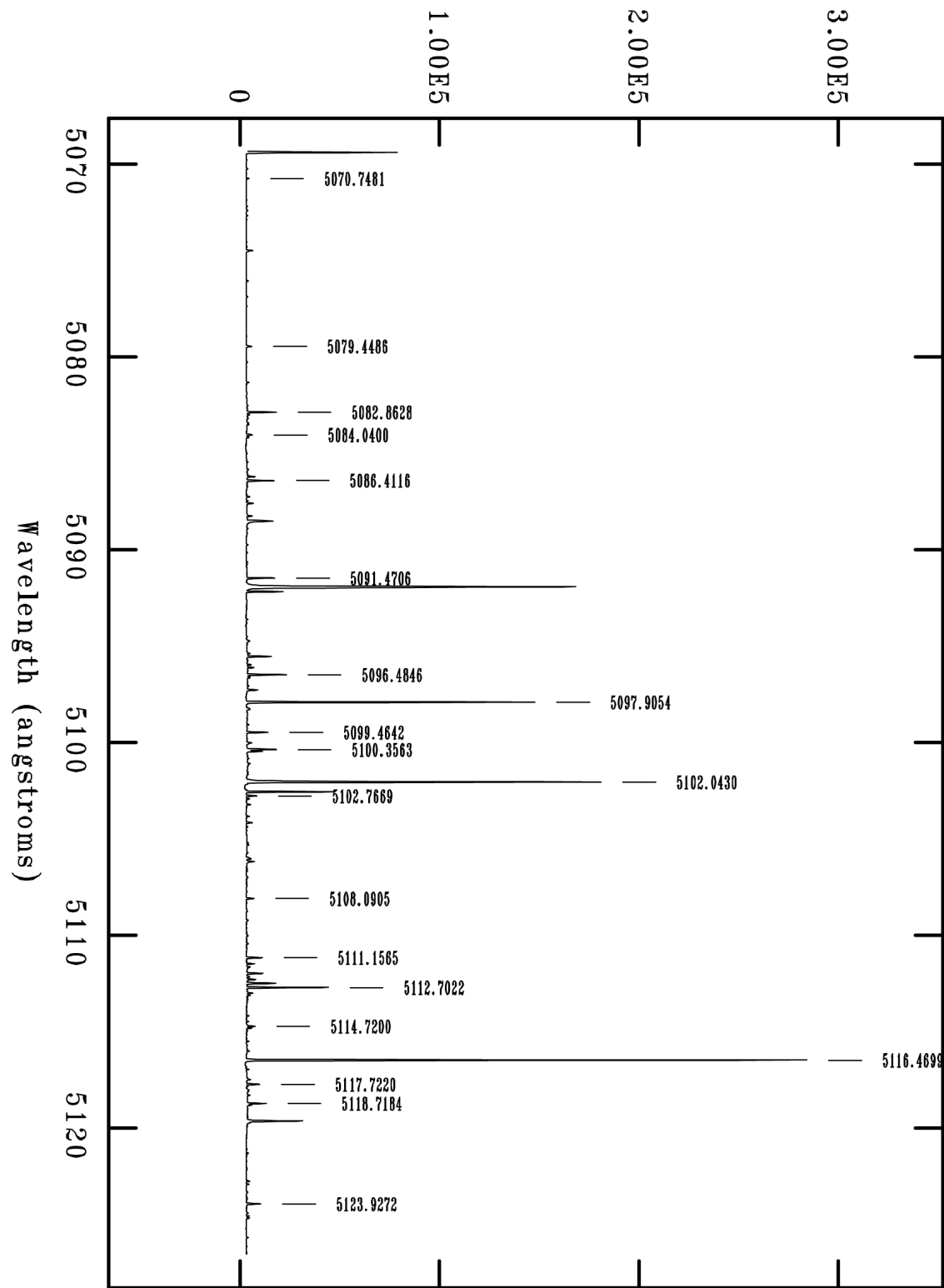




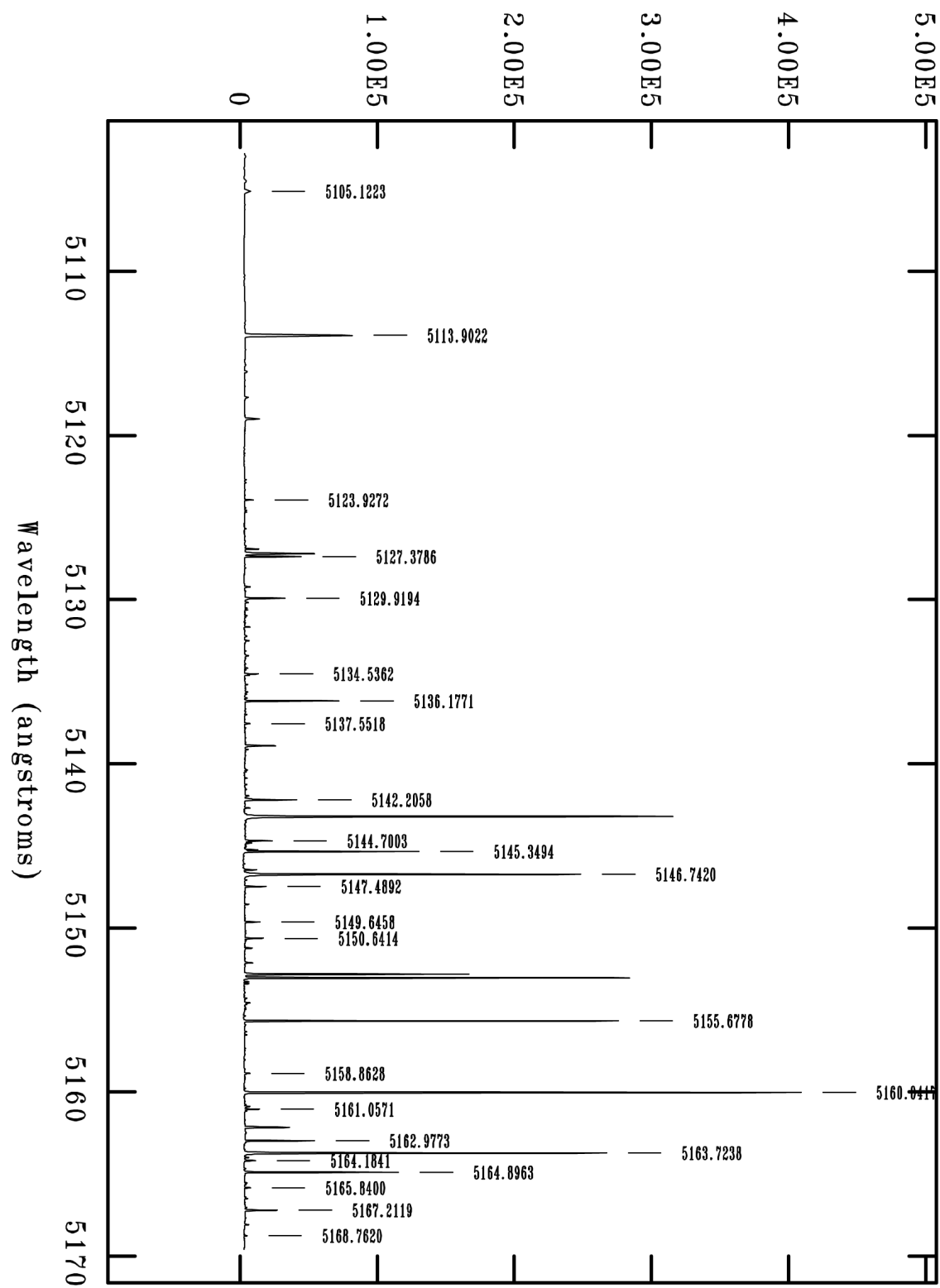
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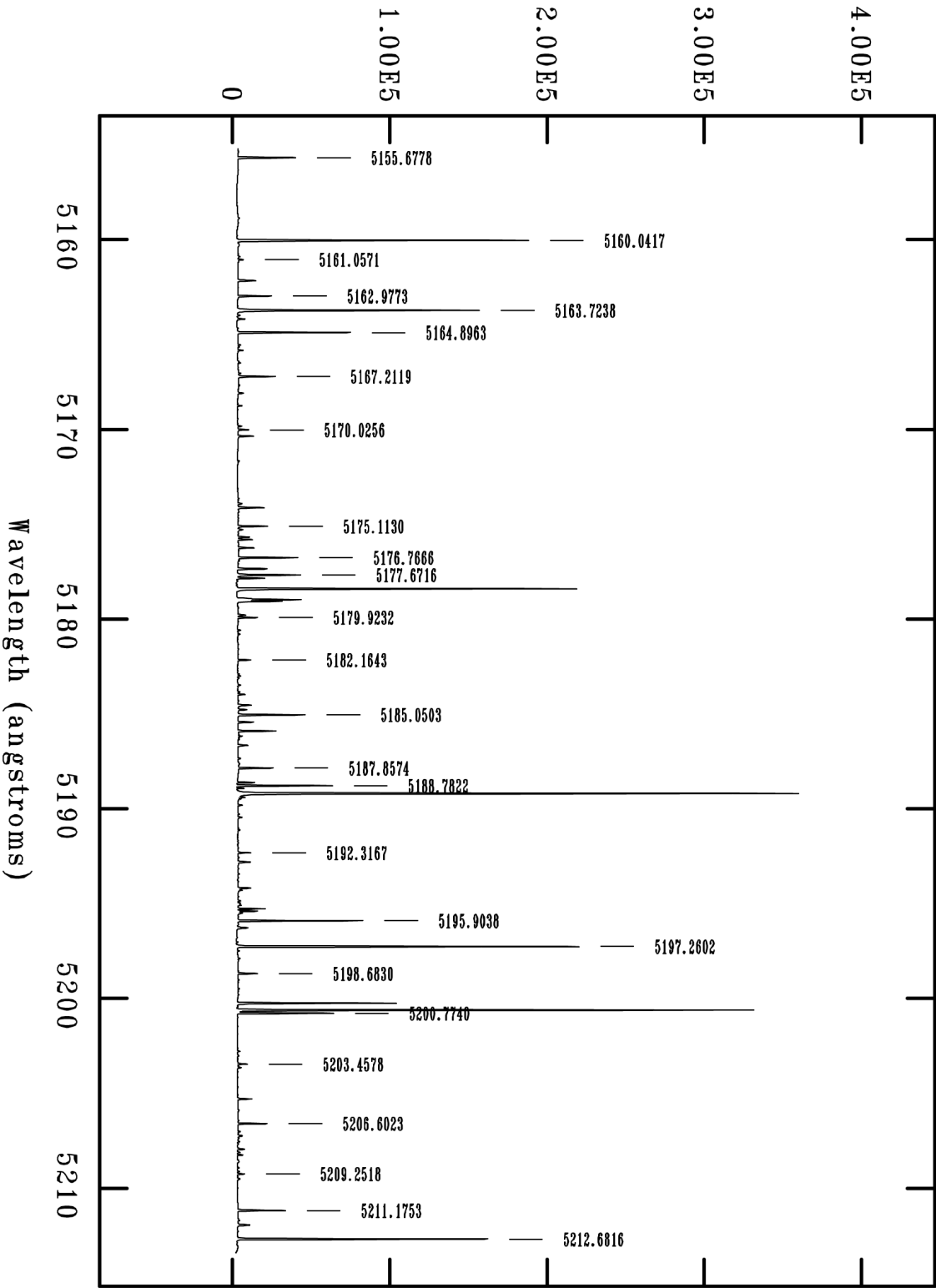
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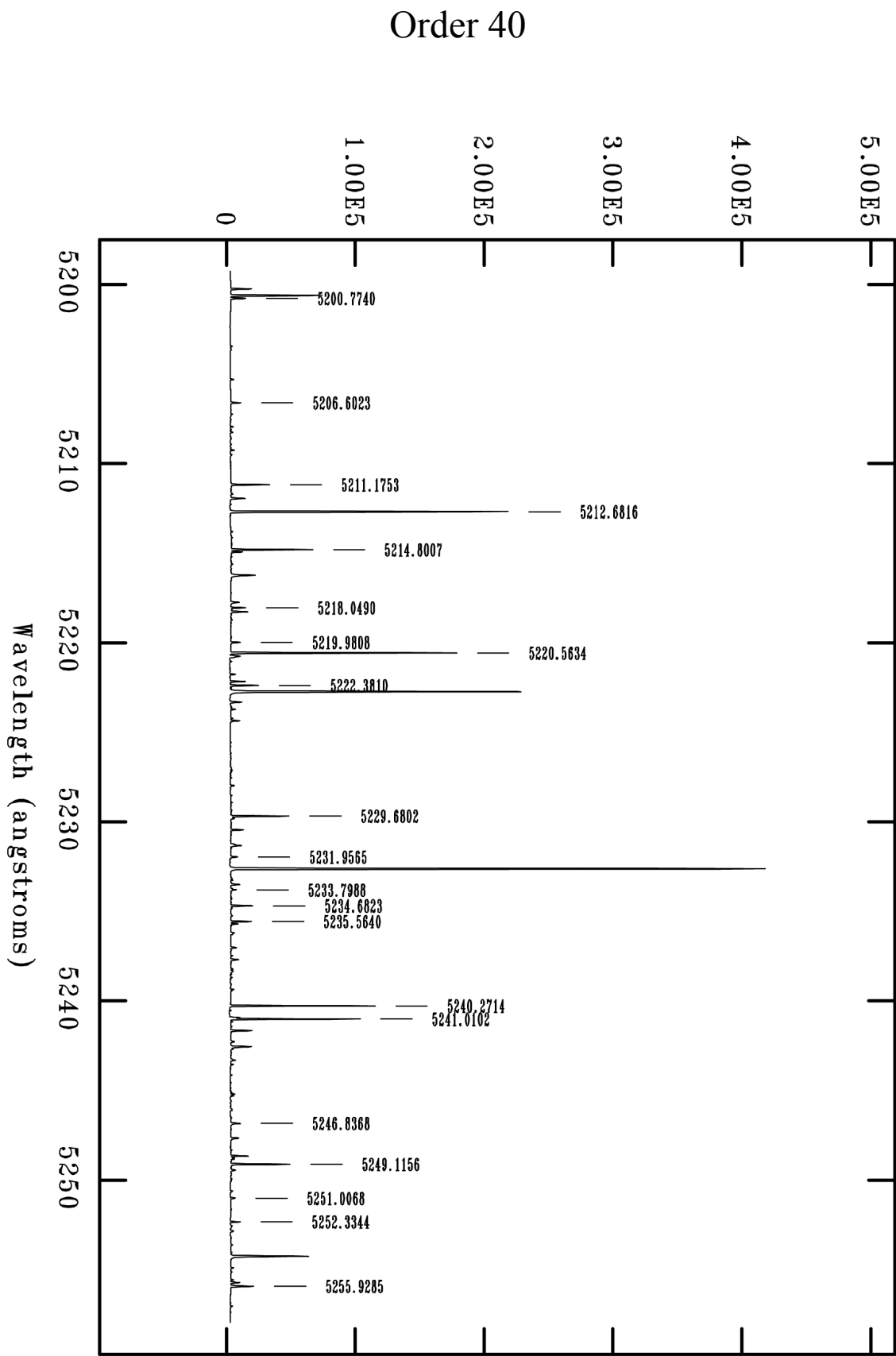


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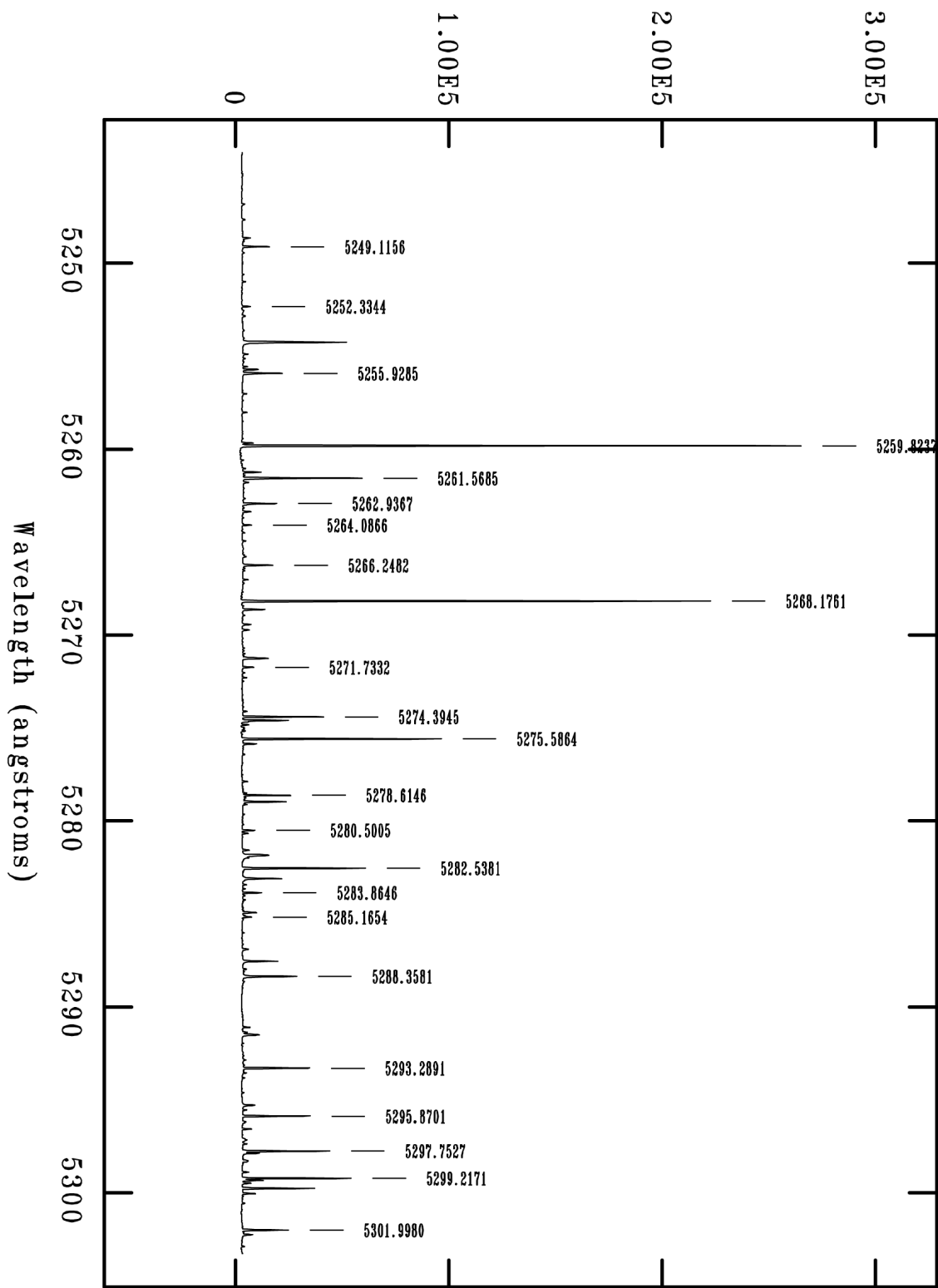


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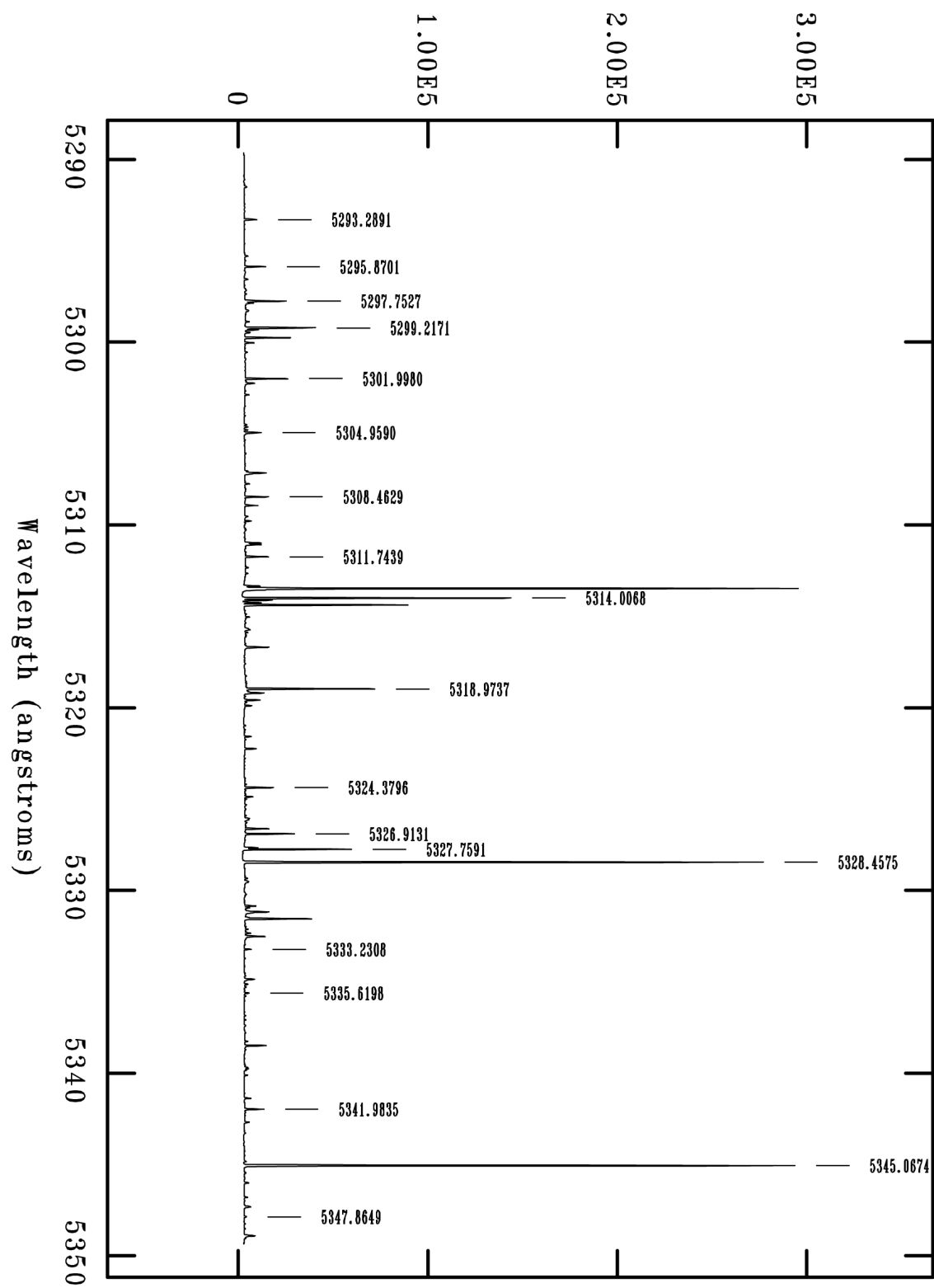


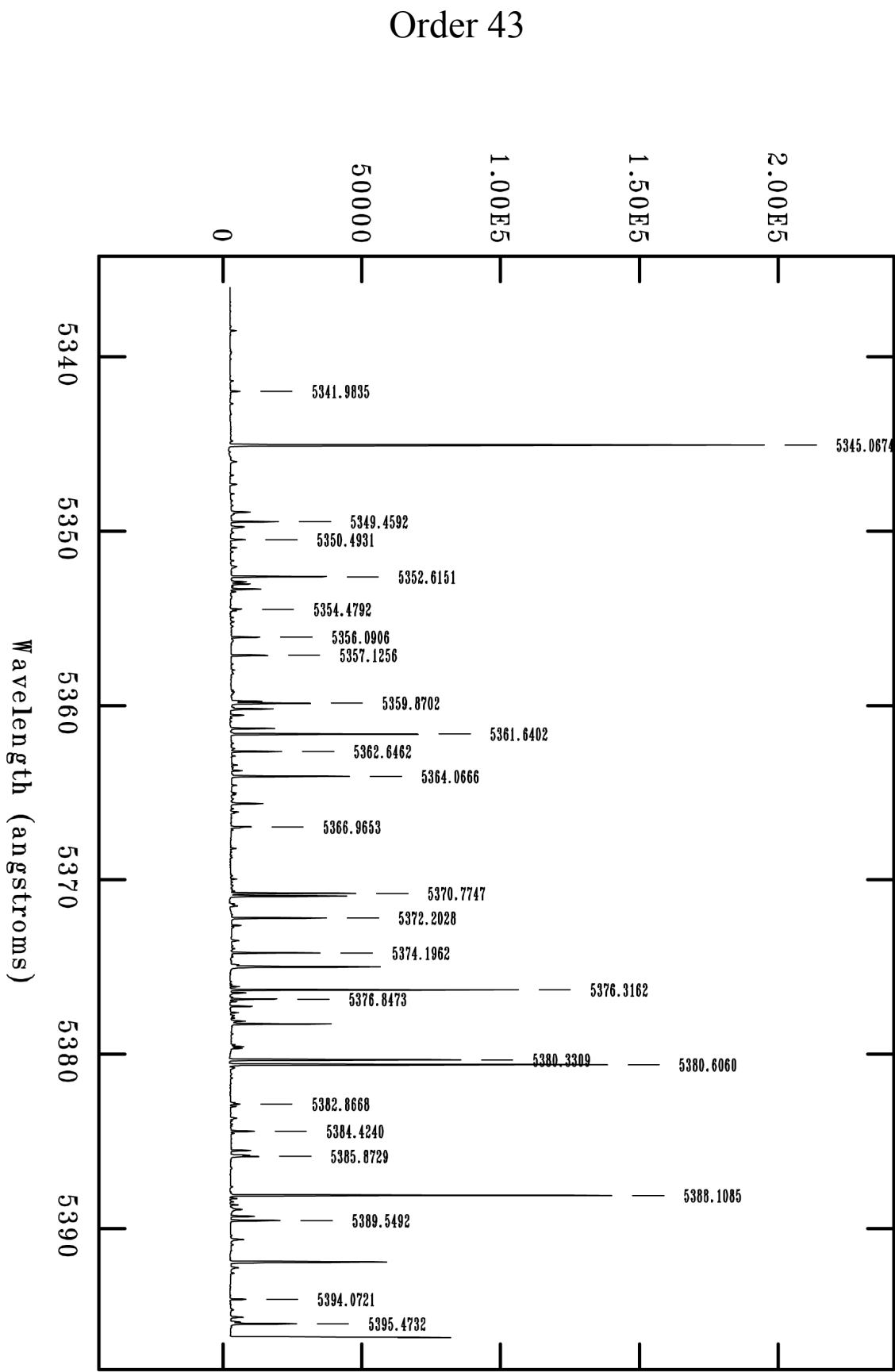


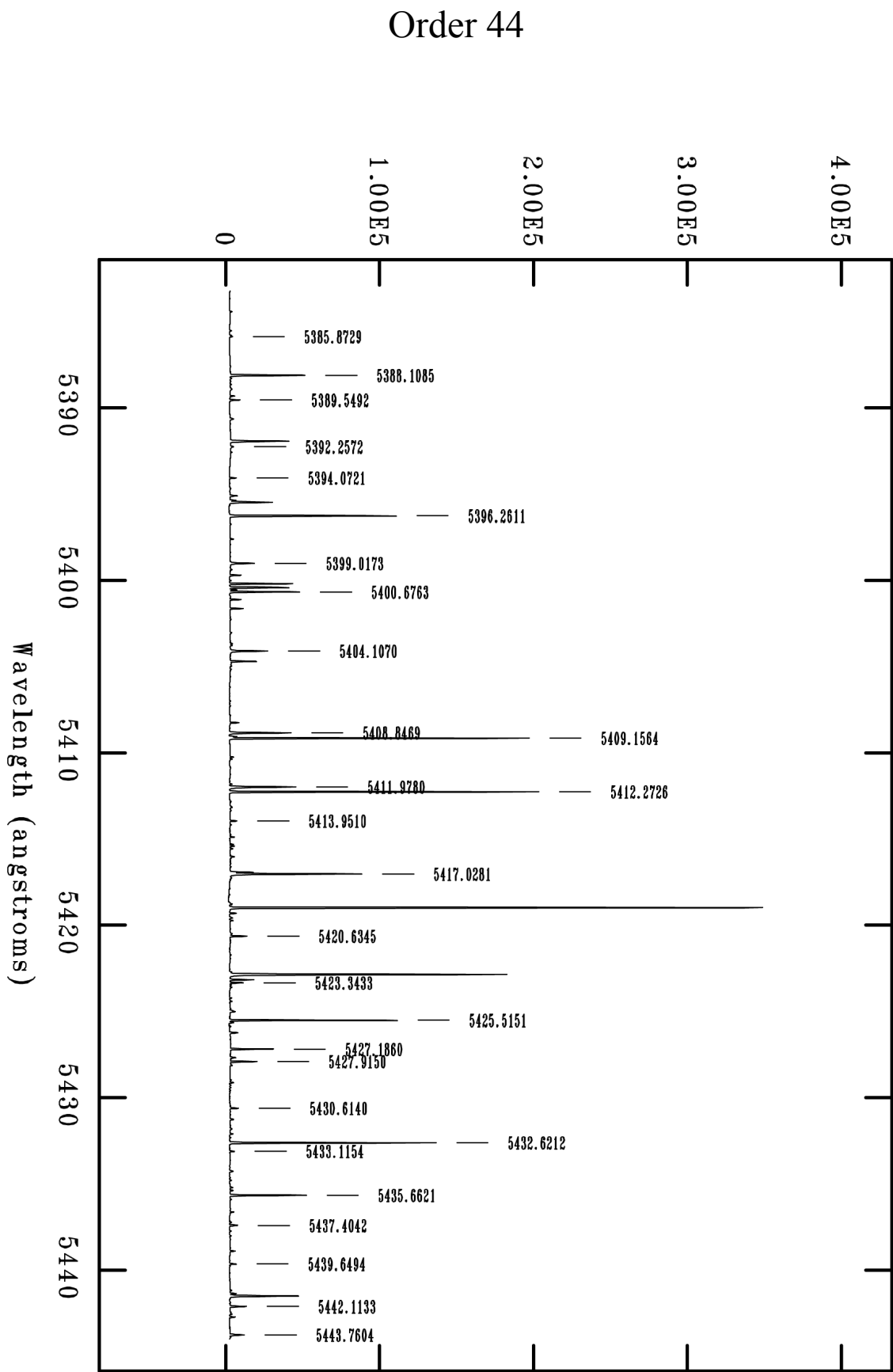
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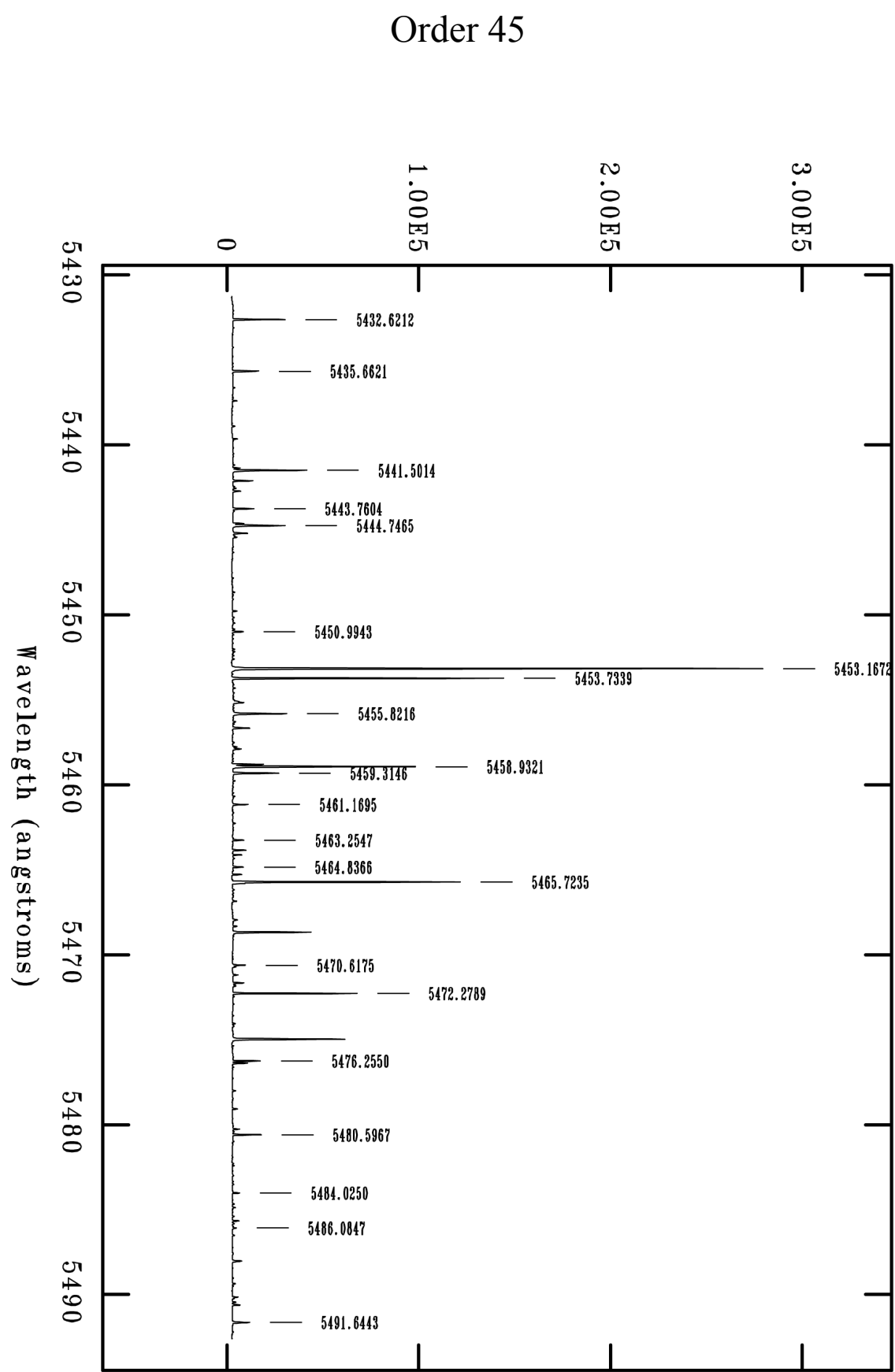


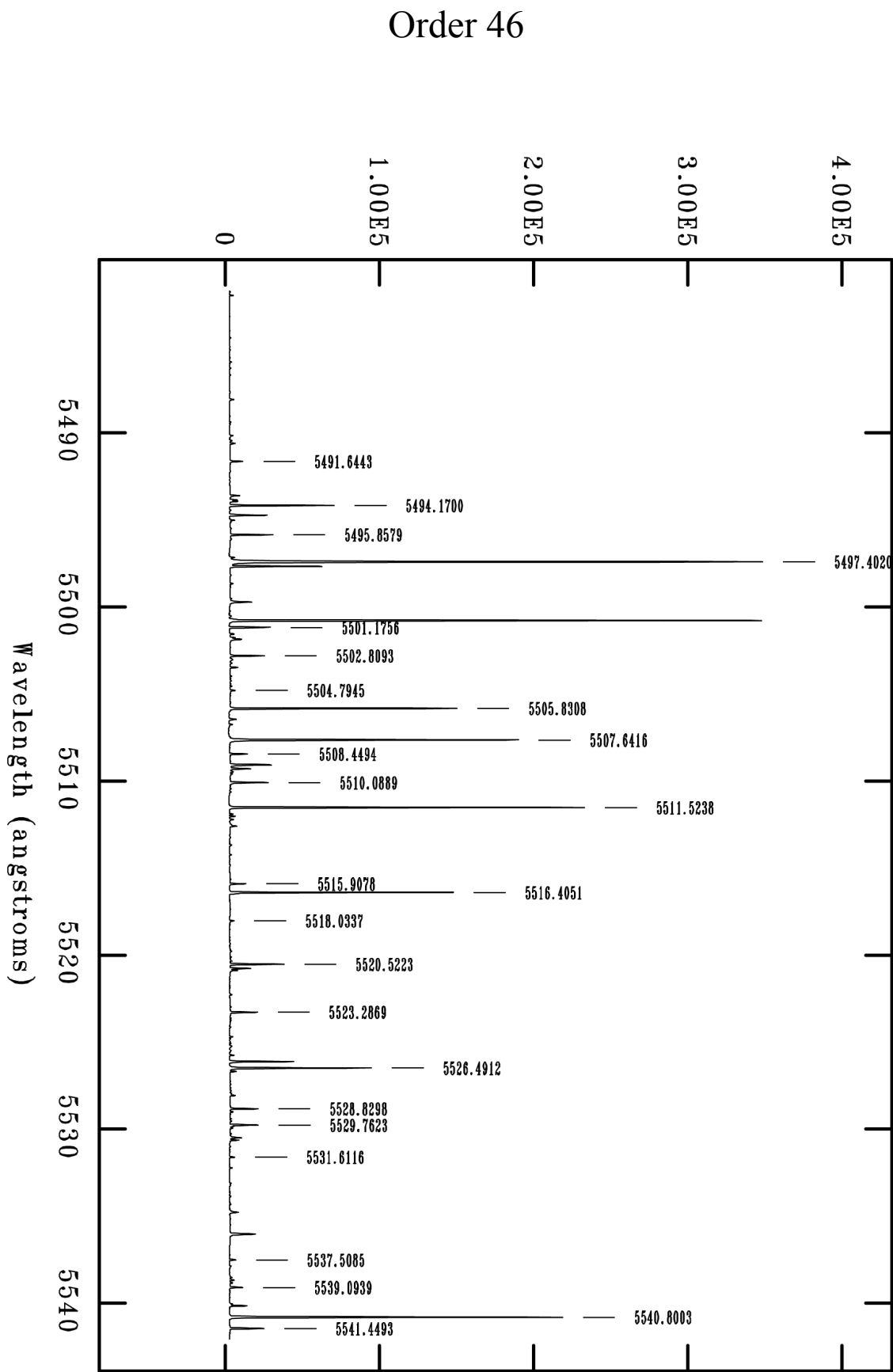
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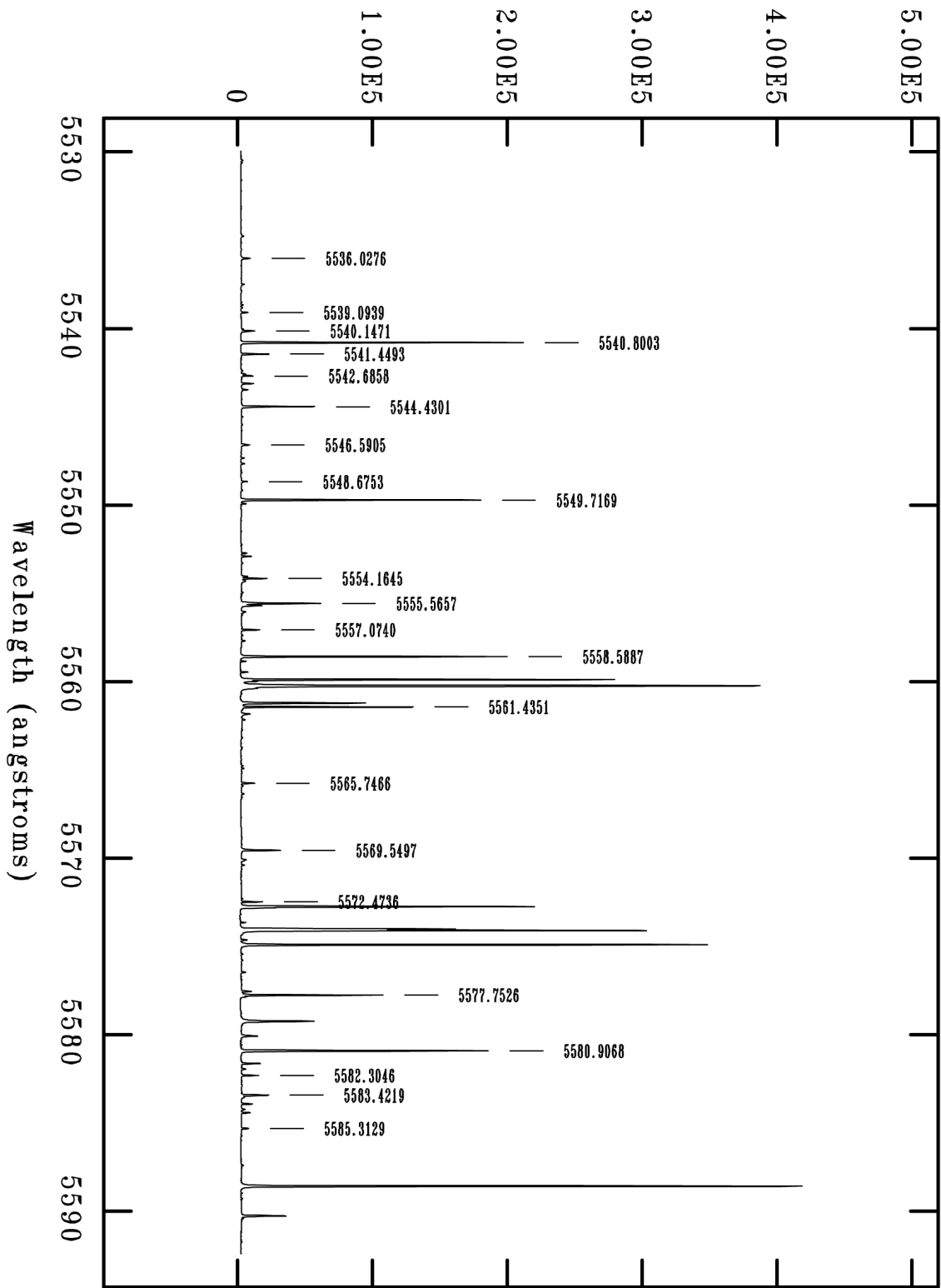




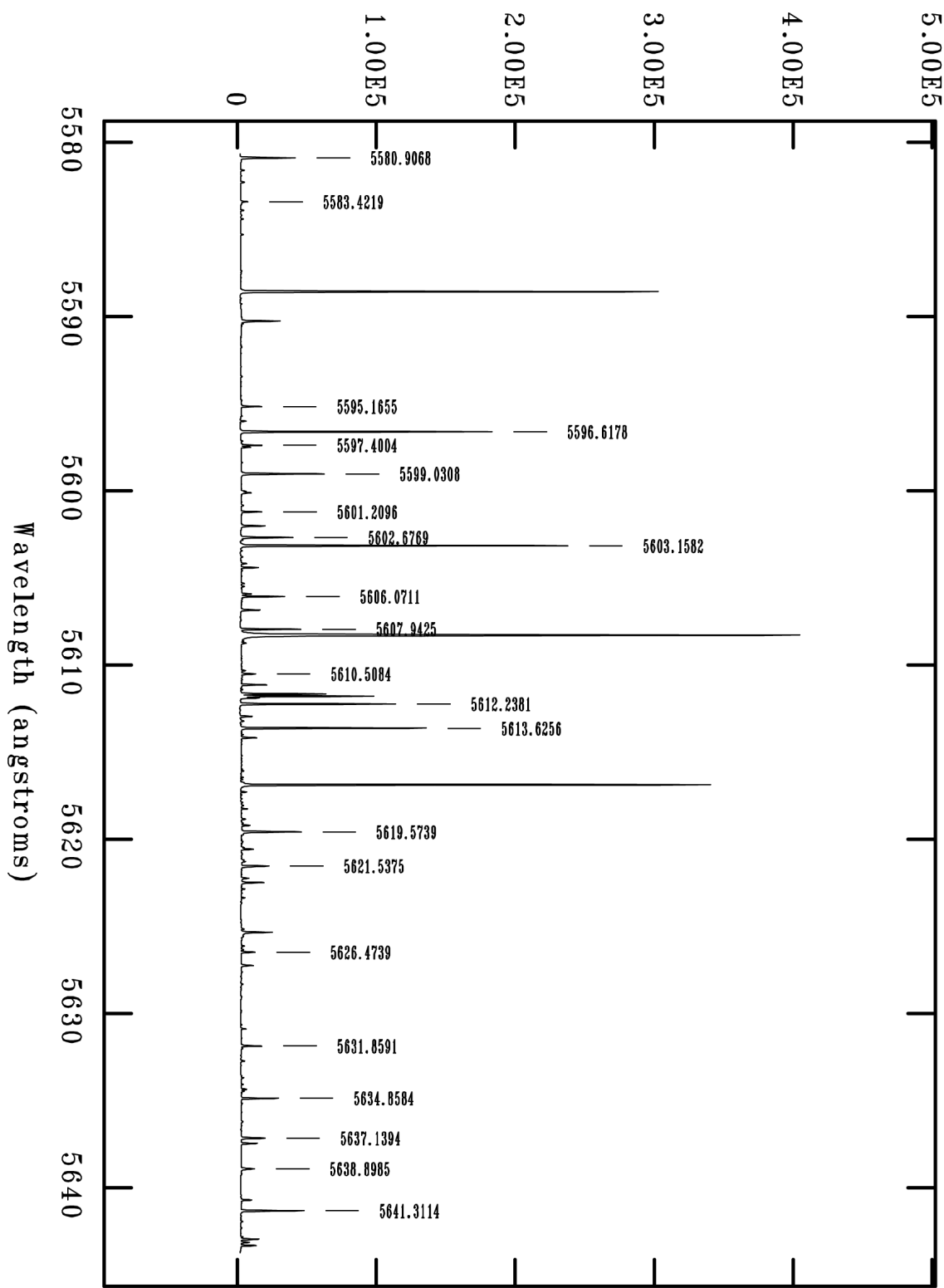




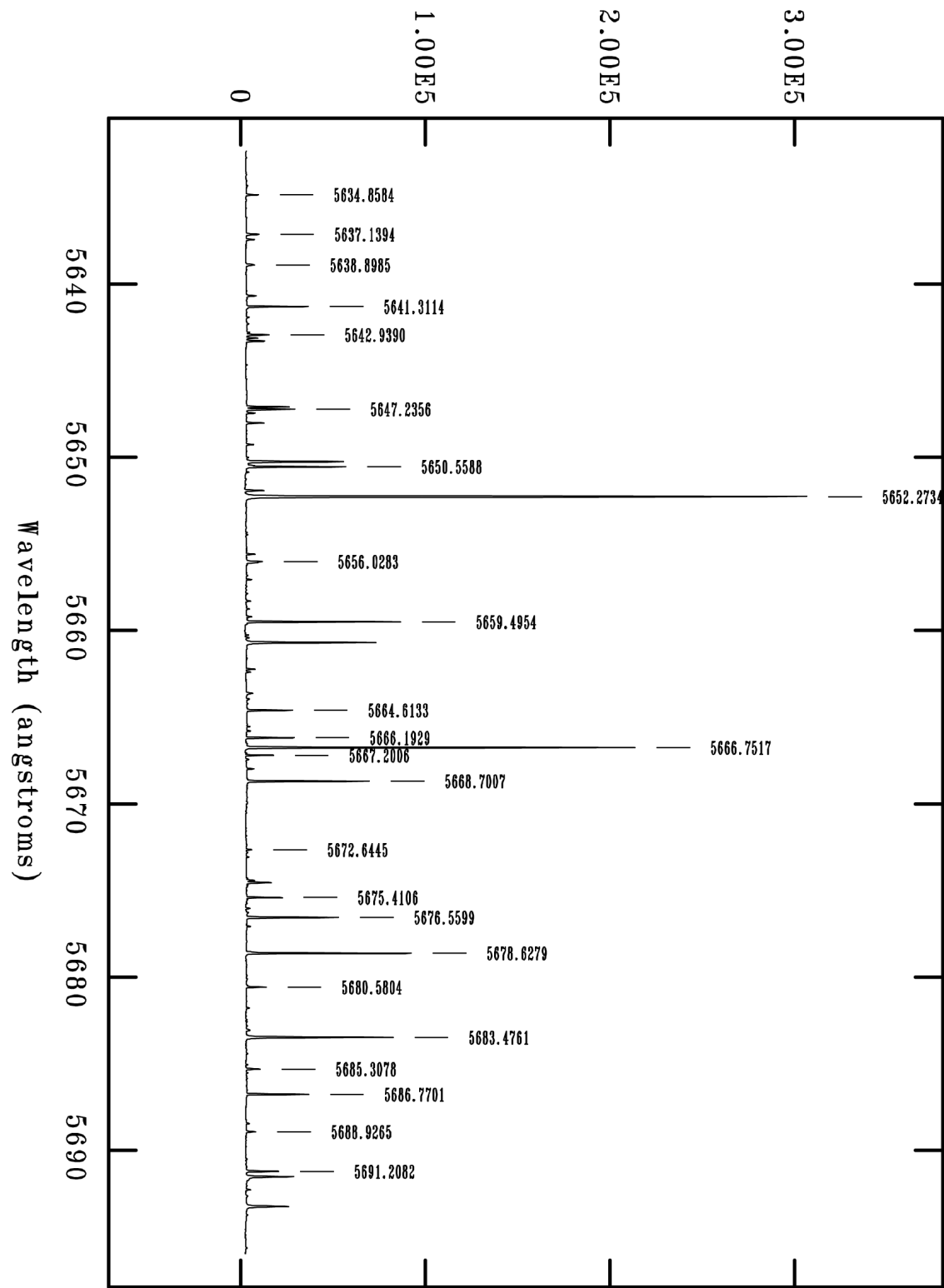
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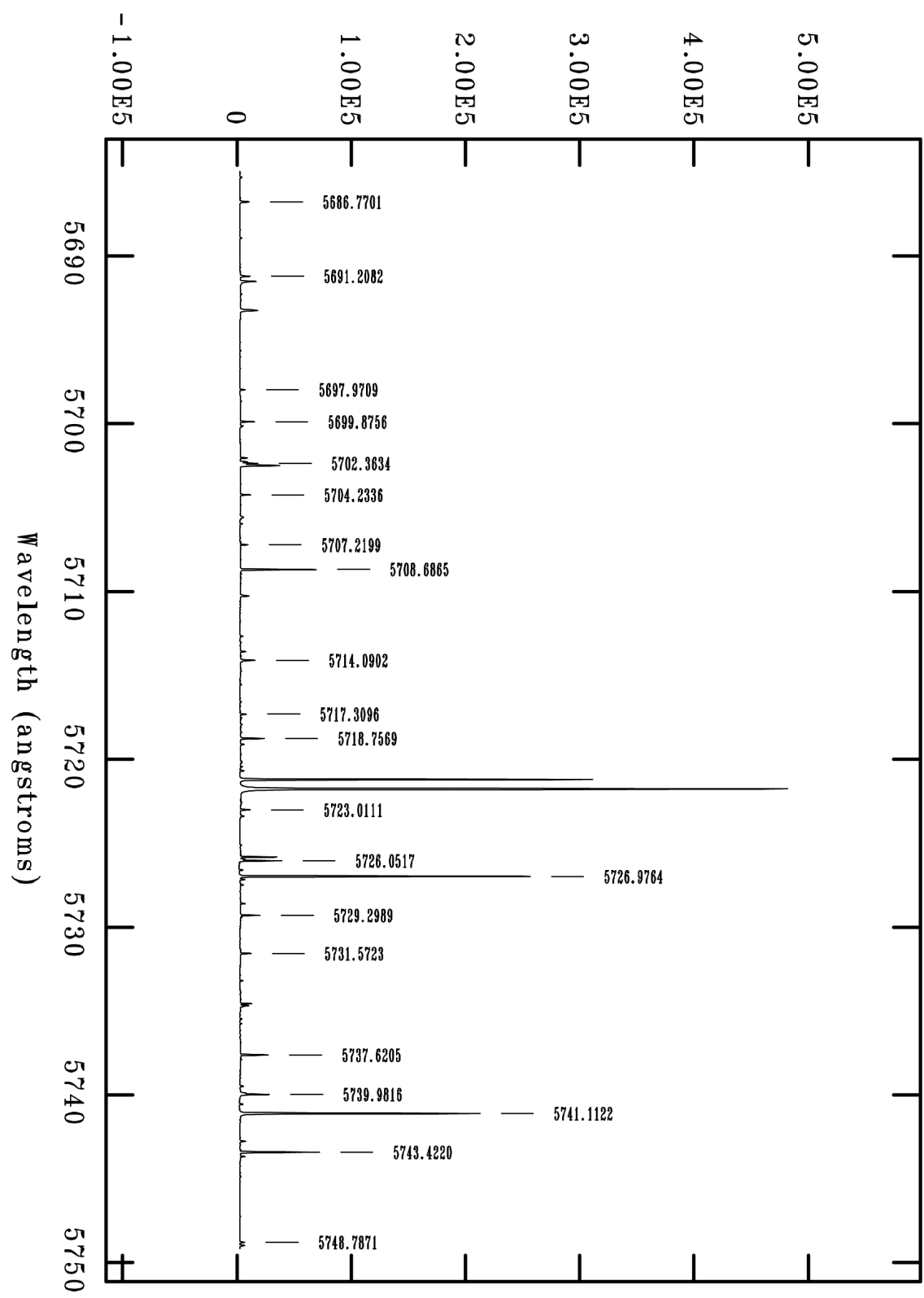
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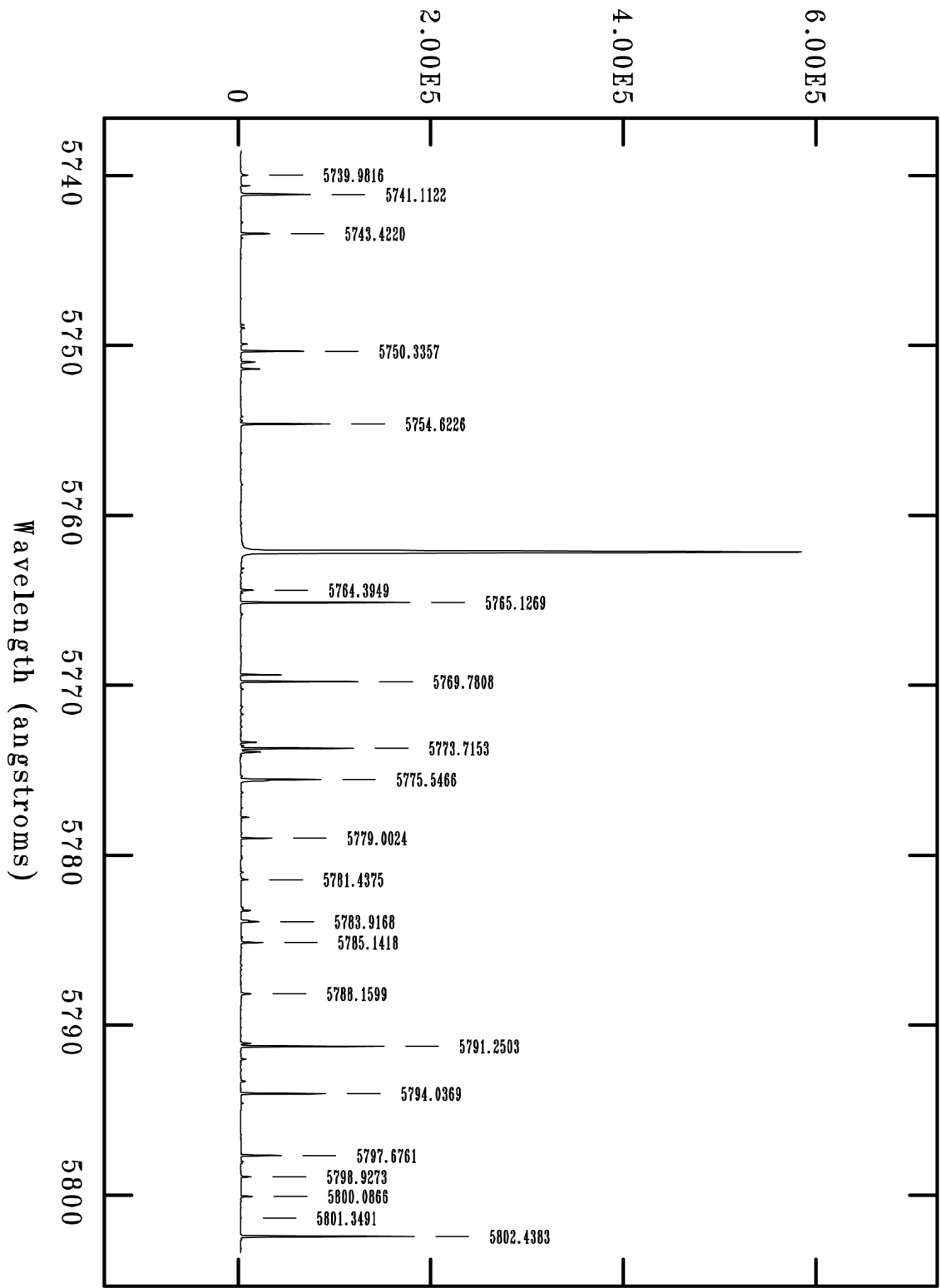
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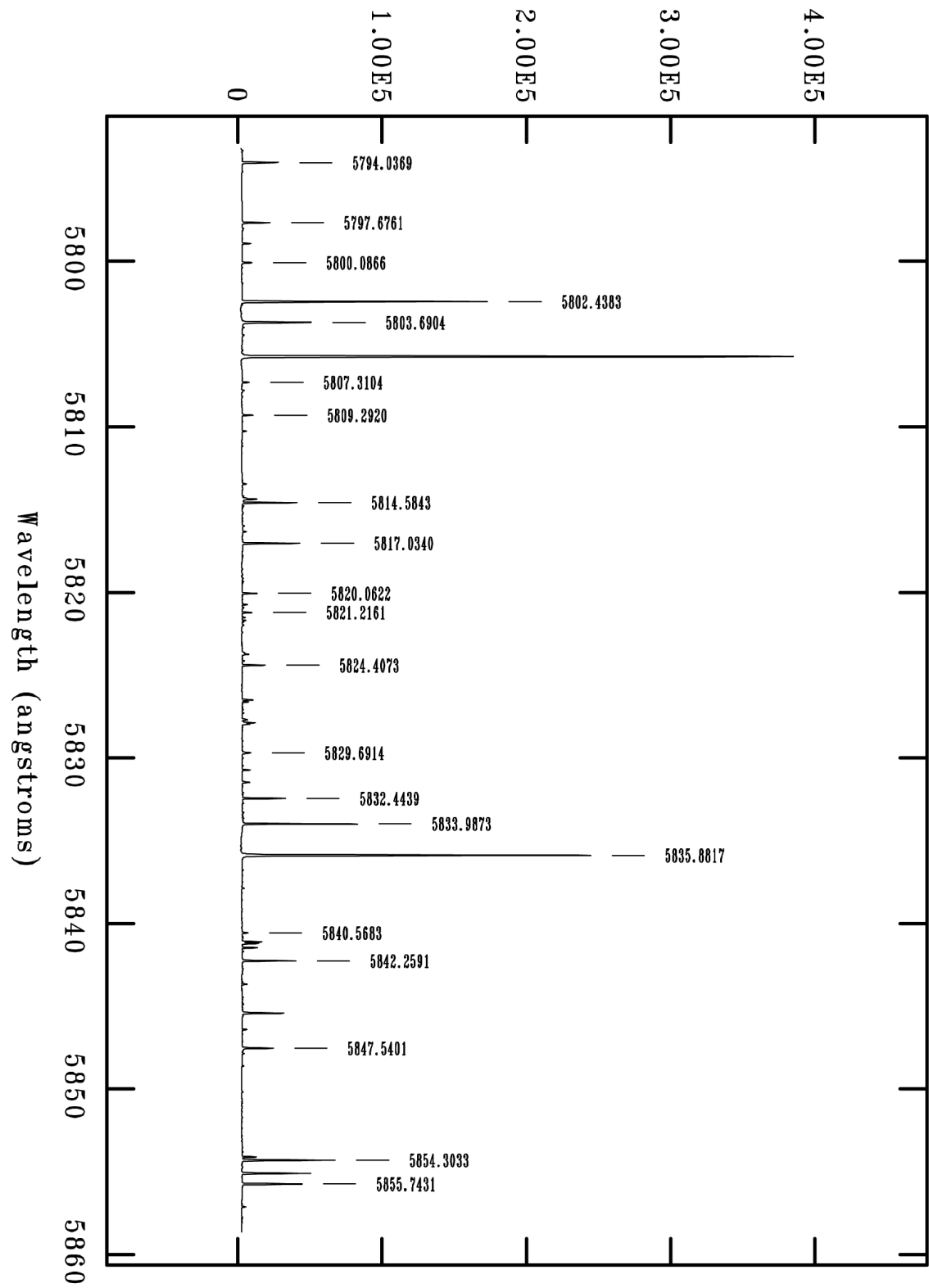
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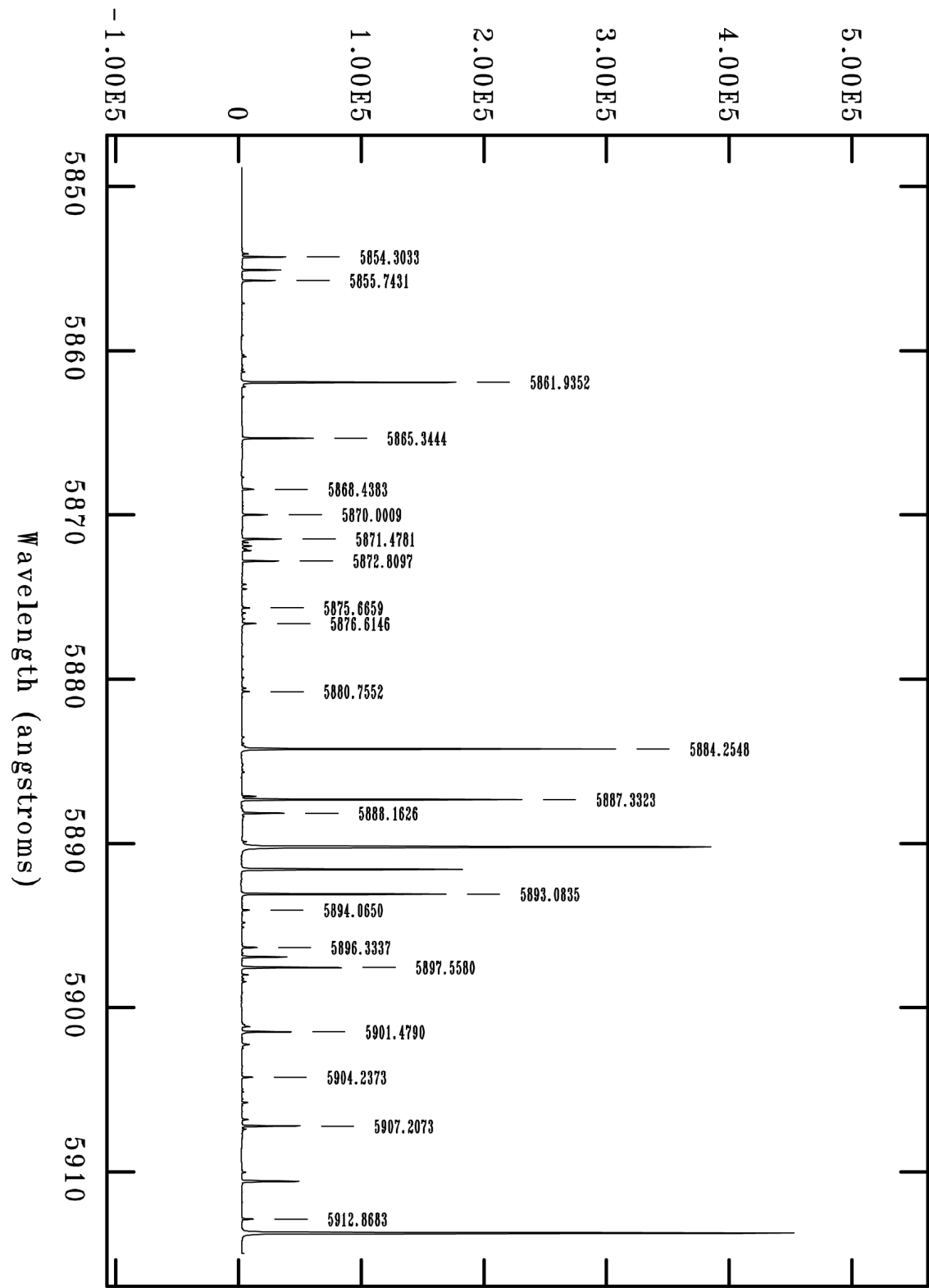
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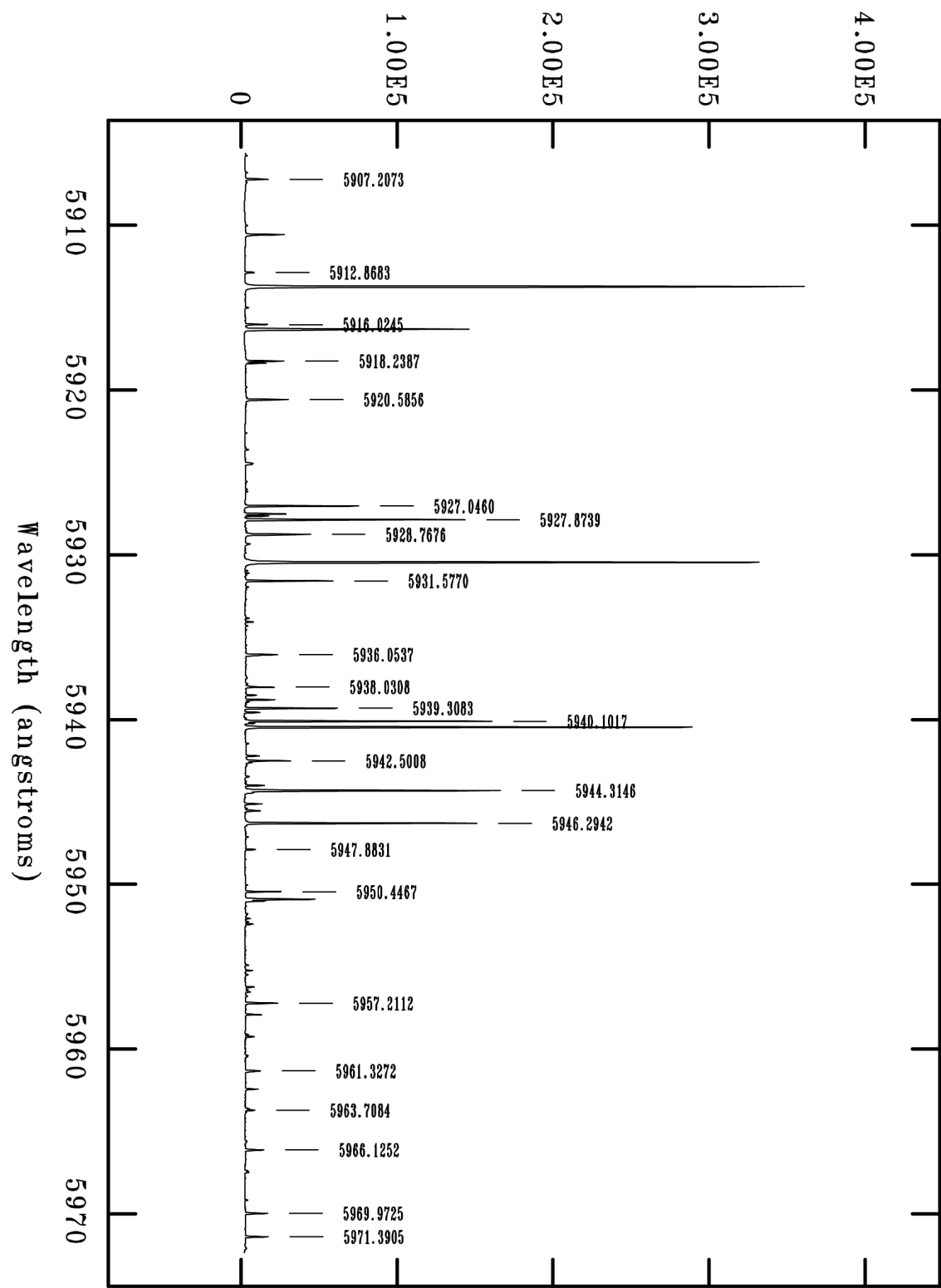
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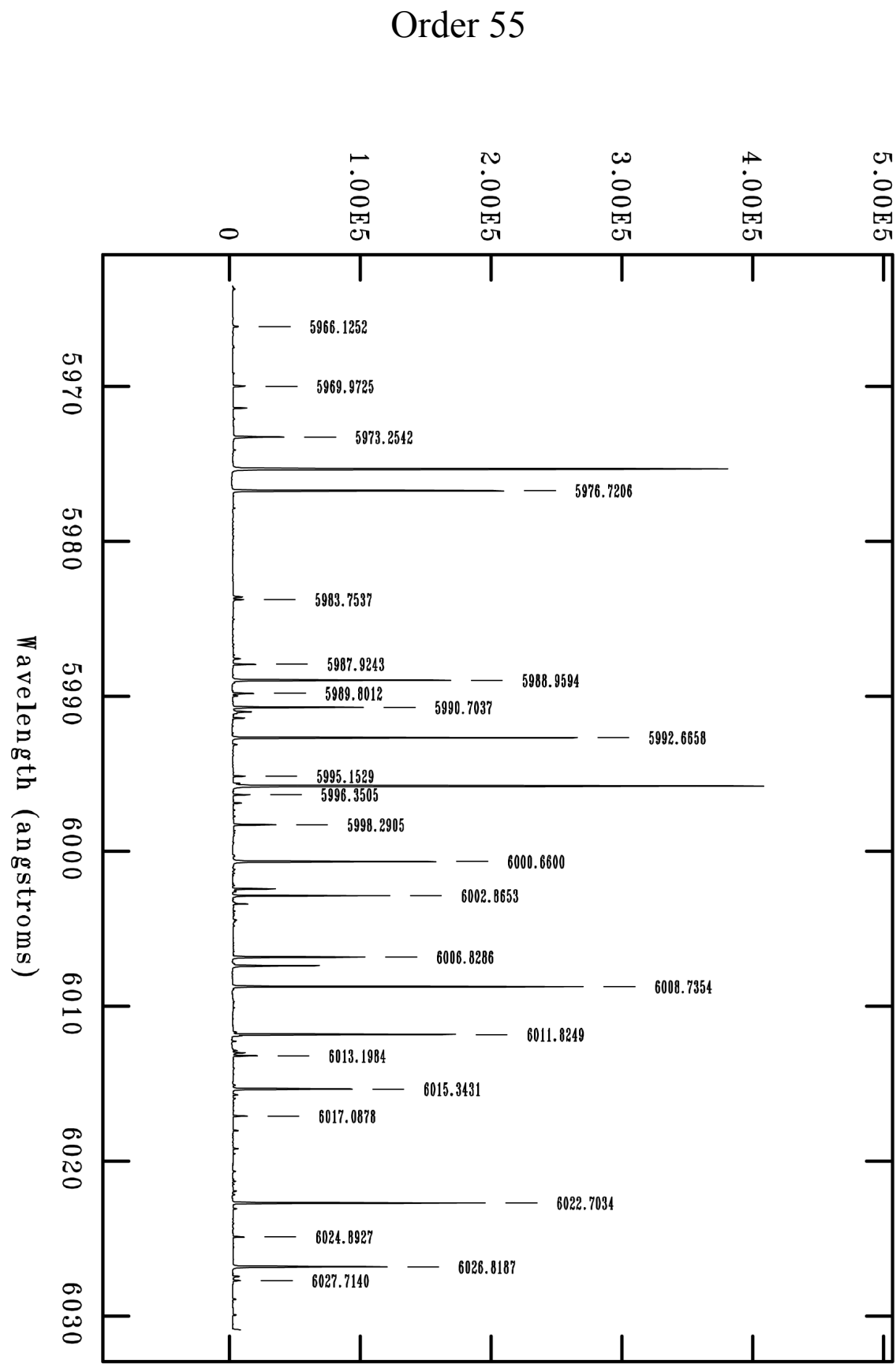


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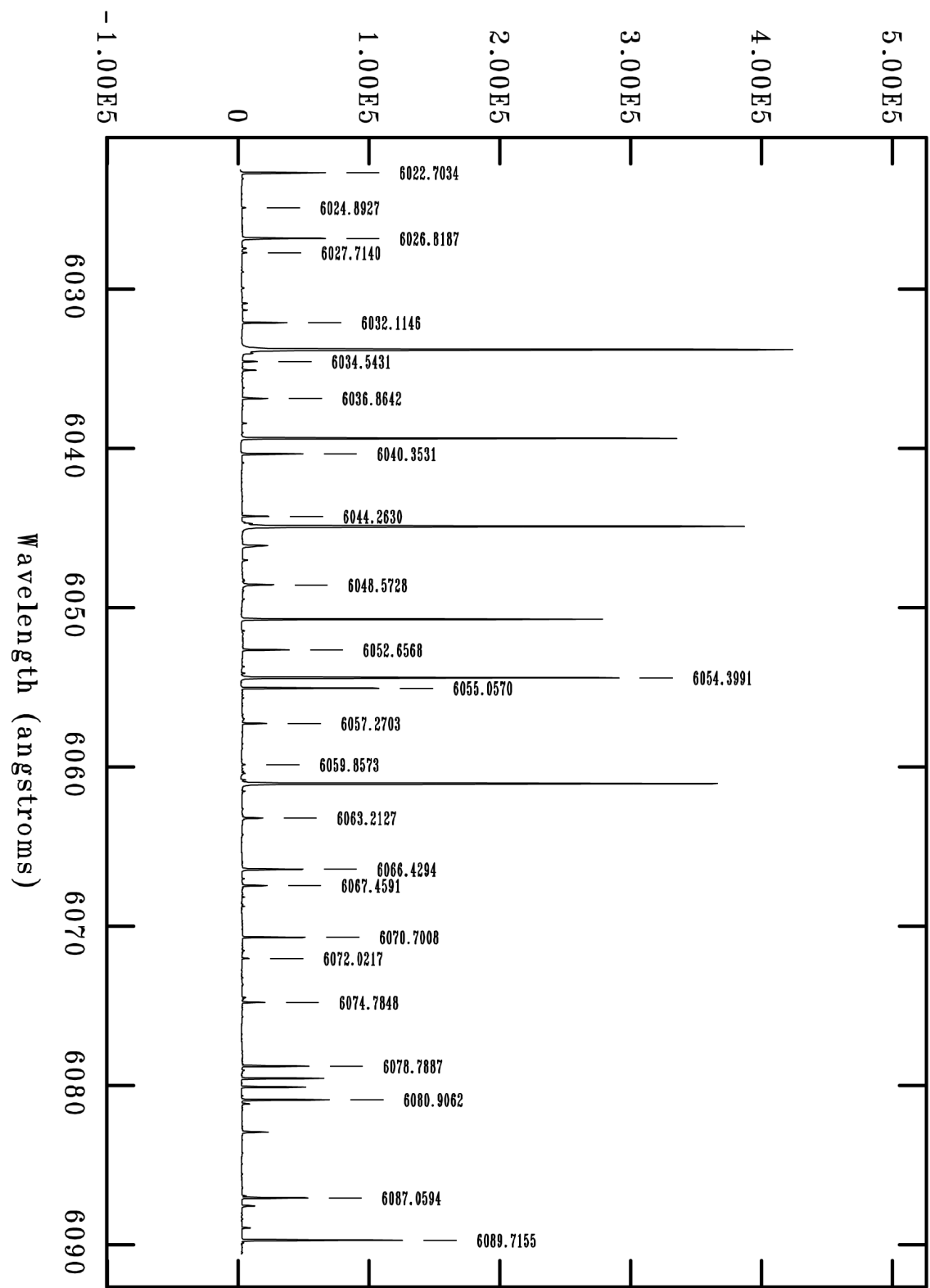


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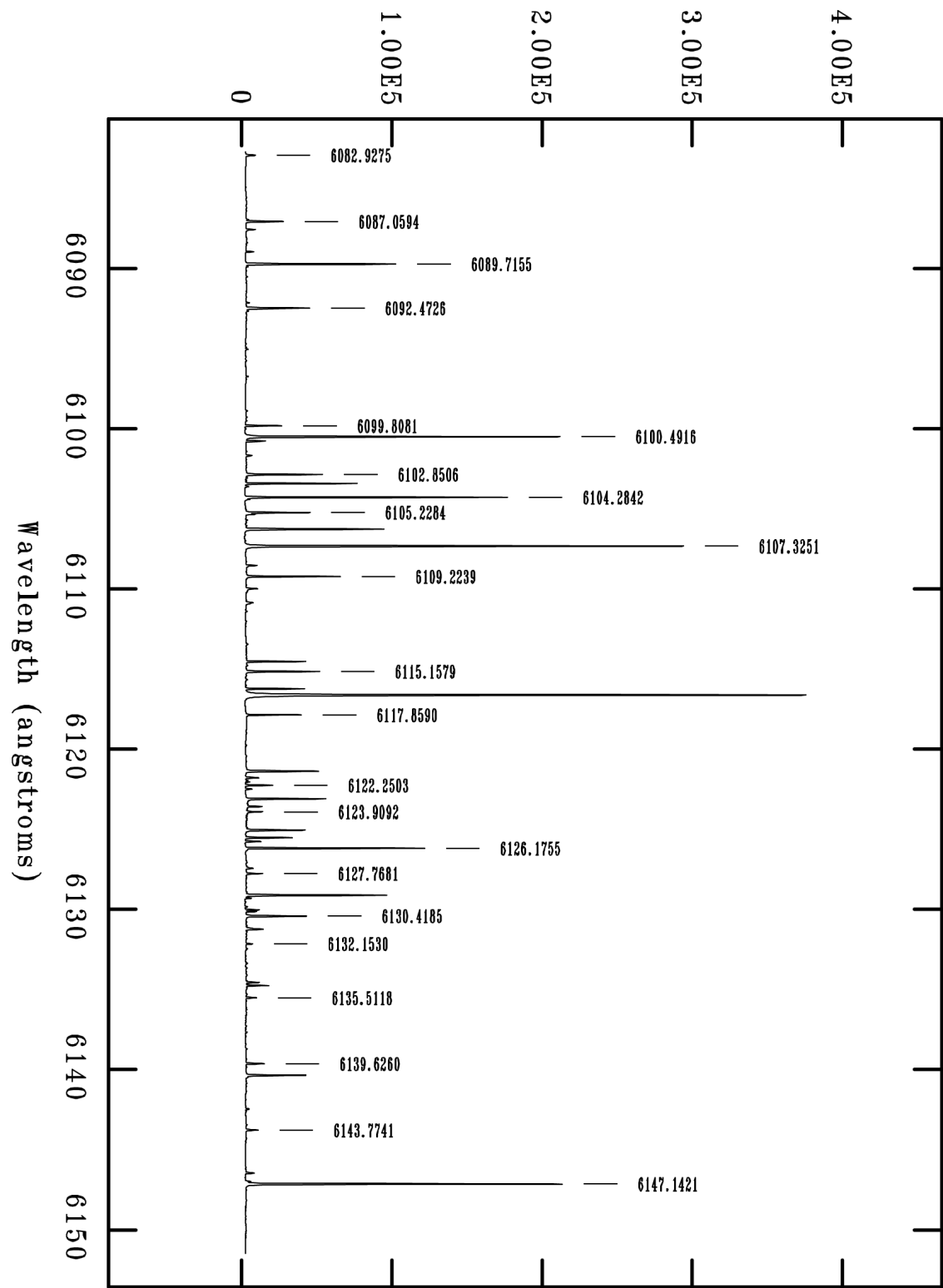


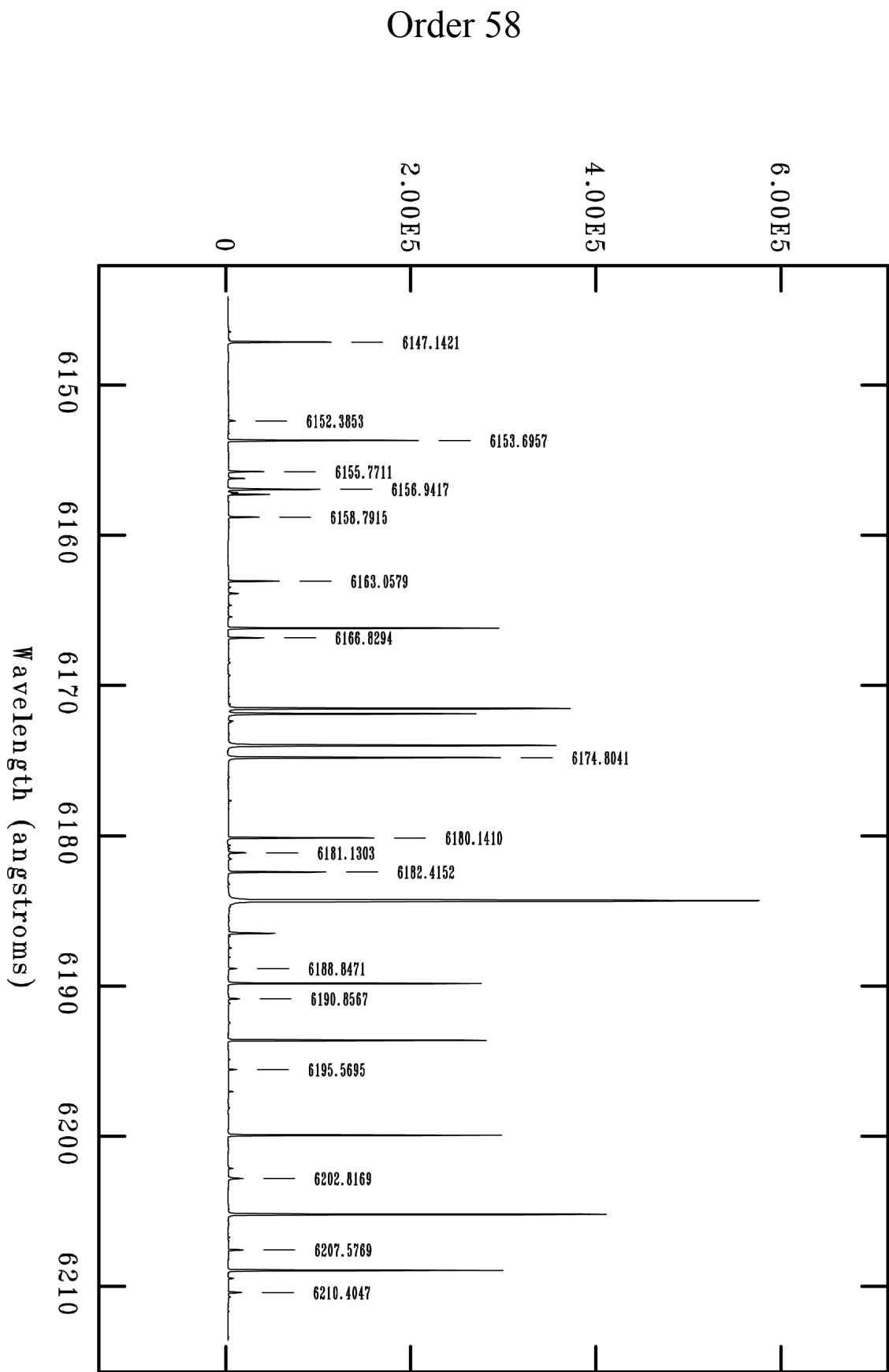


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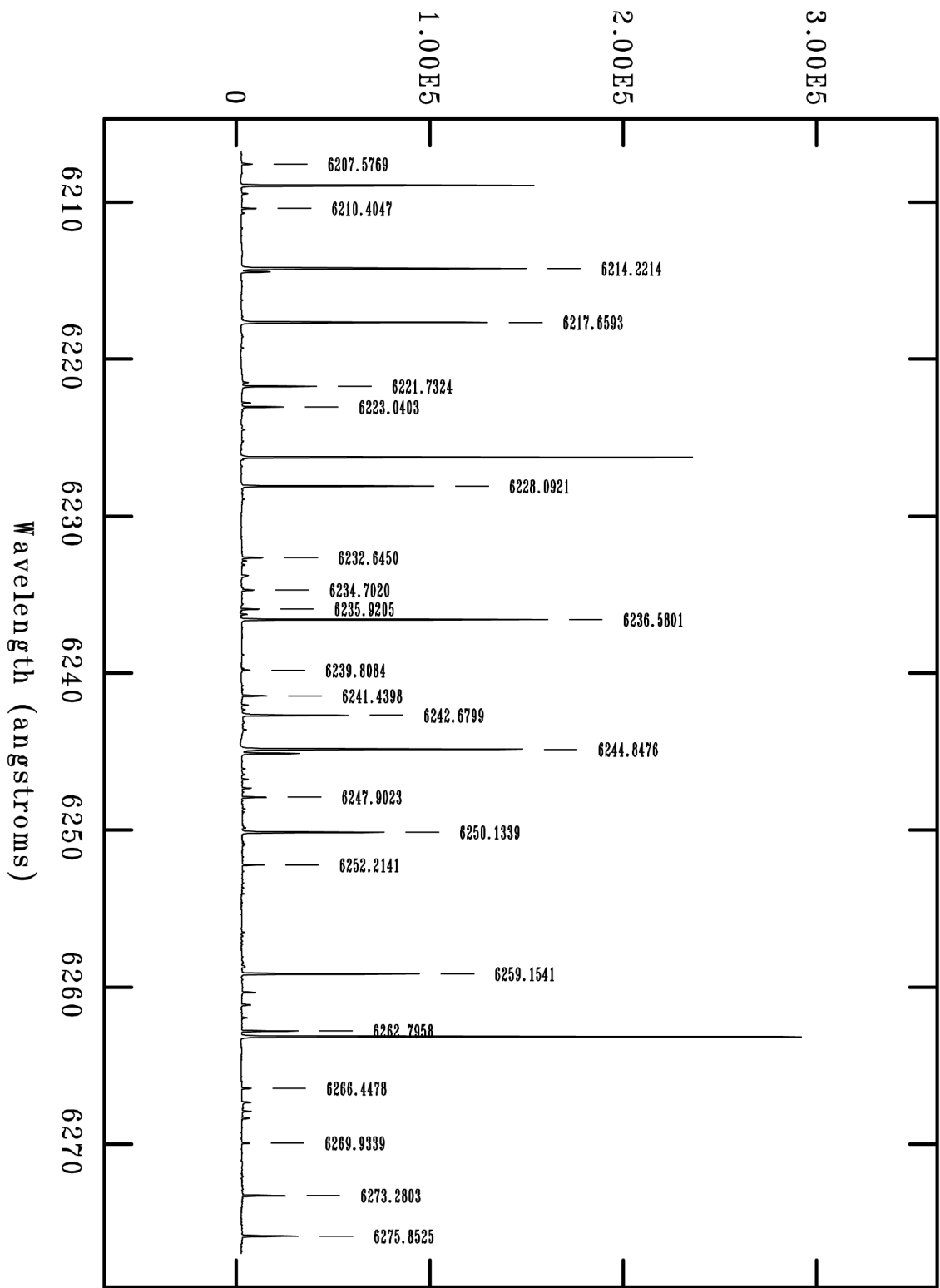


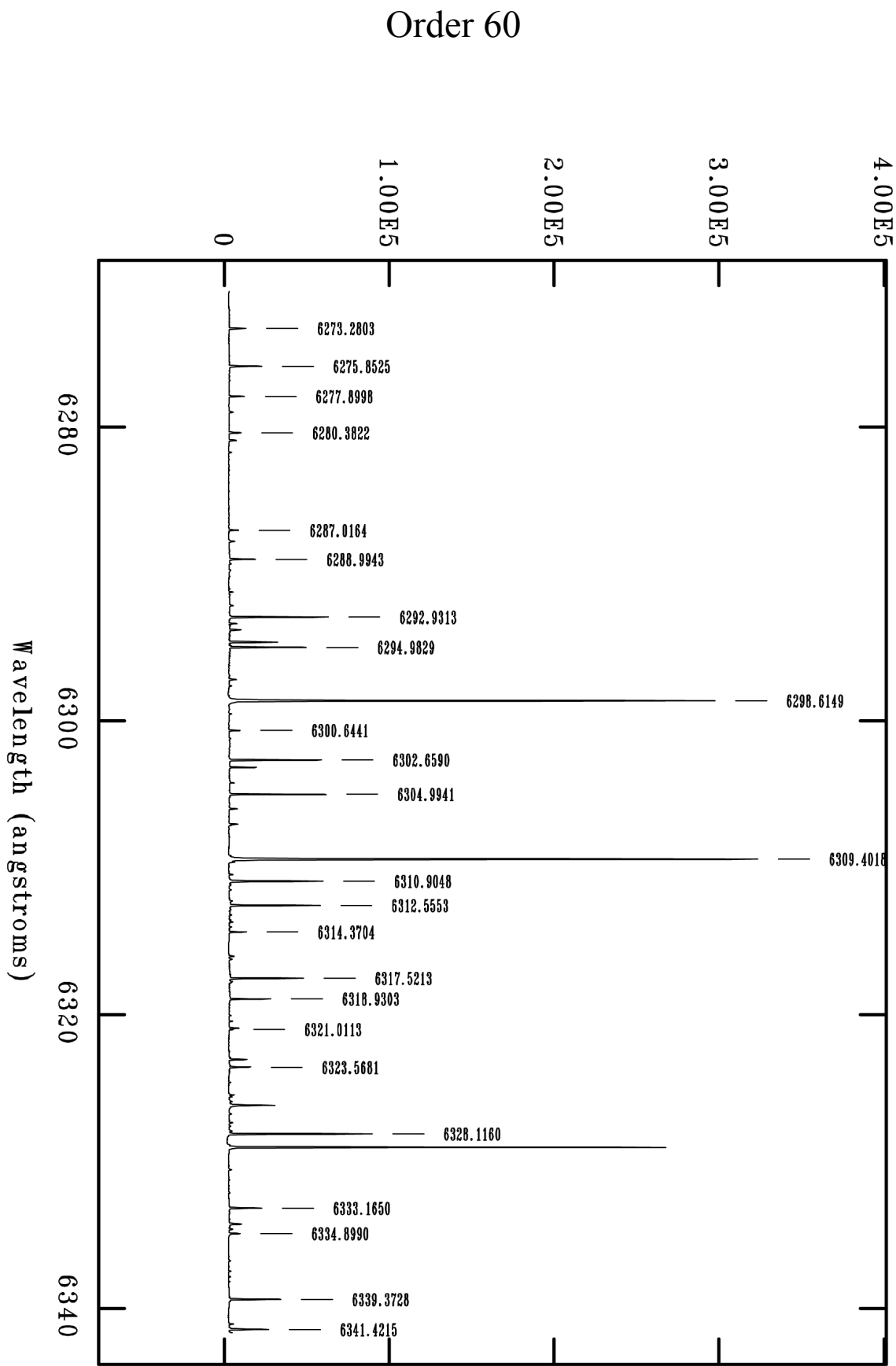
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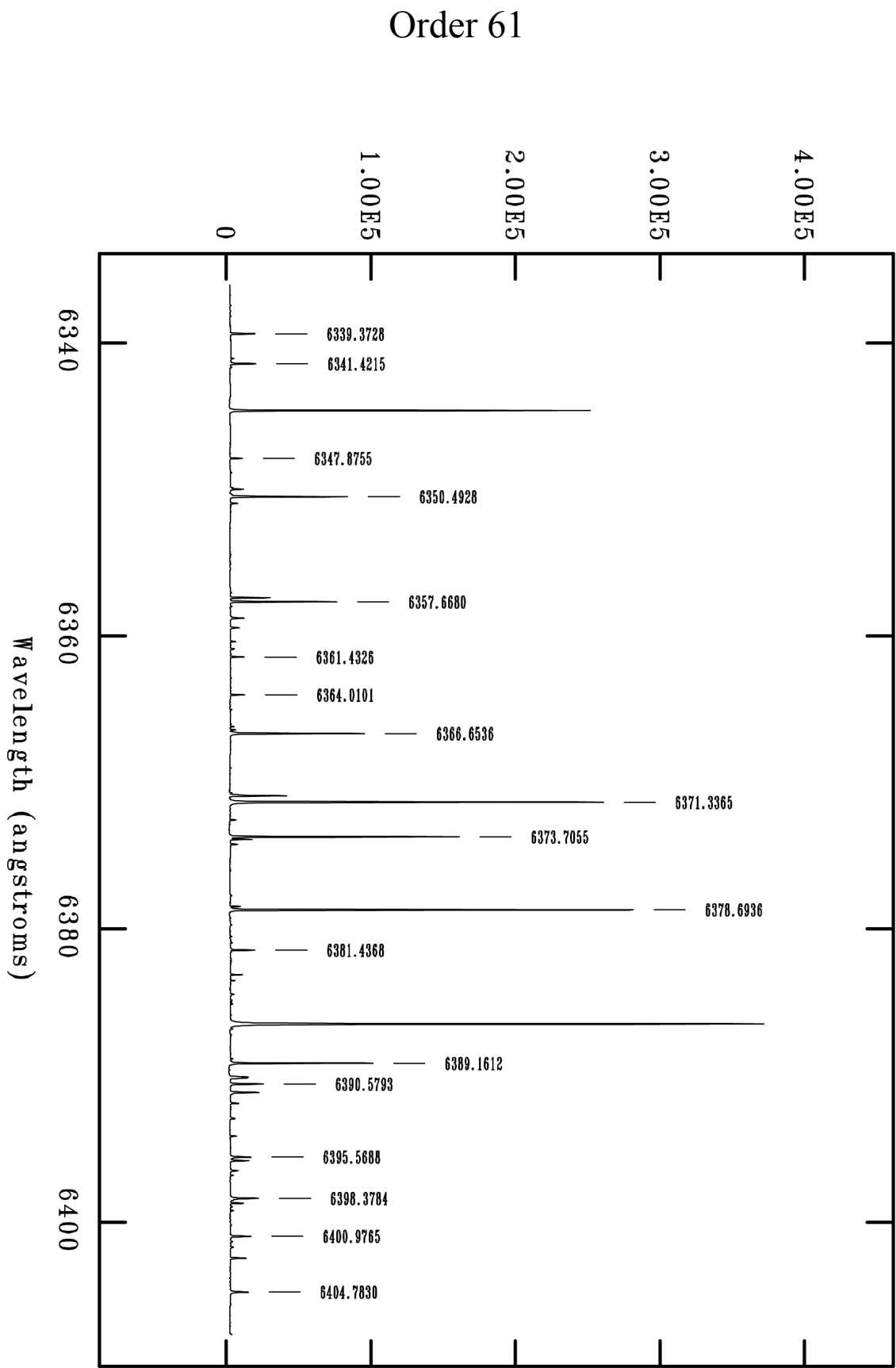




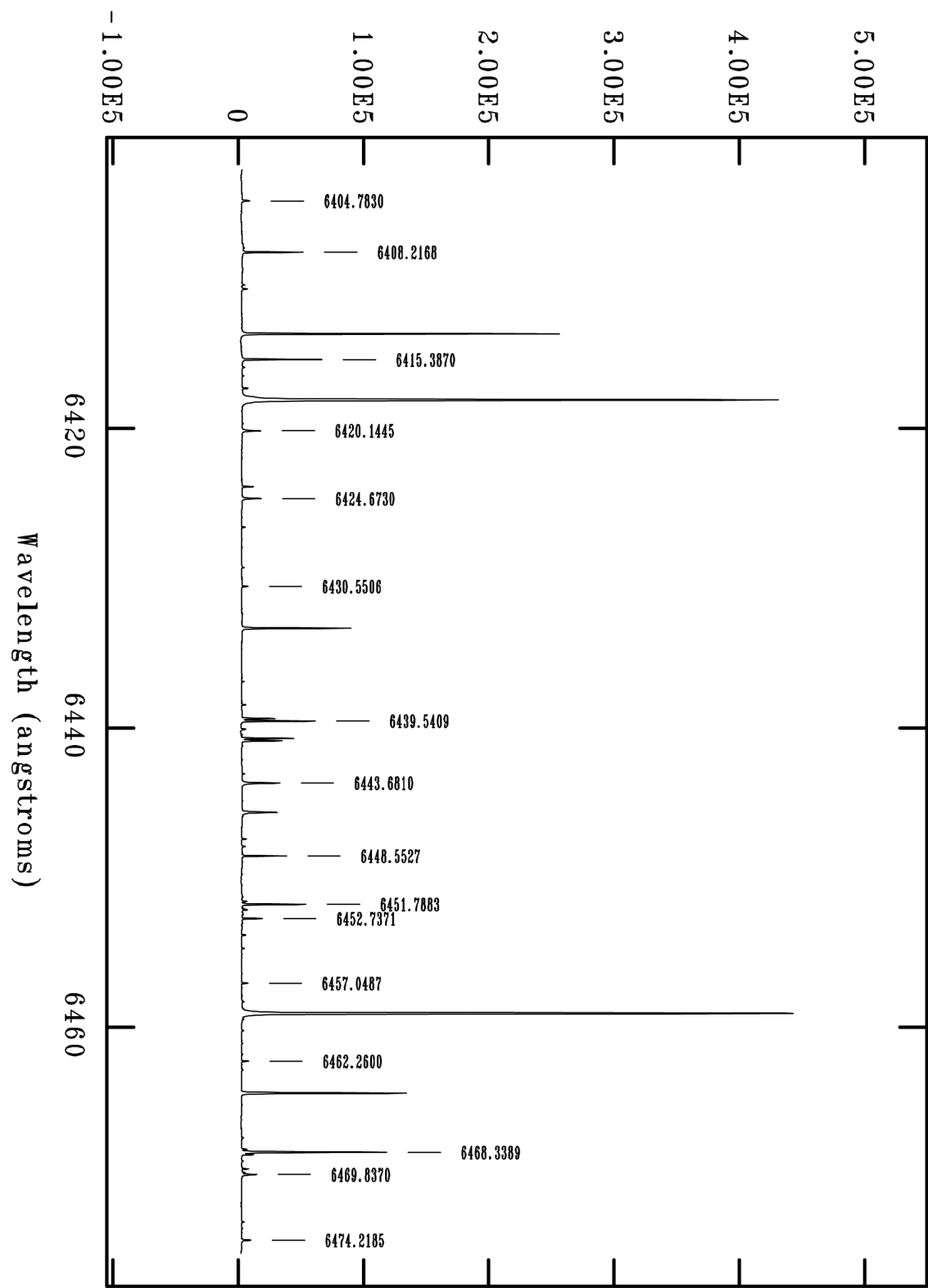
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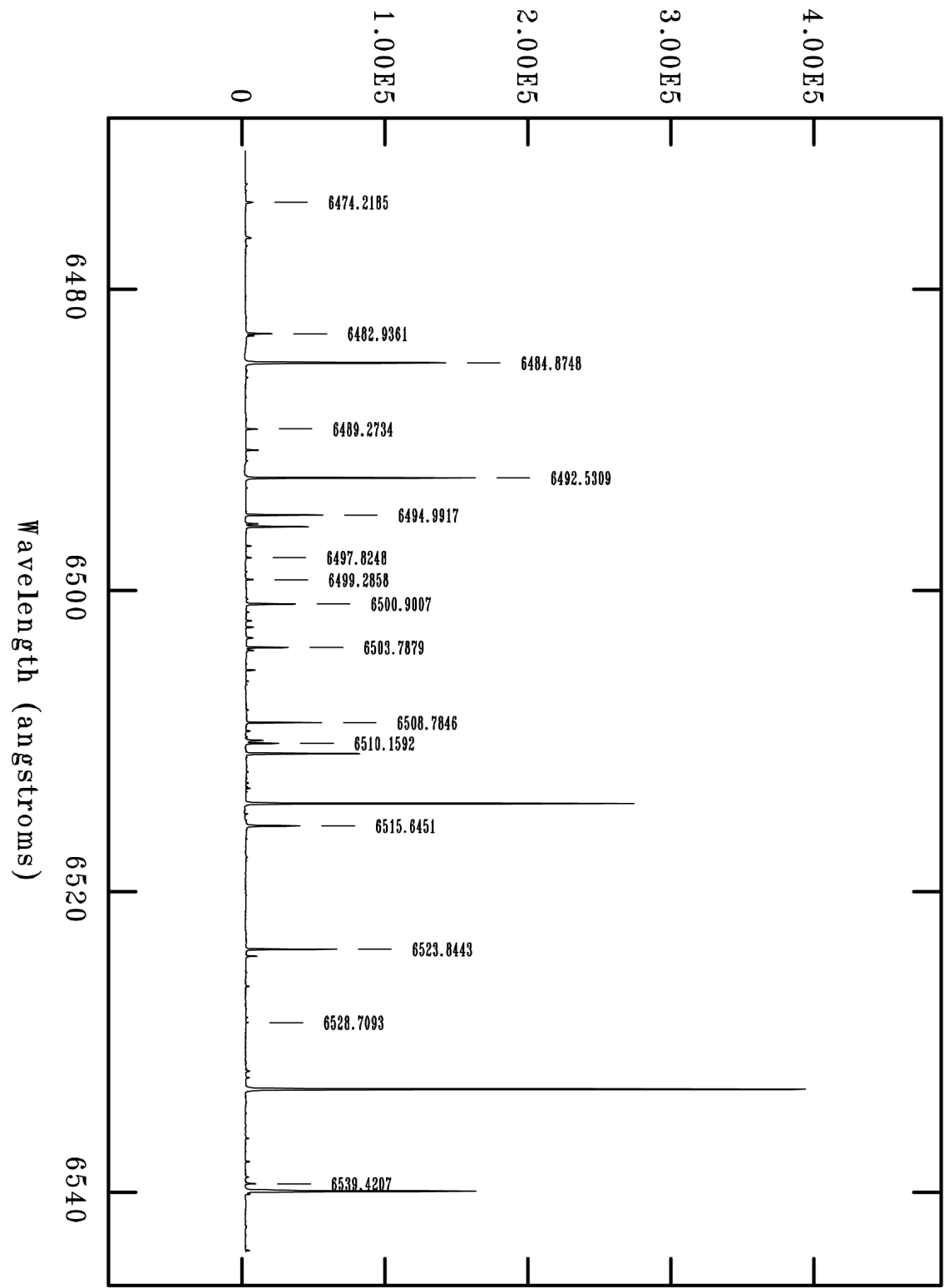




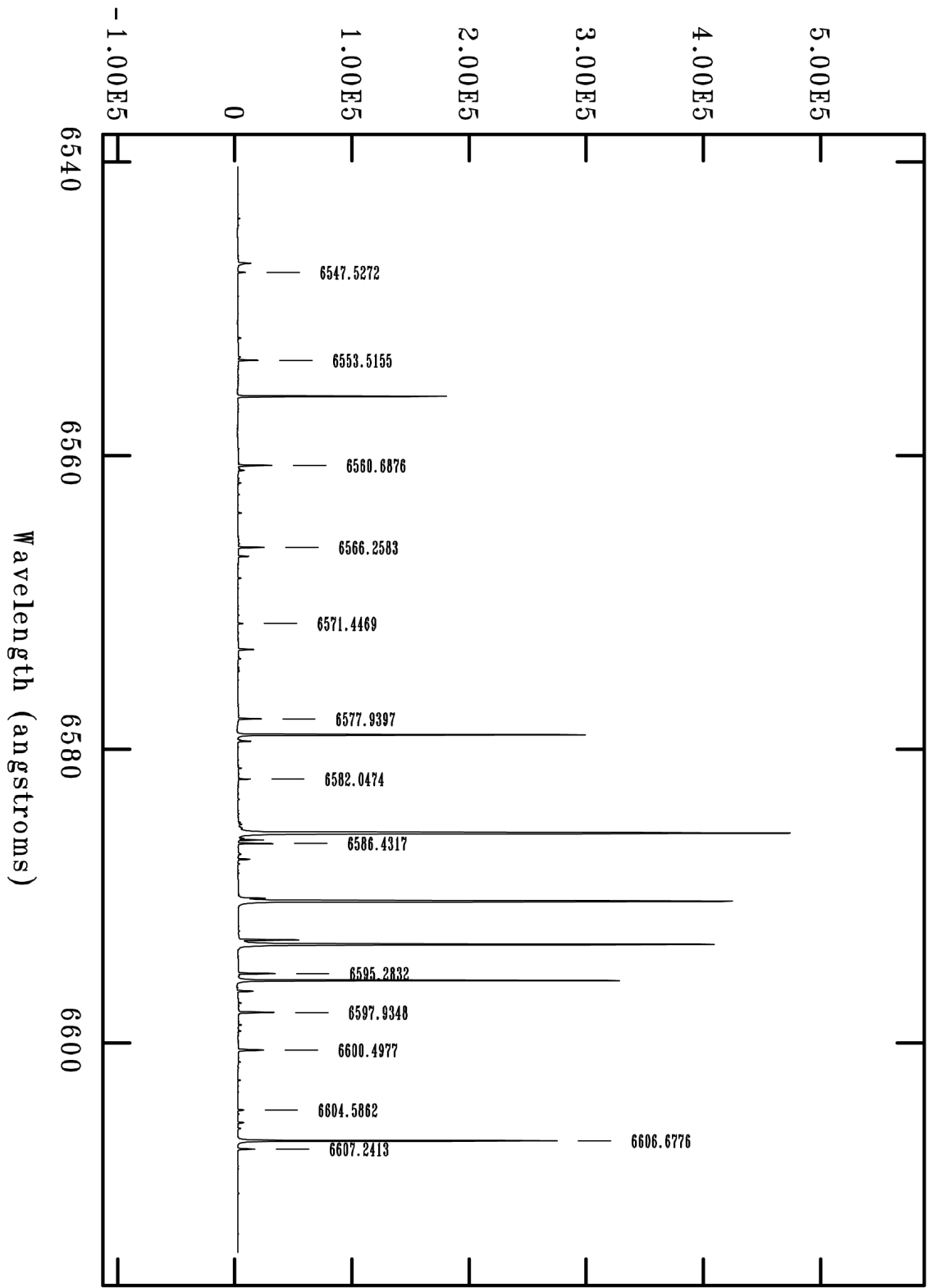
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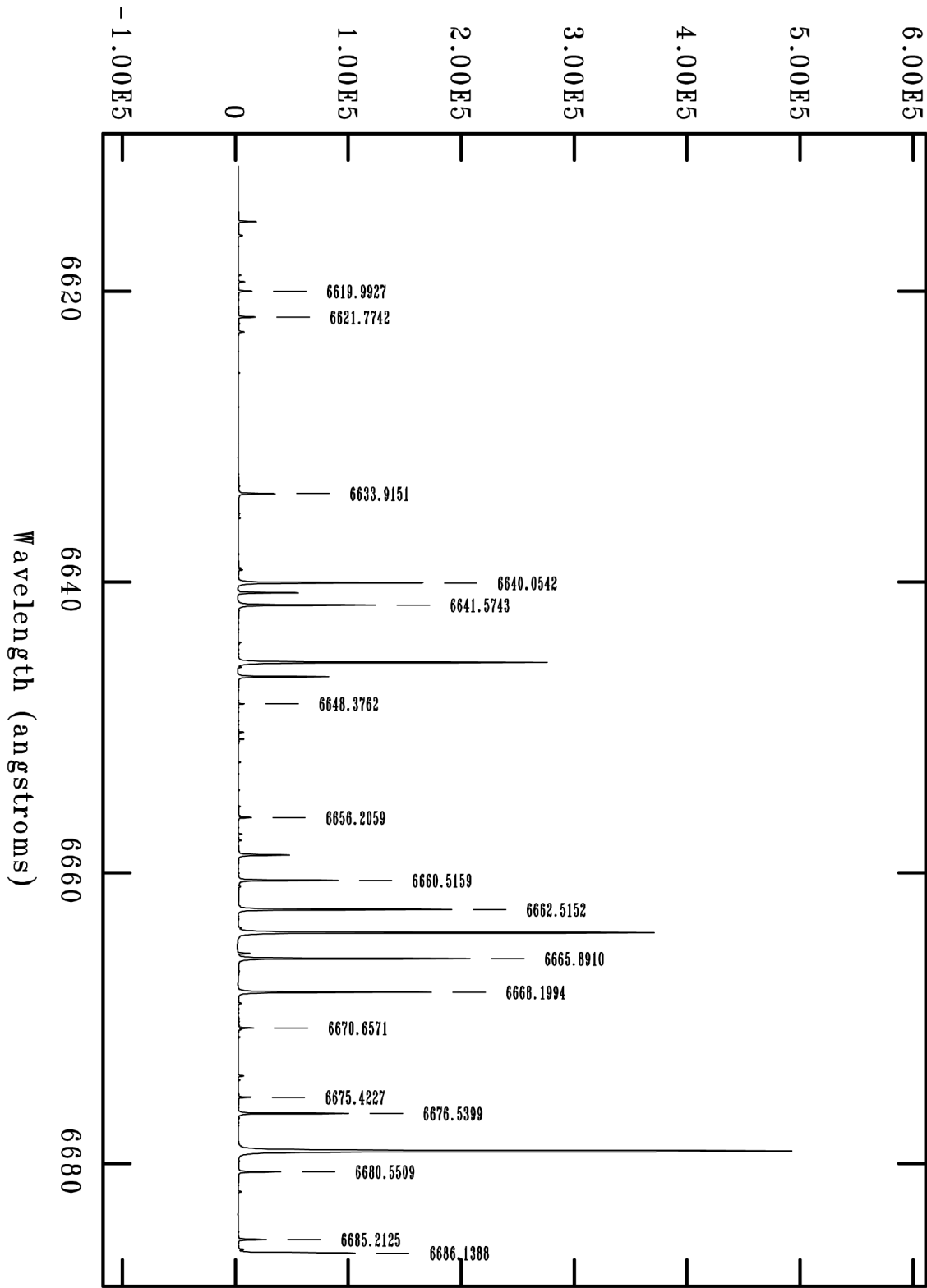
Order 63



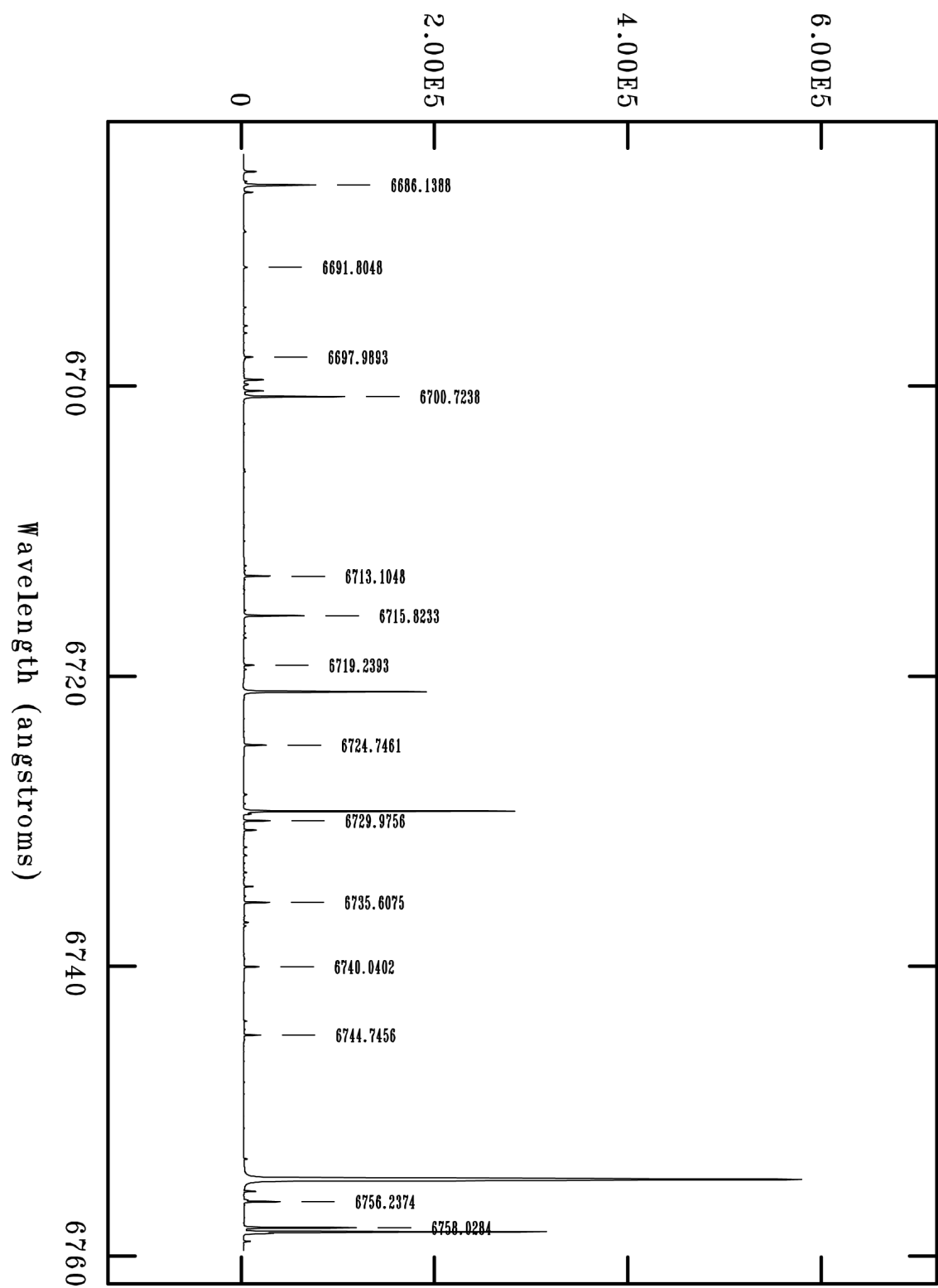
Order 64



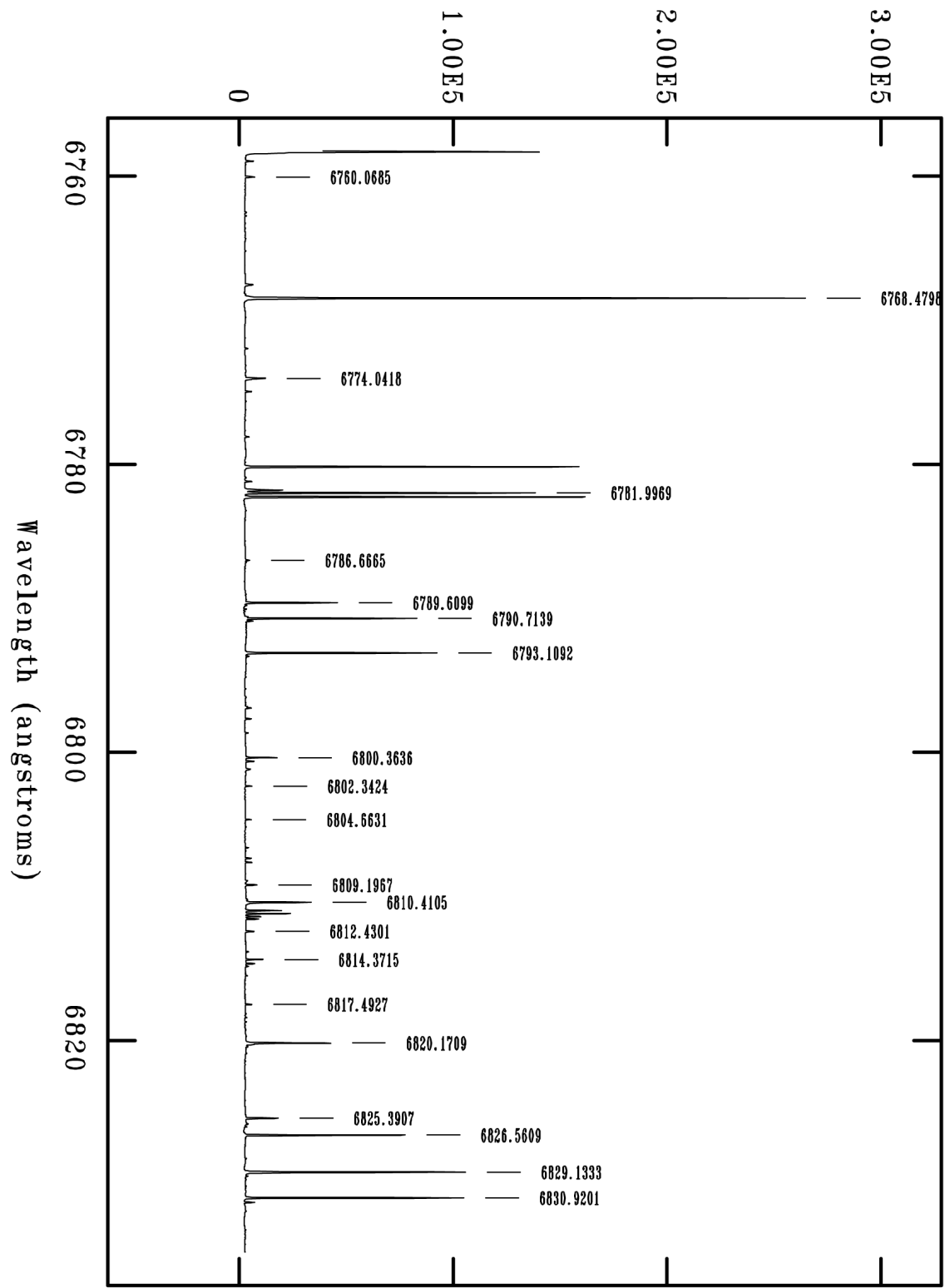
Order 65



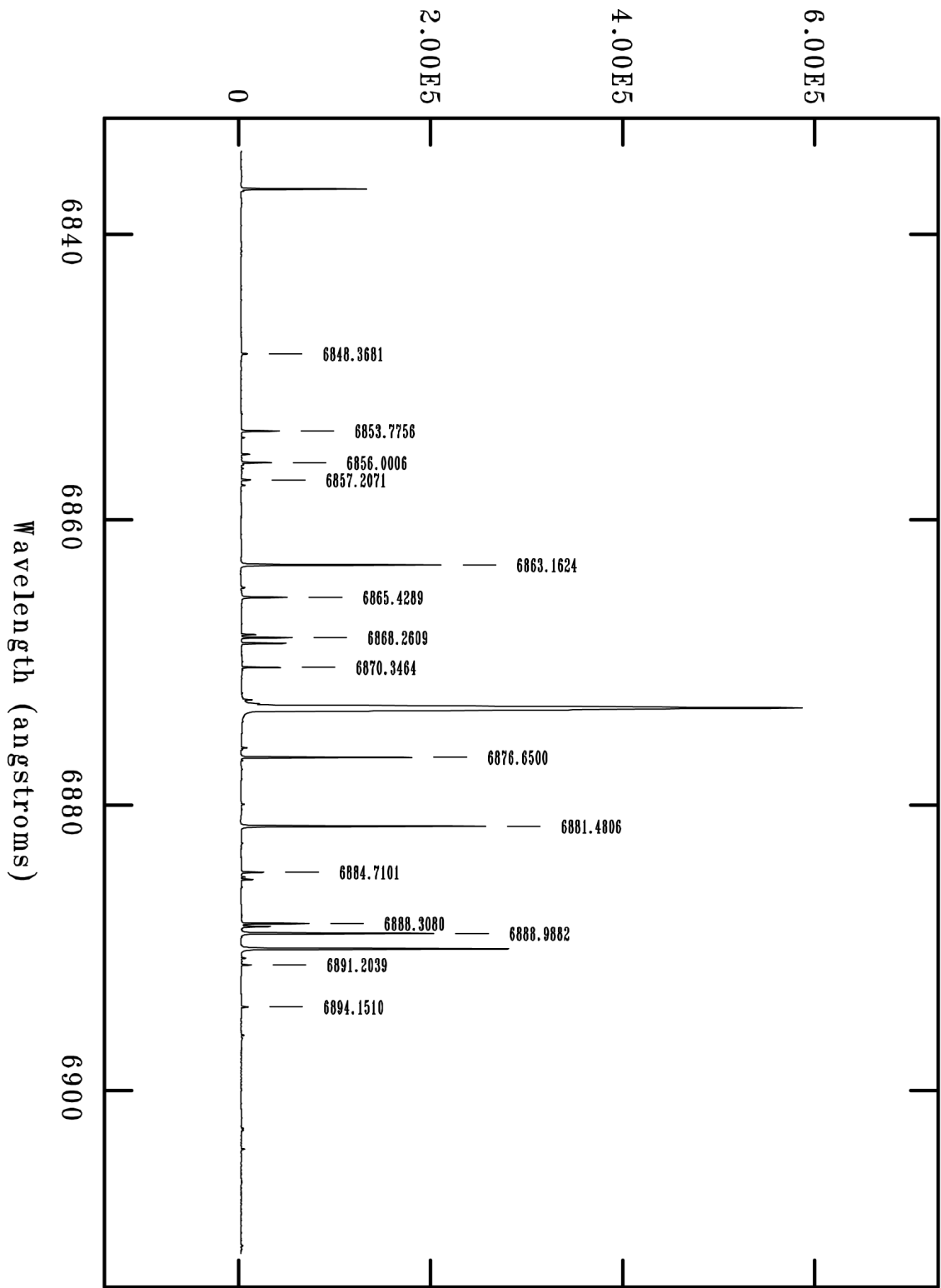
Order 66



Order 67



Order 68



**Location (Order/Y) of notable absorption/emission lines
on HARPS-N spectra**

Name	λ_{AIR} (Å)	λ_{VACUUM} (Å)	Order / Y (pix)
Ca II - H	3933.66	3934.77	01/963 02/3312
Ca II - K	3968.47	3969.59	03/2507
H δ	4101.78	4102.94	08/2491
H γ	4340.51	4341.73	16/1984
H β	4861.38	4862.74	31/1652
[O III]	4958.91	4960.29	33/83 34/3159
[O III]	5006.84	5008.24	35/2659
[N II]	6548.05	6549.86	64/3650
H α	6562.89	6564.70	64/2897
[N II]	6583.45	6585.27	64/1778
[S II]	6716.44	6718.29	66/2410
[S II]	6730.82	6732.68	66/1625
Hg (sky line)	4358.33	4359.55	16/364 17/3053
Hg (sky line)	5460.74	5462.26	45/2201
[O I] (sky line)	5577.34	5578.89	47/1017
Na - D2 (sky line)	5889.95	5891.58	53/1615
Na - D1 (sky line)	5895.92	5897.55	53/1224
[O I] (sky line)	6300.30	6302.04	60/2458
[O I] (sky line)	6363.78	6365.54	61/2576
? (sky line)	6863.96	6865.85	68/2582

on HARPS-N spectra

