

System-Plots/3C263\_z=0.140756\_sys\_plot.png

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Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
Si III	$-18 \pm 8$	$35 \pm 11$	$12.39 \pm 0.09$
C IV	$-10 \pm 3$	$33 \pm 0$	$13.71 \pm 0.04$
O VI	$0 \pm 2$	$26 \pm 4$	$13.63 \pm 0.04$
H I	$-14 \pm 1$	$87 \pm 10$	$13.49 \pm 0.06$
H I	$0 \pm 1$	$28 \pm 1$	$14.49 \pm 0.02$

$N(\text{H I})=13.49$

Excluding O VI :  $n_H = -3.88 \pm 0.04$        $Z = 1.06 \pm 0.05$   
Including O VI :  $n_H = -4.13 \pm 0.02$        $Z = 0.99 \pm 0.04$

Ionisation-Modelling-Plots/3c263-z=0.140756-compI.png

System-Plots/PKS0637-752\_z=0.161064\_sys\_plot.png

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Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
N V	$-42.0 \pm 6.0$	$40 \pm 9$	$13.37 \pm 0.07$
Si III	$11.0 \pm 4.0$	$30 \pm 7$	$12.37 \pm 0.06$
O VI	$0.0 \pm 3.0$	$48 \pm 5$	$14.02 \pm 0.03$
H I	$-13.0 \pm 2.0$	$162 \pm 21$	$13.6 \pm 0.06$
H I	$-1.0 \pm 1.0$	$45 \pm 1$	$15.01 \pm 0.02$

$N(\text{H I})=13.60$

Excluding O VI :  $n_H = -4.05 \pm 0.03$        $Z = 1.20 \pm 0.05$   
Including O VI :  $n_H = -4.12 \pm 0.01$        $Z = 1.30 \pm 0.04$

Ionisation-Modelling-Plots/pks0637-z=0.161064-compI.png

System-Plots/PKS0637-752\_z=0.417539\_sys\_plot.png

CT

Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
Si III	$-5.0 \pm 4.0$	$35 \pm 7$	$12.74 \pm 0.06$
C III	$-4.0 \pm 1.0$	$24 \pm 2$	$14.44 \pm 0.15$
O VI	$0.0 \pm 1.0$	$42 \pm 6$	$14.19 \pm 0.05$
H I	$-17.0 \pm 1.0$	$30 \pm 1$	$15.41 \pm 0.03$
H I	$20.0 \pm 1.0$	$46 \pm 4$	$14.61 \pm 0.07$

$N(\text{H I})=15.41$

Excluding O VI :  $n_H = -3.54 \pm 0.11$        $Z = -0.49 \pm 0.11$   
Including O VI :  $n_H = -3.74 \pm 0.02$        $Z = -0.23 \pm 0.04$

NOTE : MCMC walkers initialised near the solution for excluding O VI case.

Ionisation-Modelling-Plots/pks0637-z=0.417539-compI.png

System-Plots/PG1424+240\_z=0.147104\_sys\_plot.png

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Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
C IV	-81.0 ± 2.0	11 ± 4	13.58 ± 0.09
C IV	-18.0 ± 2.0	20 ± 3	14.06 ± 0.05
Si III	-78.0 ± 2.0	15 ± 3	12.58 ± 0.05
Si III	-9.0 ± 1.0	16 ± 2	12.87 ± 0.03
Si IV	-82.0 ± 4.0	13 ± 7	12.69 ± 0.1
Si IV	-11.0 ± 2.0	11 ± 5	12.88 ± 0.07
O VI	-56.0 ± 9.0	39 ± 13	13.77 ± 0.11
O VI	4.0 ± 4.0	16 ± 6	13.73 ± 0.11
H I	-454.0 ± 3.0	27 ± 5	13.16 ± 0.05
H I	-87.0 ± 3.0	23 ± 2	14.88 ± 0.05
H I	0.0 ± 3.0	29 ± 2	15.44 ± 0.14
H I	216.0 ± 2.0	40 ± 3	13.49 ± 0.02

N(H I)=15.44

Excluding O VI :  $n_H = -3.81 \pm 0.03$        $Z = -0.46 \pm 0.03$   
Including O VI :  $n_H = -3.88 \pm 0.02$        $Z = -0.42 \pm 0.02$

N(H I)=14.88

Excluding O VI :  $n_H = -3.74 \pm 0.05$        $Z = -0.22 \pm 0.04$   
Including O VI :  $n_H = -3.96 \pm 0.03$        $Z = -0.07 \pm 0.04$



Ionisation-Modelling-Plots/pg1424-z=0.147104-compIII.png

Figure 1:  $N(\text{H I})=15.44$

Ionisation-Modelling-Plots/pg1424-z=0.147104-compII.png

Figure 2:  $N(\text{H I})=14.88$

System-Plots/PG0003+158\_z=0.386089\_sys\_plot.png

Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
O III	$-18.0 \pm 2.0$	$9 \pm 5$	$13.93 \pm 0.08$
C III	$-11.0 \pm 1.0$	$13 \pm 2$	$13.35 \pm 0.05$
N V	$-7.0 \pm 1.0$	$33 \pm 11$	$13.49 \pm 0.11$
O VI	$0.0 \pm 2.0$	$25 \pm 3$	$13.87 \pm 0.04$
O VI	$54.0 \pm 3.0$	$25 \pm 4$	$13.71 \pm 0.06$
H I	$-10.0 \pm 1.0$	$29 \pm 0$	$14.81 \pm 0.03$
H I	$40.0 \pm 9.0$	$40 \pm 4$	$14.1 \pm 0.05$

$N(\text{H I})=14.81$

Excluding O VI :  $n_H = -4.12 \pm 0.06$        $Z = -0.65 \pm 0.04$   
Including O VI :  $n_H = -4.07 \pm 0.02$        $Z = -0.68 \pm 0.03$

Ionisation-Modelling-Plots/pg0003-z=0.386089-compI.png

System-Plots/PG0003+158\_z=0.421923\_sys\_plot.png

Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
C III	$-9.0 \pm 1.0$	$13 \pm 1$	$13.35 \pm 0.04$
O III	$-1.0 \pm 2.0$	$7 \pm 5$	$13.83 \pm 0.13$
O VI	$0.0 \pm 1.0$	$27 \pm 1$	$14.27 \pm 0.02$
H I	$-272.0 \pm 6.0$	$66 \pm 10$	$13.37 \pm 0.05$
H I	$-16.0 \pm 1.0$	$64 \pm 3$	$14.17 \pm 0.04$
H I	$-2.0 \pm 1.0$	$26 \pm 1$	$14.71 \pm 0.02$

$N(\text{H I})=14.17$

Excluding O VI :  $n_H = -2.66 \pm 0.22$        $Z = 0.42 \pm 0.23$

Including O VI :  $n_H = -4.24 \pm 0.02$        $Z = -0.09 \pm 0.03$

NOTE : Convergence is not good for excluding O VI case

Ionisation-Modelling-Plots/pg0003-z=0.421923-compII.png

System-Plots/PG1216+069\_z=0.282286\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	0.0 ± 1.0	14 ± 3	12.92 ± 0.05
C III	-51.0 ± 3.0	32 ± 5	13.33 ± 0.05
C III	5.0 ± 1.0	16 ± 2	13.76 ± 0.07
O VI	-64.0 ± 6.0	58 ± 9	13.93 ± 0.05
O VI	19.0 ± 2.0	12 ± 5	13.54 ± 0.09
H I	-31.0 ± 1.0	52 ± 3	15.1 ± 0.05
H I	7.0 ± 1.0	22 ± 1	16.4 ± 0.03
H I	169.0 ± 22.0	53 ± 10	13.15 ± 0.18

N(H I)=15.10

Excluding O VI :  $n_H = -2.13 \pm 0.15$        $Z = 0.65 \pm 0.22$   
Including O VI :  $n_H = -3.86 \pm 0.02$        $Z = -0.37 \pm 0.03$

NOTE : Convergence is not much good for excluding O VI case

N(H I)=16.40

Excluding O VI :  $n_H = -2.08 \pm 0.43$        $Z = -0.37 \pm 0.59$   
Including O VI :  $n_H = -3.68 \pm 0.02$        $Z = -1.55 \pm 0.04$

NOTE : Convergence is not much good for excluding O VI case

Ionisation-Modelling-Plots/pg1216-z=0.282286-compI.png

Figure 3:  $N(\text{H I})=15.10$

Ionisation-Modelling-Plots/pg1216-z=0.282286-compII.png

Figure 4:  $N(\text{H I})=16.40$



System-Plots/SDSSJ135712.61+170444\_z=0.097869\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-62.0 ± 2.0	17 ± 3	12.94 ± 0.05
Si III	4.0 ± 1.0	13 ± 10	14.67 ± 2.87
C IV	-74.0 ± 6.0	33 ± 1	13.82 ± 0.09
C IV	-7.0 ± 8.0	32 ± 12	13.63 ± 0.12
Si IV	-66.0 ± 4.0	18 ± 6	13.02 ± 0.08
Si IV	0.0 ± 4.0	29 ± 5	13.3 ± 0.05
C II	-79.0 ± 8.0	19 ± 14	13.17 ± 0.16
C II	-1.0 ± 2.0	22 ± 3	13.92 ± 0.04
O VI	-96.0 ± 10.0	43 ± 16	14.3 ± 0.11
H I	-536.0 ± 3.0	29 ± 5	13.36 ± 0.05
H I	-66.0 ± 0.0	29 ± 8	16.49 ± 0.12
H I	0.0 ± 0.0	46 ± 4	15.01 ± 0.16
H I	424.0 ± 3.0	34 ± 4	13.52 ± 0.04

N(H I)=16.49

Excluding O VI :  $n_H = -3.76 \pm 0.05$        $Z = -1.49 \pm 0.04$   
Including O VI :  $n_H = -4.06 \pm 0.02$        $Z = -1.32 \pm 0.04$

N(H I)=15.01

Excluding O VI :  $n_H = -3.25 \pm 0.04$        $Z = 0.93 \pm 0.04$   
Including O VI :  $n_H = -3.84 \pm 0.03$        $Z = 0.75 \pm 0.03$

NOTE : Using O VI column density from other component to compare.

Ionisation-Modelling-Plots/s135712-z=0.097869-compII.png

Figure 5:  $N(\text{H I})=16.49$

Ionisation-Modelling-Plots/s135712-z=0.097869-compIII.png

Figure 6:  $N(\text{H I})=15.01$

System-Plots/1ES1553+113\_z=0.187764\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
C III	-46.0 ± 1.0	5 ± 4	13.17 ± 0.46
C III	-6.0 ± 1.0	13 ± 2	13.21 ± 0.03
N V	-47.0 ± 2.0	17 ± 0	13.43 ± 0.05
N V	-5.0 ± 2.0	16 ± 4	13.33 ± 0.06
O VI	-42.0 ± 1.0	3 ± 1	14.23 ± 0.33
O VI	0.0 ± 1.0	15 ± 3	13.71 ± 0.03
O VI	511.0 ± 3.0	28 ± 5	13.49 ± 0.05
H I	-52.0 ± 3.0	8 ± 6	12.76 ± 0.15
H I	-28.0 ± 1.0	51 ± 1	13.88 ± 0.01
H I	425.0 ± 3.0	25 ± 5	13.02 ± 0.07
H I	496.0 ± 2.0	37 ± 3	13.46 ± 0.03

N(H I)=12.76

Excluding O VI :  $n_H = -4.62 \pm 0.04$        $Z = 1.37 \pm 0.06$   
Including O VI :  $n_H = -4.63 \pm 0.03$        $Z = 1.37 \pm 0.06$

NOTE : Reference metallicity at log Z = 1. Low N(H I), and error for column density for C III and O VI for component I were obtained from  $\chi^2$ , else they were large and convergence was not good. Nearly similar solution for both the cases.

N(H I)=13.88

Excluding O VI :  $n_H = -4.6 \pm 0.04$        $Z = 0.03 \pm 0.03$   
Including O VI :  $n_H = -4.44 \pm 0.02$        $Z = -0.06 \pm 0.02$

Ionisation-Modelling-Plots/1es1553-z=0.187764-compI.png

Figure 7:  $N(\text{H I})=12.76$

Ionisation-Modelling-Plots/1es1553-z=0.187764-compII.png

Figure 8:  $N(\text{H I})=13.88$

System-Plots/SBS1108+560\_z=0.463207\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
O I	25.0 ± 2.0	18 ± 4	14.13 ± 0.05
Si III	-23.0 ± 9.0	39 ± 12	13.26 ± 0.12
Si III	21.0 ± 2.0	13 ± 15	14.61 ± 0.24
C II	12.0 ± 9.0	31 ± 4	14.15 ± 0.05
C II	34.0 ± 2.0	12 ± 5	14.67 ± 0.1
C III	-48.0 ± 3.0	15 ± 1	13.66 ± 0.08
C III	-10.0 ± 3.0	26 ± 7	14.16 ± 0.07
C III	28.0 ± 3.0	24 ± 1	13.95 ± 0.05
N III	-22.0 ± 59.0	67 ± 61	13.77 ± 0.1
N III	32.0 ± 2.0	26 ± 4	14.49 ± 0.09
Si II	25.0 ± 1.0	15 ± 1	13.57 ± 0.08
O VI	0.0 ± 6.0	45 ± 10	13.71 ± 0.07
H I	-48.0 ± 0.0	22 ± 2	15.77 ± 0.02
H I	-10.0 ± 2.0	16 ± 0	15.79 ± 0.11
H I	28.0 ± 1.0	16 ± 1	18.1 ± 0.12

N(H I)=18.10

Excluding O VI :  $n_H = -1.88 \pm 0.03$        $Z = 1.07 \pm 0.04$

Including O VI :  $n_H = -2.83 \pm 0.02$        $Z = 0.89 \pm 0.03$

NOTE : Using O VI from other component to compare

N(H I)=15.79

Excluding O VI :  $n_H = -2.65 \pm 0.22$        $Z = 1.6 \pm 0.22$

Including O VI :  $n_H = -3.56 \pm 0.03$        $Z = 1.16 \pm 0.05$

NOTE : log Z is around 1 in both the components.



Ionisation-Modelling-Plots/sbs1108-z=0.463207-compIII.png

Figure 9:  $N(\text{H I})=18.10$

Ionisation-Modelling-Plots/sbs1108-z=0.463207-compII.png

Figure 10:  $N(\text{H I})=15.79$

System-Plots/PG1222+216\_z=0.378389\_sys\_plot.png

Ion	$v$ (km s <sup>-1</sup> )	$b$ (km s <sup>-1</sup> )	$\log [N \text{ cm}^{-2}]$
O III	$7.0 \pm 5.0$	$61 \pm 8$	$14.51 \pm 0.04$
Si III	$0.0 \pm 2.0$	$30 \pm 3$	$12.98 \pm 0.03$
C III	$-261.0 \pm 3.0$	$17 \pm 5$	$13.54 \pm 0.06$
C III	$-215.0 \pm 5.0$	$22 \pm 6$	$13.4 \pm 0.08$
C III	$0.0 \pm 2.0$	$32 \pm 3$	$13.79 \pm 0.02$
C III	$63.0 \pm 3.0$	$13 \pm 6$	$13.12 \pm 0.07$
O VI	$-439.0 \pm 3.0$	$28 \pm 5$	$13.42 \pm 0.06$
O VI	$-264.0 \pm 6.0$	$24 \pm 6$	$13.75 \pm 0.2$
O VI	$-223.0 \pm 14.0$	$34 \pm 13$	$13.68 \pm 0.24$
O VI	$-24.0 \pm 12.0$	$14 \pm 18$	$13.0 \pm 0.11$
O VI	$13.0 \pm 4.0$	$29 \pm 13$	$13.95 \pm 0.16$
O VI	$59.0 \pm 6.0$	$18 \pm 7$	$13.42 \pm 0.23$
H I	$-455.0 \pm 3.0$	$26 \pm 4$	$13.4 \pm 0.06$
H I	$-353.0 \pm 9.0$	$64 \pm 19$	$13.54 \pm 0.11$
H I	$-268.0 \pm 1.0$	$16 \pm 6$	$13.7 \pm 0.14$
H I	$-227.0 \pm 5.0$	$52 \pm 4$	$14.34 \pm 0.05$
H I	$-27.0 \pm 2.0$	$23 \pm 1$	$14.73 \pm 0.08$
H I	$31.0 \pm 2.0$	$43 \pm 1$	$15.43 \pm 0.04$

$N(\text{H I})=15.43$

Excluding O VI :  $n_H = -2.66 \pm 0.05$        $Z = 1.75 \pm 0.06$   
Including O VI :  $n_H = -3.16 \pm 0.03$        $Z = 1.34 \pm 0.02$

Ionisation-Modelling-Plots/pg1222-z=0.378389-compVI.png

System-Plots/PG1116+215\_z=0.138527\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
N V	-7.0 ± 3.0	12 ± 6	12.84 ± 0.09
N II	-5.0 ± 1.0	6 ± 3	13.62 ± 0.11
N II	33.0 ± 6.0	8 ± 13	12.85 ± 0.15
P II	-44.0 ± 5.0	19 ± 8	12.94 ± 0.09
Si II	-13.0 ± 0.0	9 ± 1	12.46 ± 0.06
Si II	13.0 ± 0.0	23 ± 3	12.31 ± 0.04
Si III	-9.0 ± 1.0	10 ± 1	12.92 ± 0.04
Si IV	-13.0 ± 2.0	4 ± 3	12.84 ± 0.09
O VI	-1.0 ± 0.0	35 ± 3	13.84 ± 0.02
C IV	-10.0 ± 3.0	13 ± 4	13.17 ± 0.07
C II	-7.0 ± 1.0	9 ± 1	13.85 ± 0.04
H I	-8.0 ± 3.0	27 ± 2	14.97 ± 0.05
H I	-5.0 ± 9.0	71 ± 14	13.6 ± 0.23
H I	31.0 ± 2.0	6 ± 2	16.04 ± 1.77

N(H I)=13.60

Excluding O VI :  $n_H = -3.64 \pm 0.01$        $Z = 2.0 \pm 0.0$

Including O VI :  $n_H = -4.23 \pm 0.01$        $Z = 2.0 \pm 0.0$

NOTE : logZ coming to be 2 for both the components

Ionisation-Modelling-Plots/pg1116-z=0.138527-compI.png

Figure 11:  $N(\text{H I})=14.97$

Ionisation-Modelling-Plots/pg1116-z=0.138527-compII.png

Figure 12:  $N(\text{H I})=13.60$

System-Plots/H1821+643\_z=0.170006\_sys\_plot.png



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	7.0 ± 3.0	17 ± 5	12.05 ± 0.07
Si III	52.0 ± 6.0	14 ± 10	11.62 ± 0.17
N V	47.0 ± 3.0	31 ± 5	13.29 ± 0.05
N V	122.0 ± 7.0	21 ± 11	12.74 ± 0.14
O VI	3.0 ± 28.0	152 ± 20	13.94 ± 0.06
O VI	107.0 ± 9.0	48 ± 12	13.29 ± 0.11
H I	-92.0 ± 0.0	36 ± 1	13.85 ± 0.02
H I	0.0 ± 2.0	63 ± 3	13.68 ± 0.02
H I	120.0 ± 1.0	28 ± 1	13.35 ± 0.02

log  $Z_{ref}$  = -1  
N(H I)= 13.68

Excluding O VI :  $n_H = -4.10 \pm 0.02$        $Z = 0.91 \pm 0.04$   
Including O VI :  $n_H = -4.14 \pm 0.02$        $Z = 0.94 \pm 0.04$

N(H I)= 13.35

Excluding O VI :  $n_H = -4.07 \pm 0.06$        $Z = 0.75 \pm 0.11$   
Including O VI :  $n_H = -4.11 \pm 0.05$        $Z = 0.79 \pm 0.10$

log  $Z_{ref}$  = 1

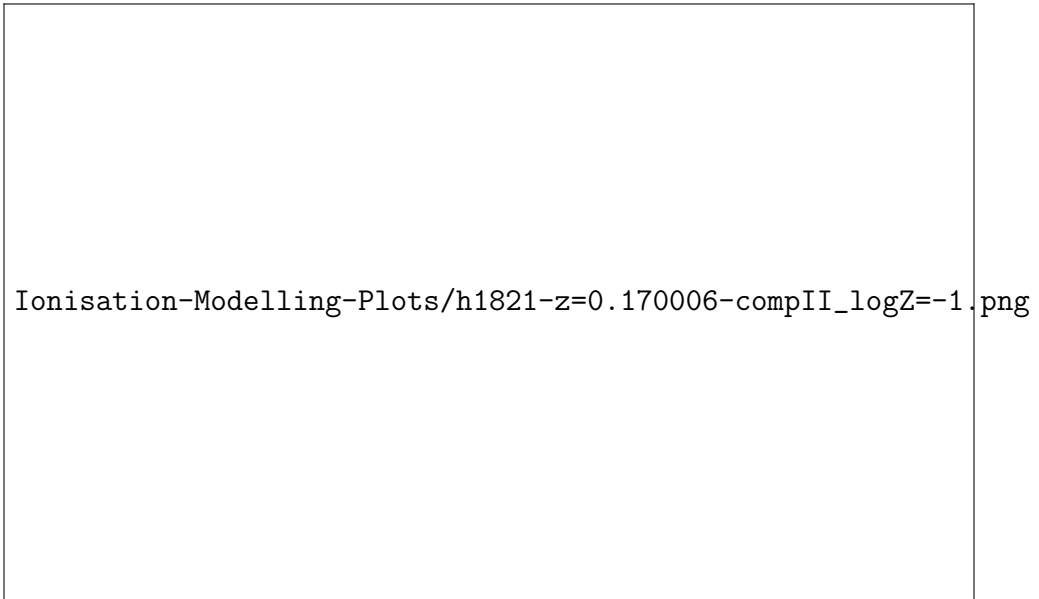


Figure 13:  $N(\text{H I})=13.68$ ,  $\log Z_{ref} = -1$

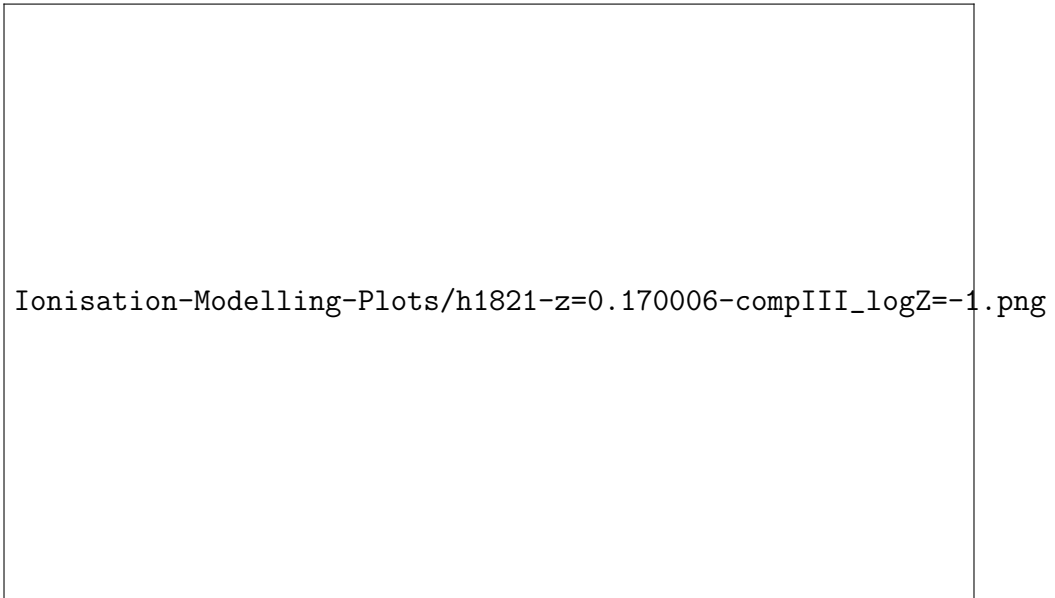


Figure 14:  $N(\text{H I})=13.35$ ,  $\log Z_{ref} = -1$

System-Plots/PG1121+422\_z=0.192393\_sys\_plot.png

Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-11.0 ± 13.0	10 ± 3	12.62 ± 0.10
Si III	9.0 ± 13.0	18 ± 4	13.14 ± 0.04
C III	-26.0 ± 10.0	10 ± 7	13.04 ± 0.09
C III	8.0 ± 5.0	18 ± 6	13.74 ± 0.11
C II	-9.0 ± 3.0	17 ± 5	13.69 ± 0.08
C II	9.0 ± 2.0	16 ± 3	13.93 ± 0.05
Si IV	10.0 ± 7.0	22 ± 11	12.86 ± 0.13
Si II	-3.0 ± 1.0	15 ± 2	13.04 ± 0.06
Si II	27.0 ± 19.0	42 ± 1	12.48 ± 0.23
O VI	-7.0 ± 13.0	11 ± 16	12.84 ± 0.19
O VI	20.0 ± 3.0	3 ± 4	13.37 ± 0.12
H I	1.0 ± 2.0	60 ± 6	14.34 ± 0.09
H I	5.0 ± 0.0	19 ± 0	17.7 ± 0.11

N(H I)=14.34

log  $Z_{ref}$  = -1

Excluding O VI :  $n_H = -1.78 \pm 0.05$        $Z = 1.97 \pm 0.04$

Including O VI :  $n_H = -3.00 \pm 0.04$        $Z = 1.25 \pm 0.04$

log  $Z_{ref}$  = 1

Excluding O VI :  $n_H = -3.12 \pm 0.07$        $Z = 1.62 \pm 0.07$

Including O VI :  $n_H = -3.7 \pm 0.03$        $Z = 1.33 \pm 0.04$

N(H I)= 17.70

Excluding O VI :  $n_H = -2.35 \pm 0.05$        $Z = -1.66 \pm 0.06$

Including O VI :  $n_H = -3.08 \pm 0.04$        $Z = -2.08 \pm 0.05$


NOTE : Since very high N(H I), so low metallicity. And solutions aren't much good.

Ionisation-Modelling-Plots/pg1121-z=0.192393-compI\_logZ=-1.png

Figure 15:  $N(\text{H I})=14.34$ ,  $\log Z_{ref}=-1$

Ionisation-Modelling-Plots/pg1121-z=0.192393-compI.png

Figure 16:  $N(\text{H I})=14.34$ ,  $\log Z_{ref}=1$



Ionisation-Modelling-Plots/pg1121-z=0.192393-compII.png

Figure 17:  $N(\text{H I})=17.70$ ,  $\log Z_{ref}=-1$