

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

N(HI)=13.49

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

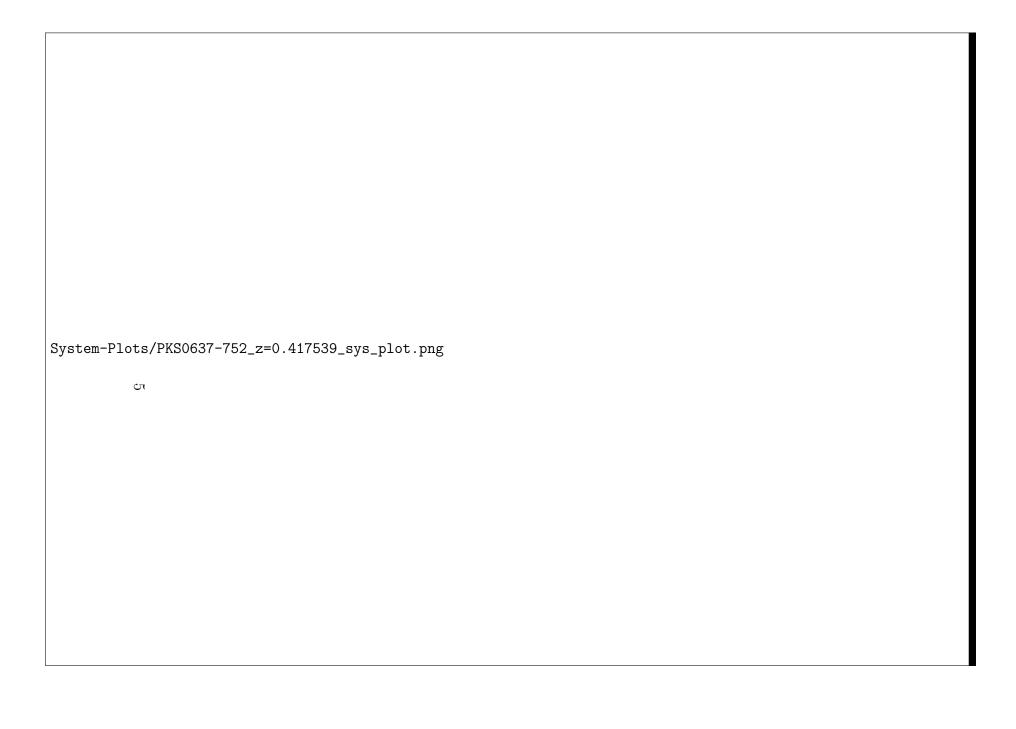
Ionisation-Modelling-Plots/3c263-z=0.140756-compI.png



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

N(HI)=13.60

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

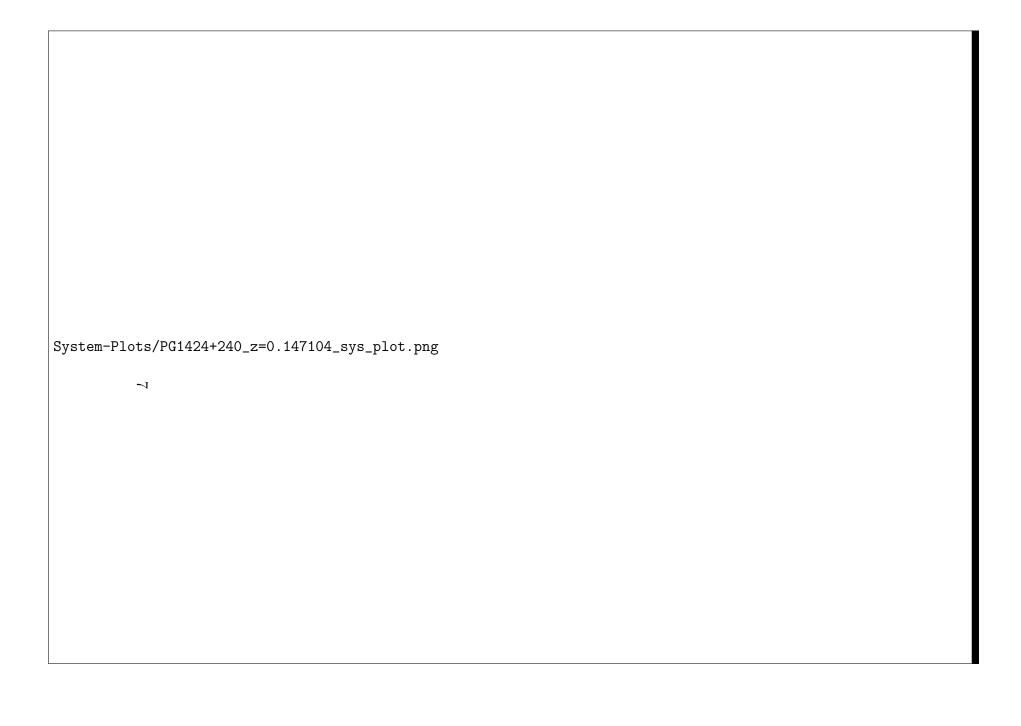


Ion	$ m v~(km~s^{-1})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[{ m N~cm^{-2}}]$
Si III C III O VI H I H I	-5.0 ± 4.0 -4.0 ± 1.0 0.0 ± 1.0 -17.0 ± 1.0 20.0 ± 1.0	35 ± 7 24 ± 2 42 ± 6 30 ± 1 46 ± 4	12.74 ± 0.06 14.44 ± 0.15 14.19 ± 0.05 15.41 ± 0.03 14.61 ± 0.07

N(HI)=15.41

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

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



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

N(HI)=15.44

$$N(HI) = 14.88$$

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



Figure 1: N(H I)=15.44

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

Figure 2: N(H I)=14.88

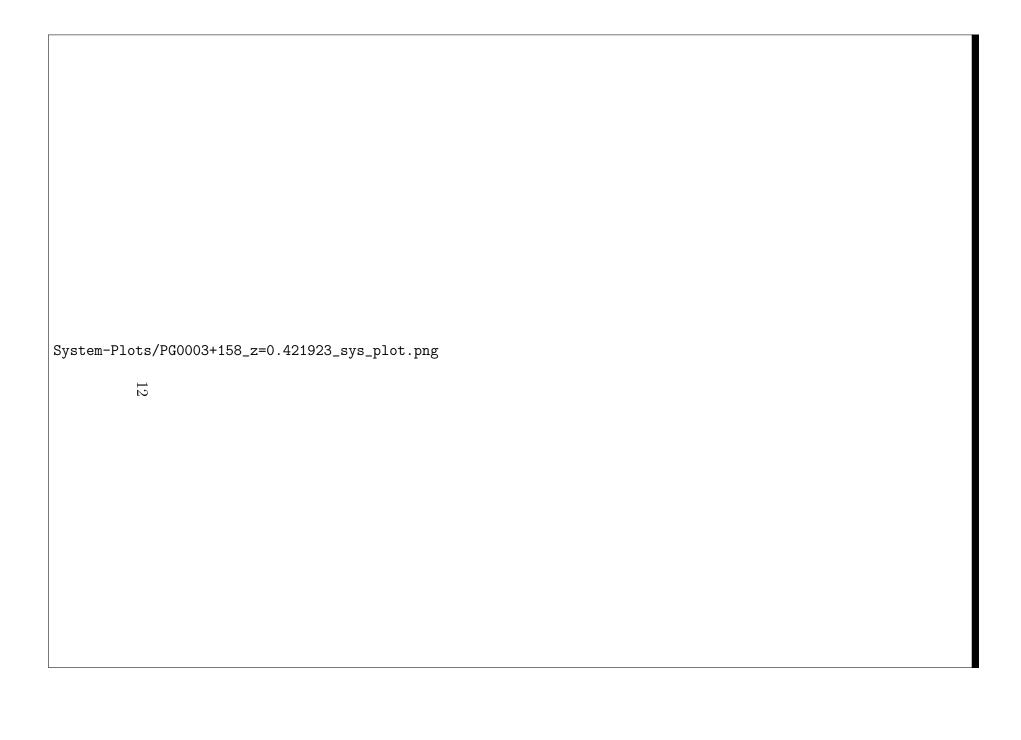


Ion	${ m v}~{ m (km~s^{-1})}$	$\mathrm{b}~\mathrm{(km~s^{-1})}$	$\log~[{ m N~cm^{-2}}]$
OIII	-18.0 ± 2.0	9 ± 5	13.93 ± 0.08
$\mathrm{C}\mathrm{III}$	-11.0 ± 1.0	13 ± 2	13.35 ± 0.05
Nv	-7.0 ± 1.0	33 ± 11	13.49 ± 0.11
Ovi	0.0 ± 2.0	25 ± 3	13.87 ± 0.04
Ovi	54.0 ± 3.0	25 ± 4	13.71 ± 0.06
Ηι	-10.0 ± 1.0	29 ± 0	14.81 ± 0.03
Ηι	40.0 ± 9.0	40 ± 4	14.1 ± 0.05

N(HI)=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



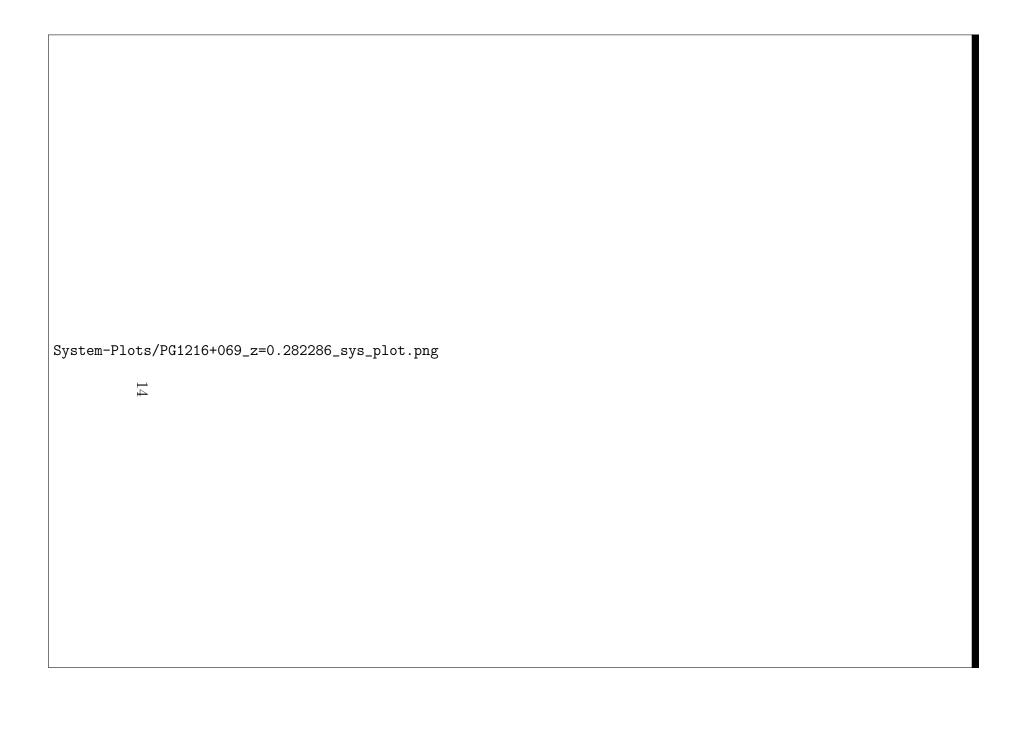
Ion	${ m v}~({ m km~s^{-1}})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[{ m N~cm^{-2}}]$
CIII OIII OVI HI HI	-9.0 ± 1.0 -1.0 ± 2.0 0.0 ± 1.0 -272.0 ± 6.0 -16.0 ± 1.0 -2.0 ± 1.0	13 ± 1 7 ± 5 27 ± 1 66 ± 10 64 ± 3 26 ± 1	13.35 ± 0.04 13.83 ± 0.13 14.27 ± 0.02 13.37 ± 0.05 14.17 ± 0.04 14.71 ± 0.02

N(HI)=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



Ion	$v~(km~s^{-1})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[{ m N~cm^{-2}}]$
G:	0.0 1.0	14 0	10.00 0.05
Si III	0.0 ± 1.0	14 ± 3	12.92 ± 0.05
$\mathrm{C}\mathrm{iii}$	-51.0 ± 3.0	32 ± 5	13.33 ± 0.05
$\mathrm{C}{}_{\mathrm{III}}$	5.0 ± 1.0	16 ± 2	13.76 ± 0.07
Ovi	-64.0 ± 6.0	58 ± 9	13.93 ± 0.05
Ovi	19.0 ± 2.0	12 ± 5	13.54 ± 0.09
Ηι	-31.0 ± 1.0	52 ± 3	15.1 ± 0.05
Ηι	7.0 ± 1.0	22 ± 1	16.4 ± 0.03
Ηι	169.0 ± 22.0	53 ± 10	13.15 ± 0.18

N(HI)=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

$$N(HI) = 16.40$$

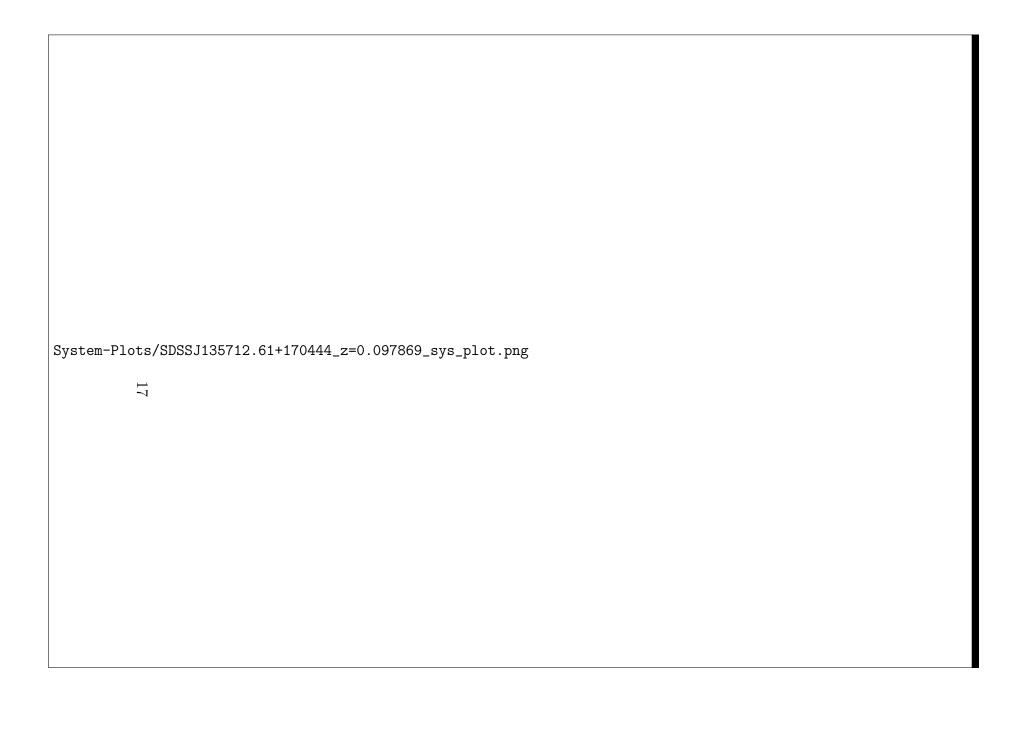
NOTE : Convergence is not much good for excluding O VI case



Figure 3: N(HI)=15.10

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

Figure 4: N(H I)=16.40



Ion	$v~(km~s^{-1})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[\rm N~cm^{-2}]$
Si III	-62.0 ± 2.0	17 ± 3	12.94 ± 0.05
Si III	4.0 ± 1.0	13 ± 10	14.67 ± 2.87
$\mathrm{C}\mathrm{iv}$	-74.0 ± 6.0	33 ± 1	13.82 ± 0.09
$\mathrm{C}\mathrm{iv}$	-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
$\mathrm{C}{}_{\mathrm{II}}$	-79.0 ± 8.0	19 ± 14	13.17 ± 0.16
$\mathrm{C}{}_{\mathrm{II}}$	-1.0 ± 2.0	22 ± 3	13.92 ± 0.04
Ovi	-96.0 ± 10.0	43 ± 16	14.3 ± 0.11
Ηι	-536.0 ± 3.0	29 ± 5	13.36 ± 0.05
Ηι	-66.0 ± 0.0	29 ± 8	16.49 ± 0.12
Ηι	0.0 ± 0.0	46 ± 4	15.01 ± 0.16
Ηι	424.0 ± 3.0	34 ± 4	13.52 ± 0.04

N(HI) = 16.49

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

$$N(HI) = 15.01$$

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

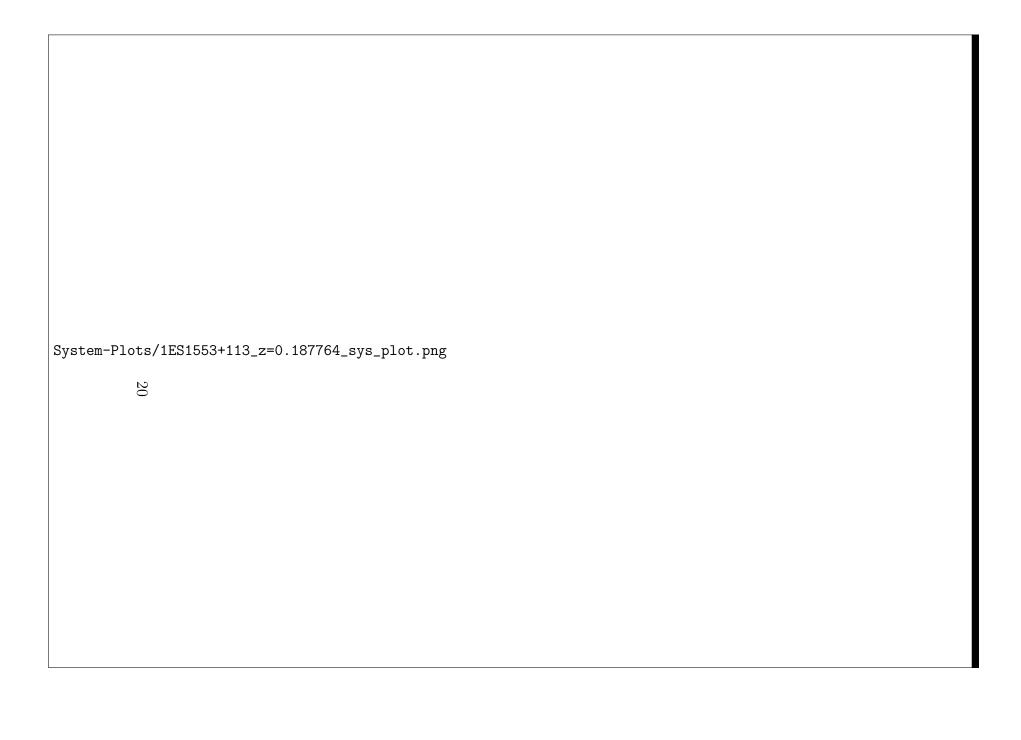
NOTE: Using O VI column density from other component to compare.



Figure 5: N(H I)=16.49

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

Figure 6: N(H I)=15.01



Ion	${ m v} ~ ({ m km} ~ { m s}^{-1})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[{ m N~cm^{-2}}]$
C III C III N V N V O VI O VI H I H I	-46.0 ± 1.0 -6.0 ± 1.0 -47.0 ± 2.0 -5.0 ± 2.0 -42.0 ± 1.0 0.0 ± 1.0 511.0 ± 3.0 -52.0 ± 3.0 -28.0 ± 1.0 425.0 ± 3.0	5 ± 4 13 ± 2 17 ± 0 16 ± 4 3 ± 1 15 ± 3 28 ± 5 8 ± 6 51 ± 1 25 ± 5	13.17 ± 0.46 13.21 ± 0.03 13.43 ± 0.05 13.33 ± 0.06 14.23 ± 0.33 13.71 ± 0.03 13.49 ± 0.05 12.76 ± 0.15 13.88 ± 0.01 13.02 ± 0.07
Ні	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 χ^2 , else they were large and convergence was not good. Nearly similar solution for both the cases.

N(HI) = 13.88

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



Figure 7: N(H I)=12.76

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

Figure 8: N(H I)=13.88



Ion	$v~({\rm km~s^{-1}})$	$\rm b~(km~s^{-1})$	$\log~[{ m N~cm^{-2}}]$
Οı	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
$\mathrm{C}\textsc{ii}$	12.0 ± 9.0	31 ± 4	14.15 ± 0.05
$\mathrm{C}\textsc{ii}$	34.0 ± 2.0	12 ± 5	14.67 ± 0.1
$\mathrm{C}\mathrm{III}$	-48.0 ± 3.0	15 ± 1	13.66 ± 0.08
$\mathrm{C}\mathrm{iii}$	-10.0 ± 3.0	26 ± 7	14.16 ± 0.07
$\mathrm{C}\mathrm{iii}$	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
Ovi	0.0 ± 6.0	45 ± 10	13.71 ± 0.07
Ηι	-48.0 ± 0.0	22 ± 2	15.77 ± 0.02
Ηι	-10.0 ± 2.0	16 ± 0	15.79 ± 0.11
Ηι	28.0 ± 1.0	16 ± 1	18.1 ± 0.12

N(HI)=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

$$N(HI) = 15.79$$

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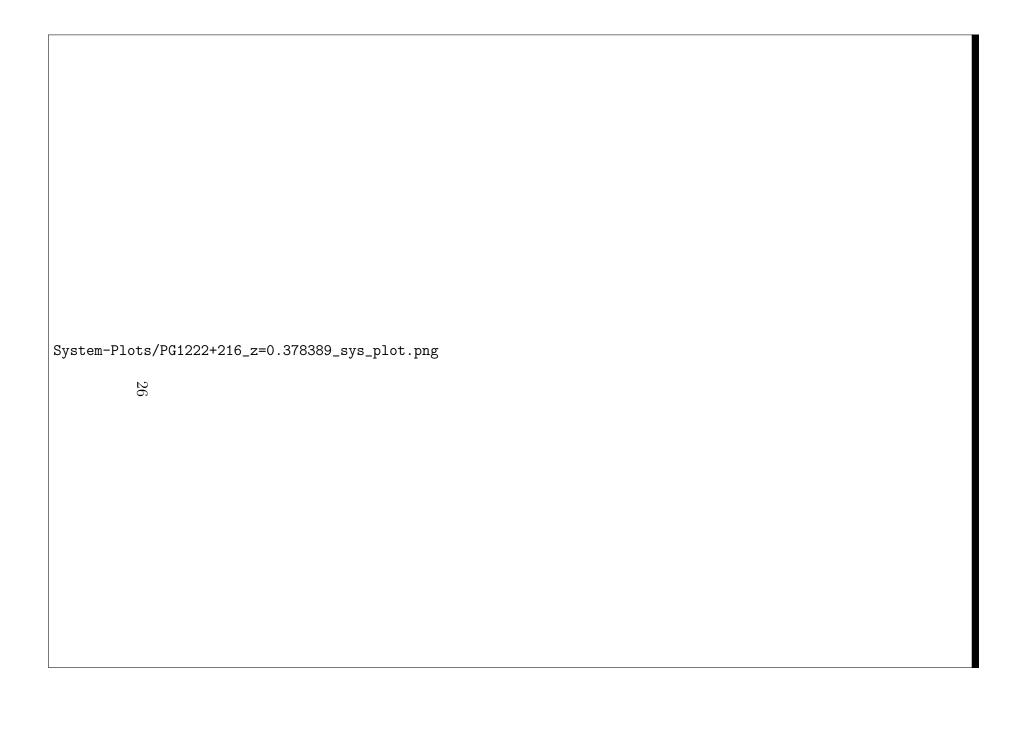
NOTE: log Z is around 1 in both the components.



Figure 9: N(H I)=18.10

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

Figure 10: N(HI)=15.79



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

N(HI) = 15.43





Ion	$v~(km~s^{-1})$	$\mathrm{b}~(\mathrm{km}~\mathrm{s}^{-1})$	$\log~[\rm N~cm^{-2}]$
NT		10 0	10.04 0.00
Nv	-7.0 ± 3.0	12 ± 6	12.84 ± 0.09
NII	-5.0 ± 1.0	6 ± 3	13.62 ± 0.11
NII	33.0 ± 6.0	8 ± 13	12.85 ± 0.15
Рп	-44.0 ± 5.0	19 ± 8	12.94 ± 0.09
Si 11	-13.0 ± 0.0	9 ± 1	12.46 ± 0.06
Si 11	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
Ovi	-1.0 ± 0.0	35 ± 3	13.84 ± 0.02
$\mathrm{C}\mathrm{iv}$	-10.0 ± 3.0	13 ± 4	13.17 ± 0.07
$\mathrm{C}\textsc{ii}$	-7.0 ± 1.0	9 ± 1	13.85 ± 0.04
Ηι	-8.0 ± 3.0	27 ± 2	14.97 ± 0.05
Ηι	-5.0 ± 9.0	71 ± 14	13.6 ± 0.23
Ηι	31.0 ± 2.0	6 ± 2	16.04 ± 1.77

N(HI) = 13.60

Excluding O VI : $n_H=$ -3.64 \pm 0.01 $Z=2.0\pm0.0$ Including O VI : $n_H=$ -4.23 \pm 0.01 $Z=2.0\pm0.0$ NOTE : logZ coming to be 2 for both the components



Figure 11: N(H I)=14.97

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

Figure 12: N(HI)=13.60



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

$$N(HI) = 13.68$$

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

NOTE: logZ near 1, needs to be done with log Zref=1.

$$N(HI) = 13.35$$

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

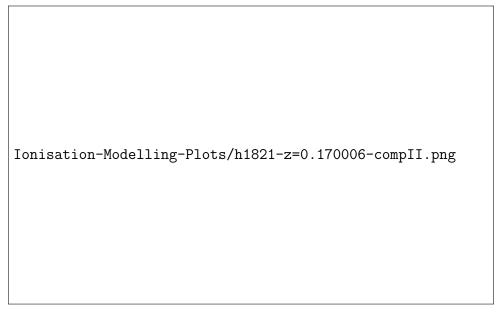
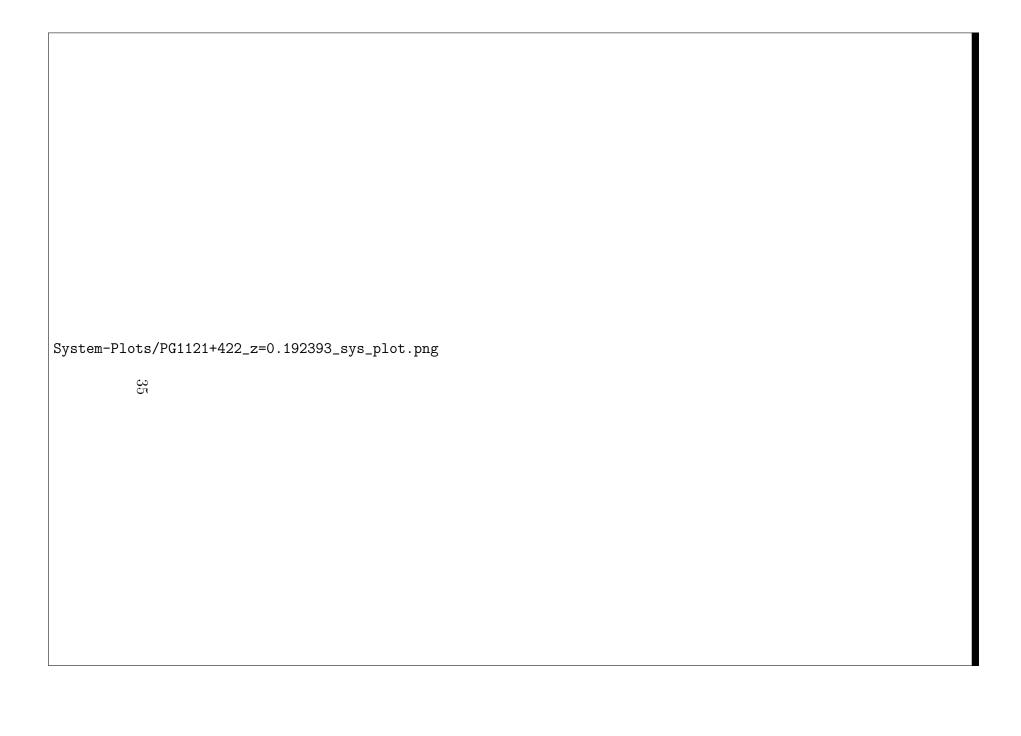


Figure 13: N(H_I)=13.68

Ionisation-Modelling-Plots/h1821-z=0.170006-compIII.png

Figure 14: N(HI)=13.35



Ion	${ m v}~{ m (km~s^{-1})}$	$\rm b~(km~s^{-1})$	$\log~[{ m N~cm^{-2}}]$
Si III	-11.0 ± 13.0	10 ± 3	12.62 ± 0.10
Si III	9.0 ± 13.0	18 ± 4	13.14 ± 0.04
$\mathrm{C}\mathrm{iii}$	-26.0 ± 10.0	10 ± 7	13.04 ± 0.09
$\mathrm{C}\mathrm{iii}$	8.0 ± 5.0	18 ± 6	13.74 ± 0.11
$\mathrm{C}\textsc{ii}$	-9.0 ± 3.0	17 ± 5	13.69 ± 0.08
$\mathrm{C}\textsc{ii}$	9.0 ± 2.0	16 ± 3	13.93 ± 0.05
Siıv	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
Ovi	-7.0 ± 13.0	11 ± 16	12.84 ± 0.19
Ovi	20.0 ± 3.0	3 ± 4	13.37 ± 0.12
Ηι	1.0 ± 2.0	60 ± 6	14.34 ± 0.09
Ηι	5.0 ± 0.0	19 ± 0	17.7 ± 0.11

N(HI)=14.34

Excluding O VI :
$$n_H = -1.78 \pm 0.05$$
 $Z = 1.97 \pm 0.04$
Including O VI : $n_H = -3.00 \pm 0.04$ $Z = 1.25 \pm 0.04$

NOTE: logZ coming 1.25 and nearly 2, so needs to be looked at.

$$N(HI) = 17.70$$

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 $\scriptstyle\rm I)$, so low metallicity. And solutions aren't much good.

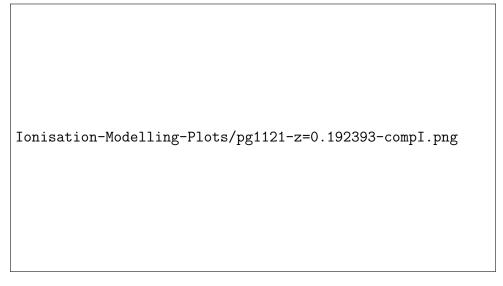


Figure 15: N(H I)=14.34

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

Figure 16: N(HI)=17.70