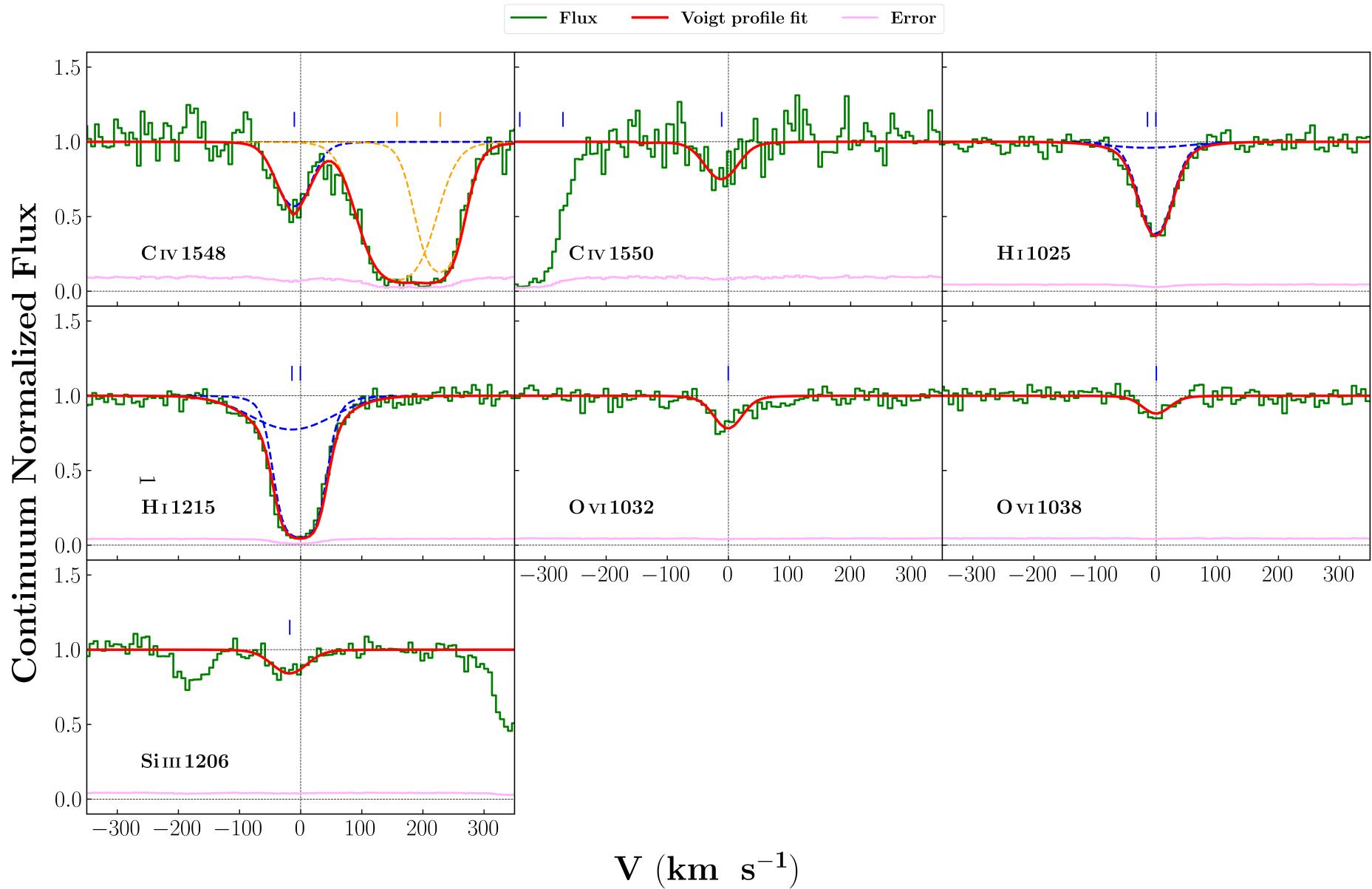


### 3C263 ( $z_{\text{abs}} = 0.140756$ )



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

$$N(HI) = 13.49$$

$$\log Z_{ref} = -1$$

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

$$\log Z_{ref} = 1$$

Excluding O VI : $n_H = -4.14 \pm 0.04$	$Z = 1.69 \pm 0.08$
Including O VI : $n_H = -4.45 \pm 0.01$	$Z = 1.30 \pm 0.05$

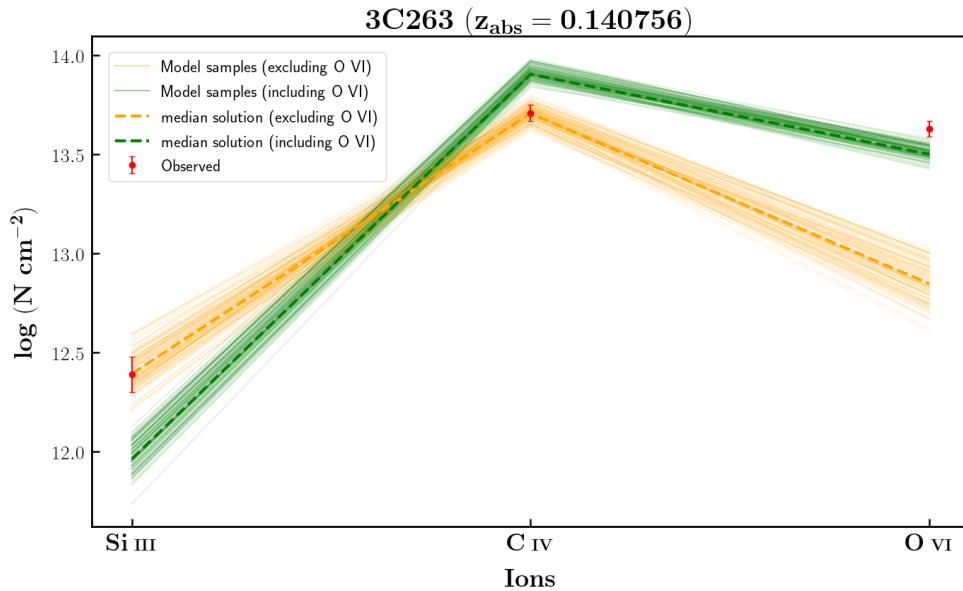


Figure 1:  $N(\text{H I})=13.49$ ,  $\log Z_{\text{ref}}=-1$

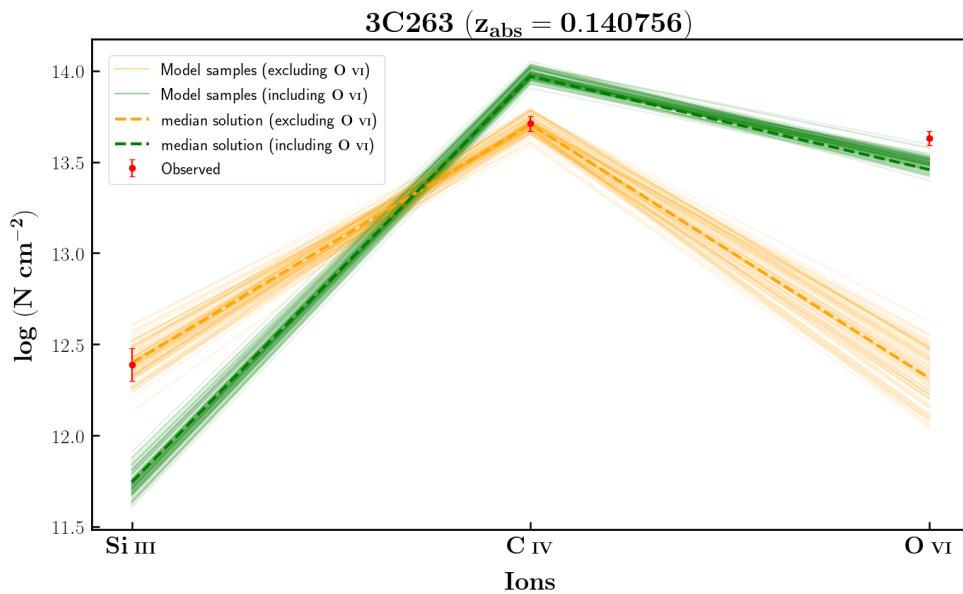
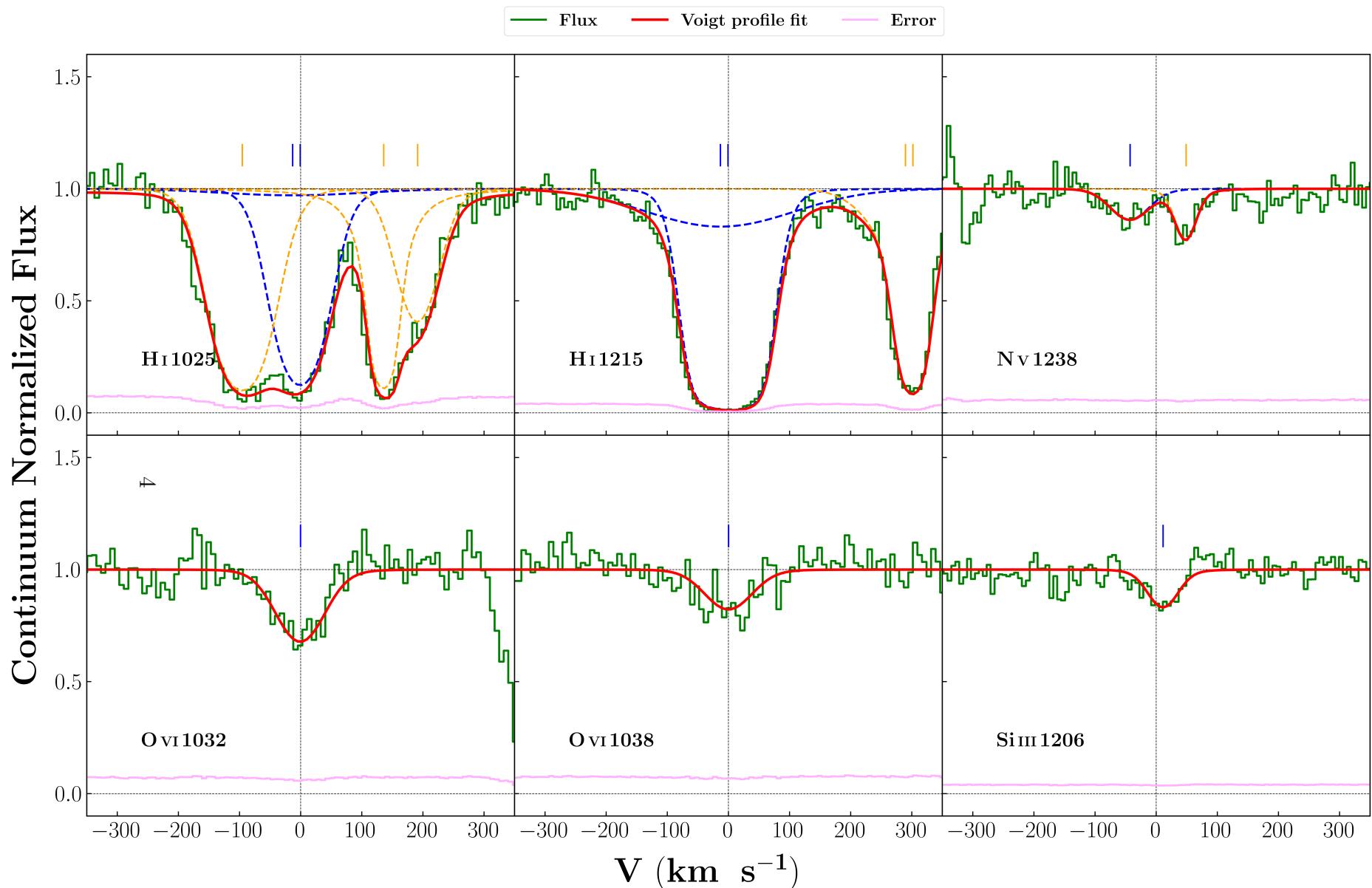


Figure 2:  $N(\text{H I})=13.49$ ,  $\log Z_{\text{ref}}=1$

PKS0637 – 752 ( $z_{\text{abs}} = 0.161064$ )



<b>Ion</b>	<b>v (km s<sup>-1</sup>)</b>	<b>b (km s<sup>-1</sup>)</b>	<b>log [N cm<sup>-2</sup>]</b>
N V	-42 ± 6	40 ± 9	13.37 ± 0.07
Si III	11 ± 4	30 ± 7	12.37 ± 0.06
O VI	0 ± 3	48 ± 5	14.02 ± 0.03
H I	-13 ± 2	162 ± 21	13.6 ± 0.06
H I	-1 ± 1	45 ± 1	15.01 ± 0.02

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

$$\log Z_{ref} = -1$$

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

$$\log Z_{ref} = 1$$

Excluding O VI : $n_H = -4.29 \pm 0.02$	$Z = 1.64 \pm 0.05$
Including O VI : $n_H = -4.42 \pm 0.01$	$Z = 1.69 \pm 0.04$

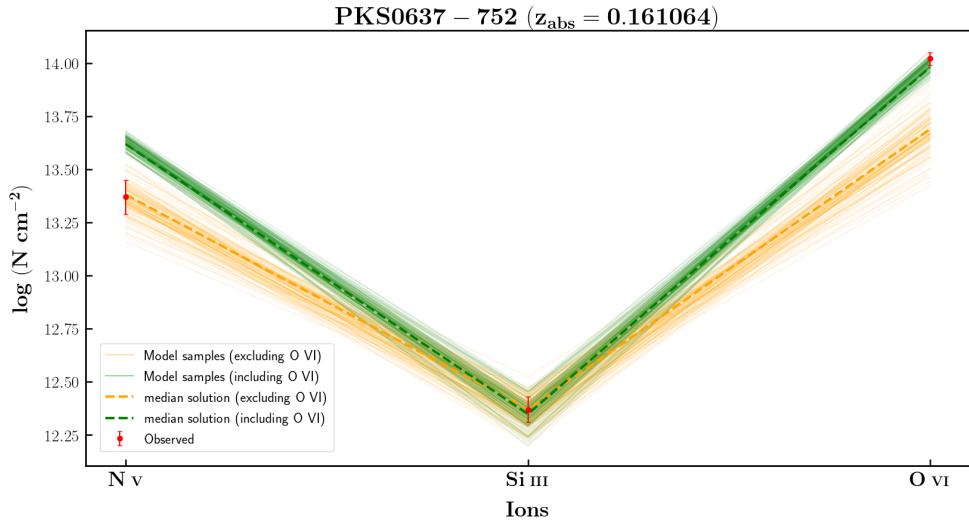


Figure 3:  $\text{N(H I)}=13.60$ ,  $\log Z_{\text{ref}}=-1$

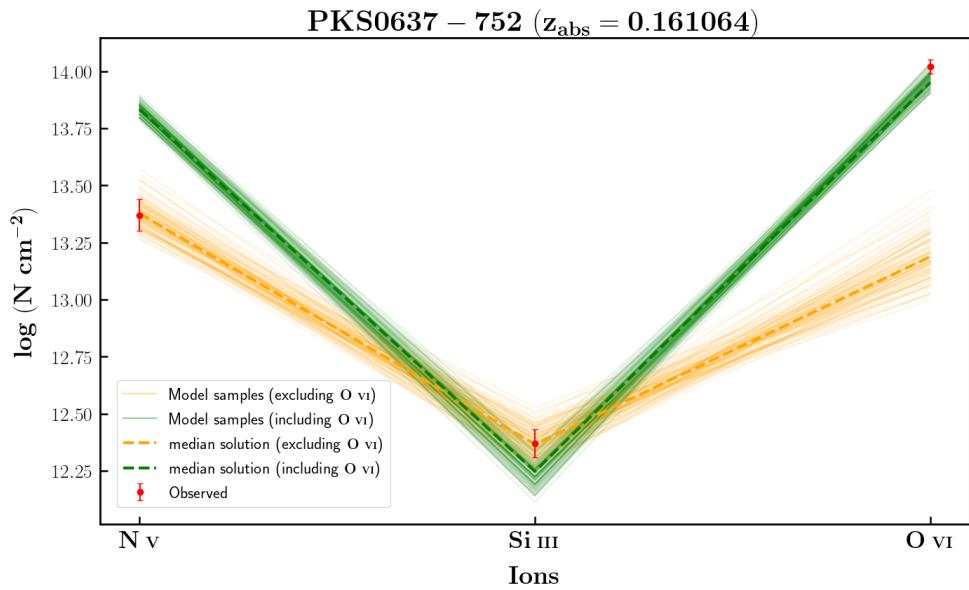
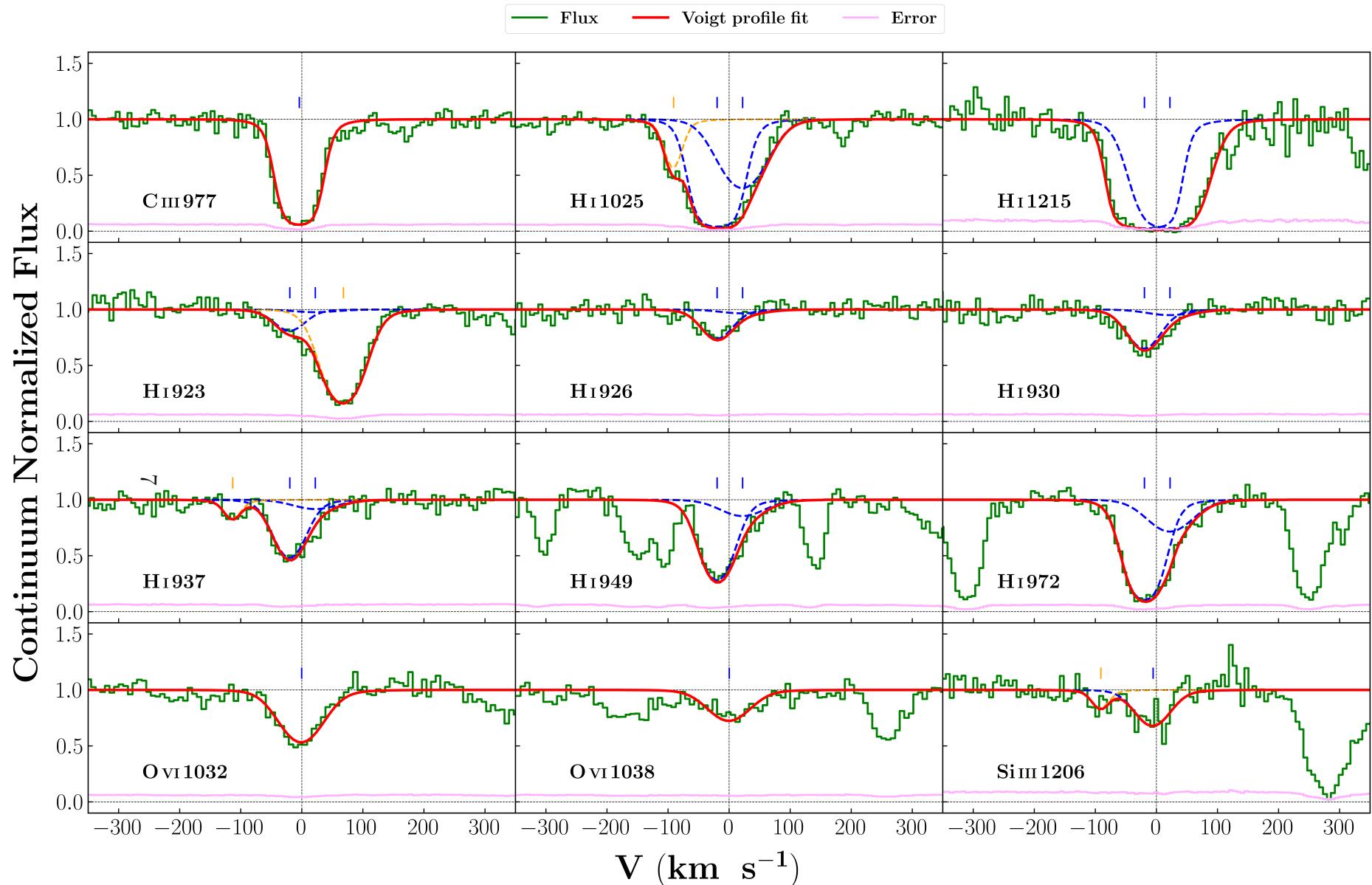


Figure 4:  $\text{N(H I)}=13.60$ ,  $\log Z_{\text{ref}}=1$

PKS0637 – 752 ( $z_{\text{abs}} = 0.417539$ )

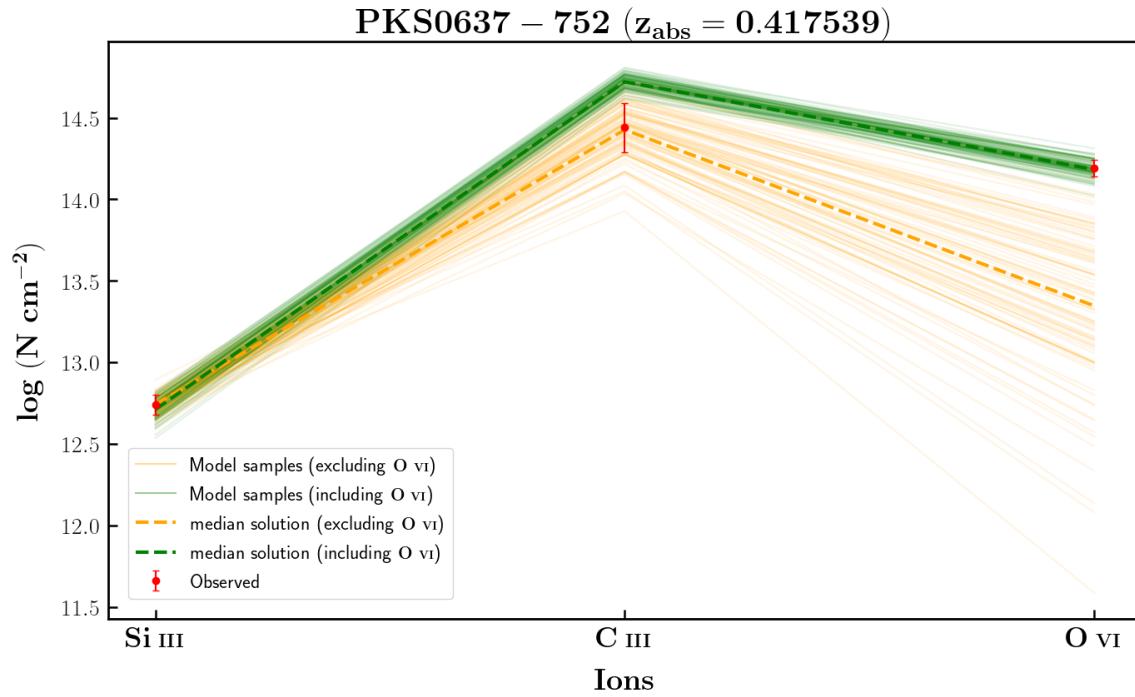


Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-5 ± 4	35 ± 7	12.74 ± 0.06
C III	-4 ± 1	24 ± 2	14.44 ± 0.15
O VI	0 ± 1	42 ± 6	14.19 ± 0.05
H I	-17 ± 1	30 ± 1	15.41 ± 0.03
H I	20 ± 1	46 ± 4	14.61 ± 0.07

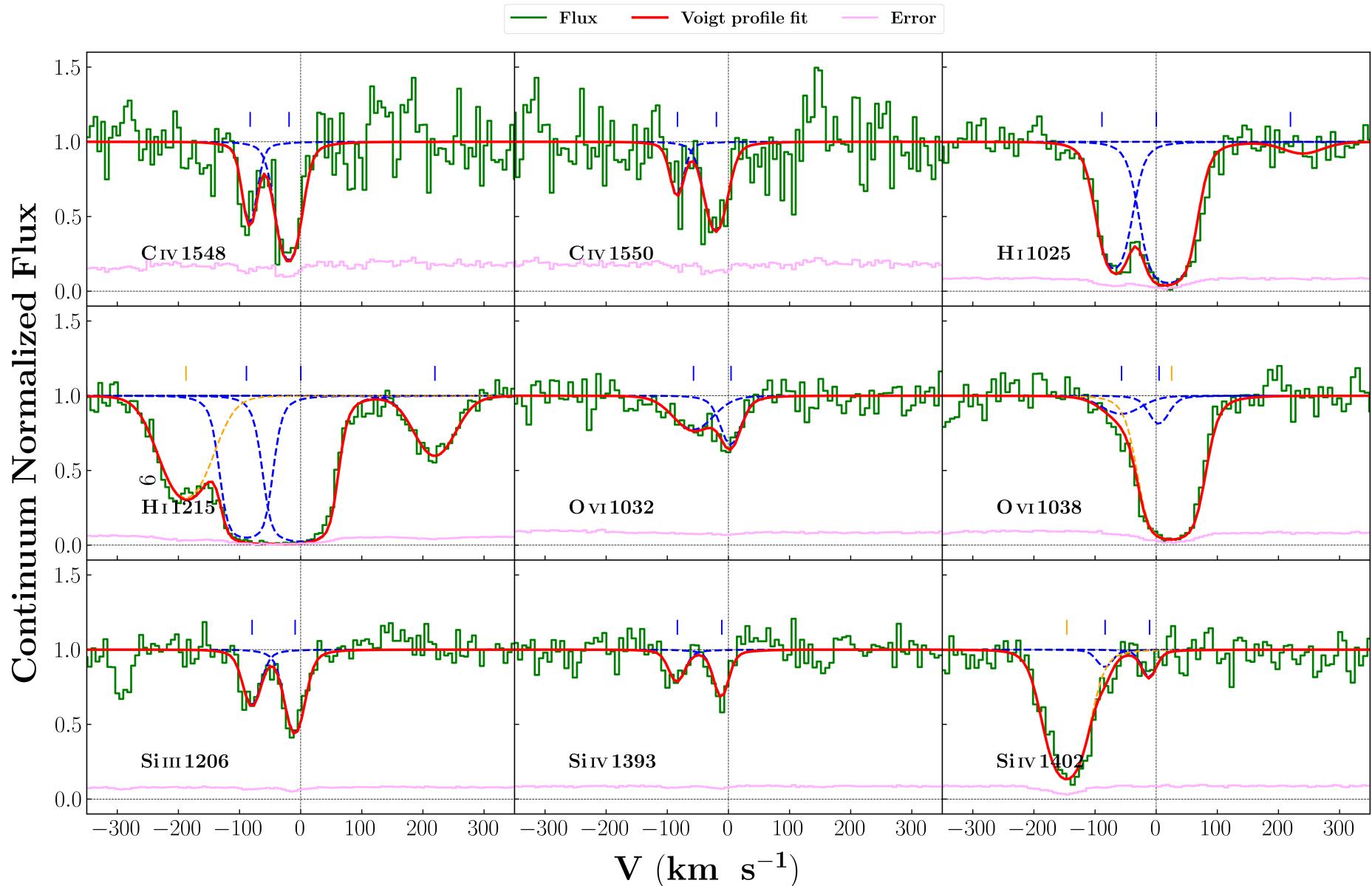
$$N(HI) = 15.41$$

$$\begin{aligned} \text{Excluding O VI : } n_H &= -3.54 \pm 0.11 & Z &= -0.49 \pm 0.11 \\ \text{Including O VI : } n_H &= -3.74 \pm 0.02 & Z &= -0.23 \pm 0.04 \end{aligned}$$

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



PG1424 + 240 ( $z_{\text{abs}} = 0.147104$ )



<b>Ion</b>	<b>v (km s<sup>-1</sup>)</b>	<b>b (km s<sup>-1</sup>)</b>	<b>log [N cm<sup>-2</sup>]</b>
C IV	-81 ± 2	11 ± 4	13.58 ± 0.09
C IV	-18 ± 2	20 ± 3	14.06 ± 0.05
Si III	-78 ± 2	15 ± 3	12.58 ± 0.05
Si III	-9 ± 1	16 ± 2	12.87 ± 0.03
Si IV	-82 ± 4	13 ± 7	12.69 ± 0.1
Si IV	-11 ± 2	11 ± 5	12.88 ± 0.07
O VI	-56 ± 9	39 ± 13	13.77 ± 0.11
O VI	4 ± 4	16 ± 6	13.73 ± 0.11
H I	-454 ± 3	27 ± 5	13.16 ± 0.05
H I	-87 ± 3	23 ± 2	14.88 ± 0.05
H I	0 ± 3	29 ± 2	15.44 ± 0.14
H I	216 ± 2	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 : $n_H = -3.96 \pm 0.03$	$Z = -0.07 \pm 0.04$

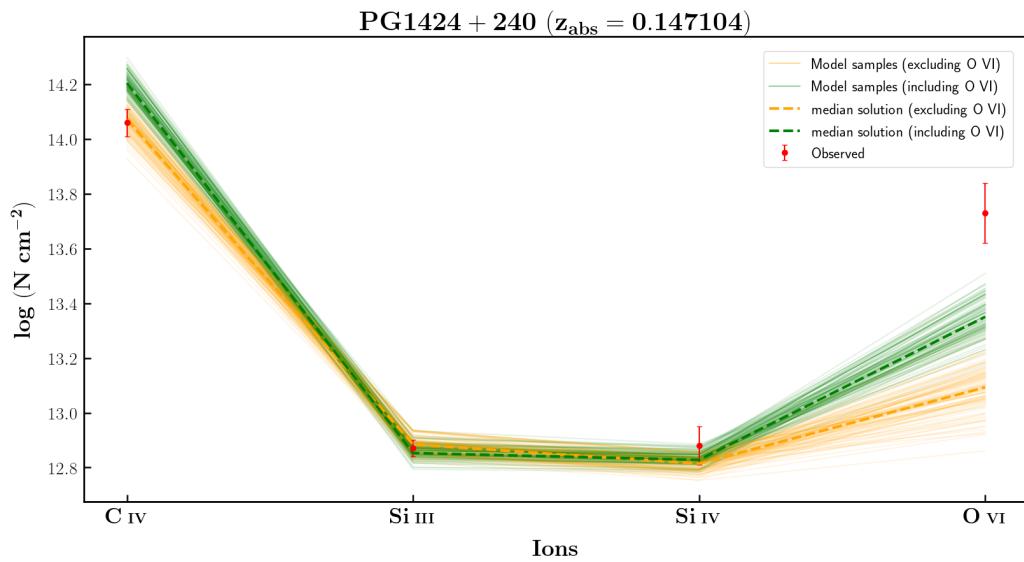


Figure 5:  $N(\text{H I})=15.44$

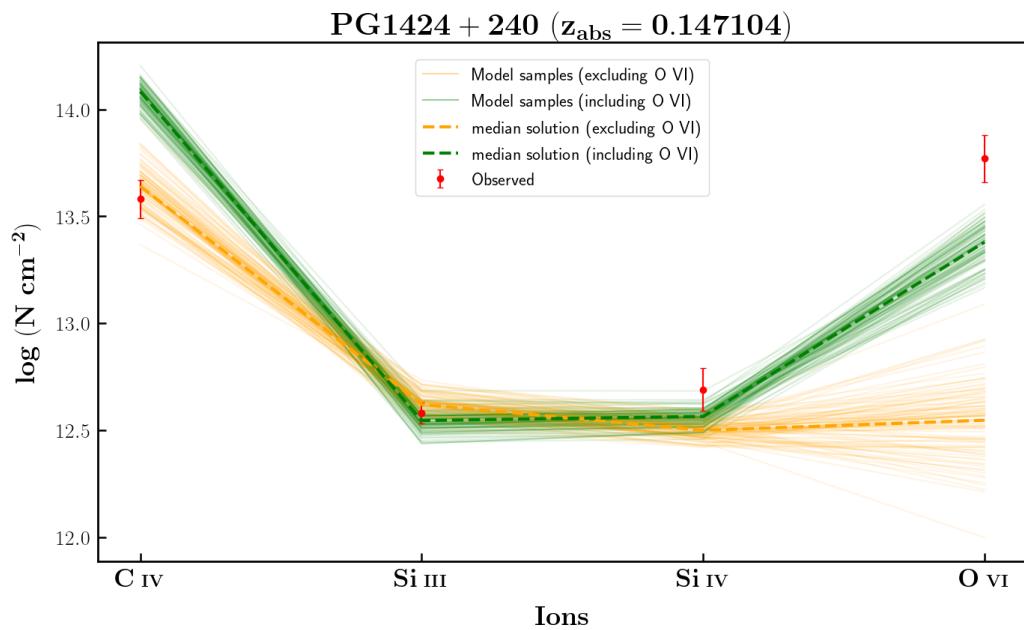
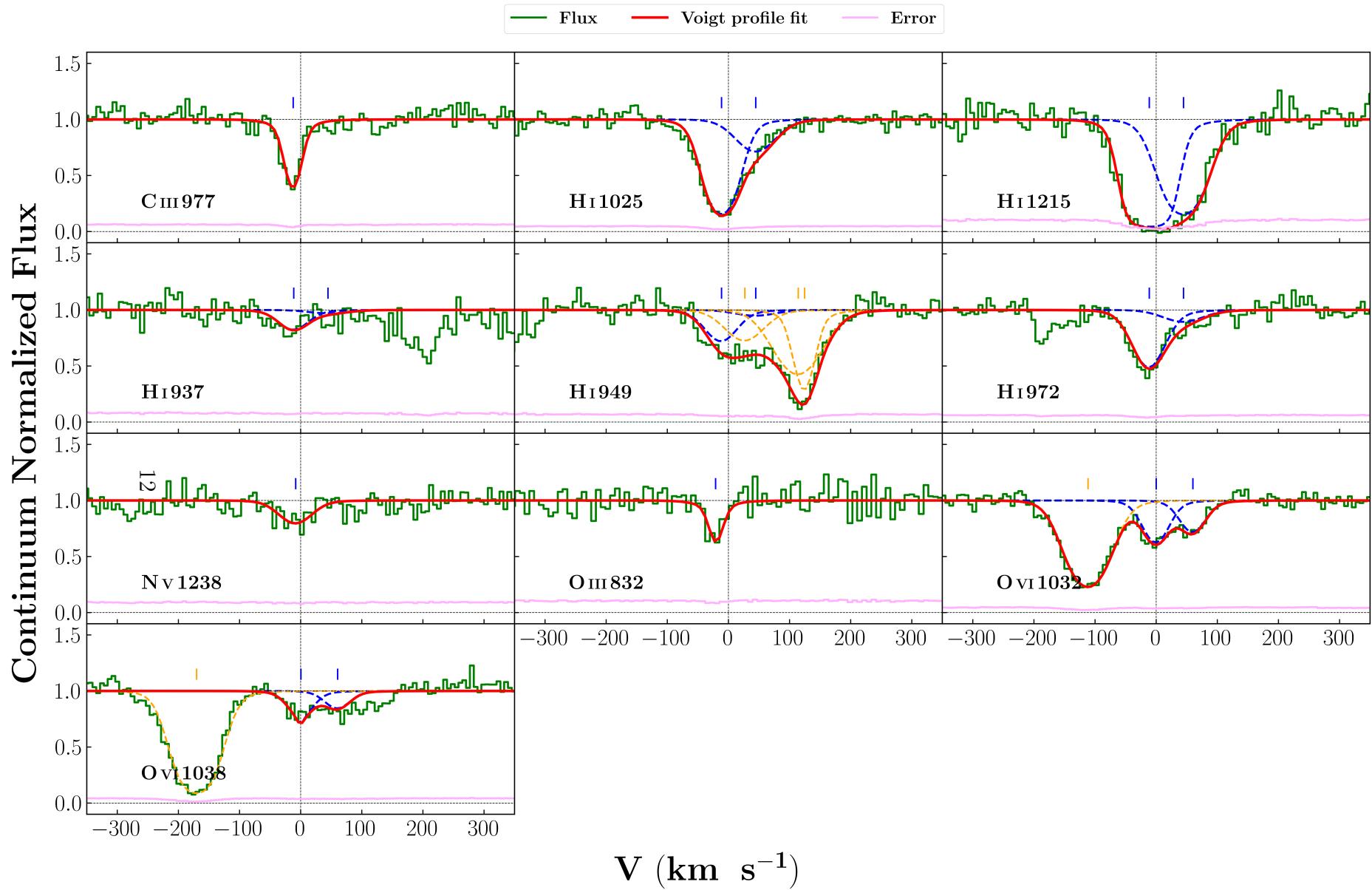


Figure 6:  $N(\text{H I})=14.88$

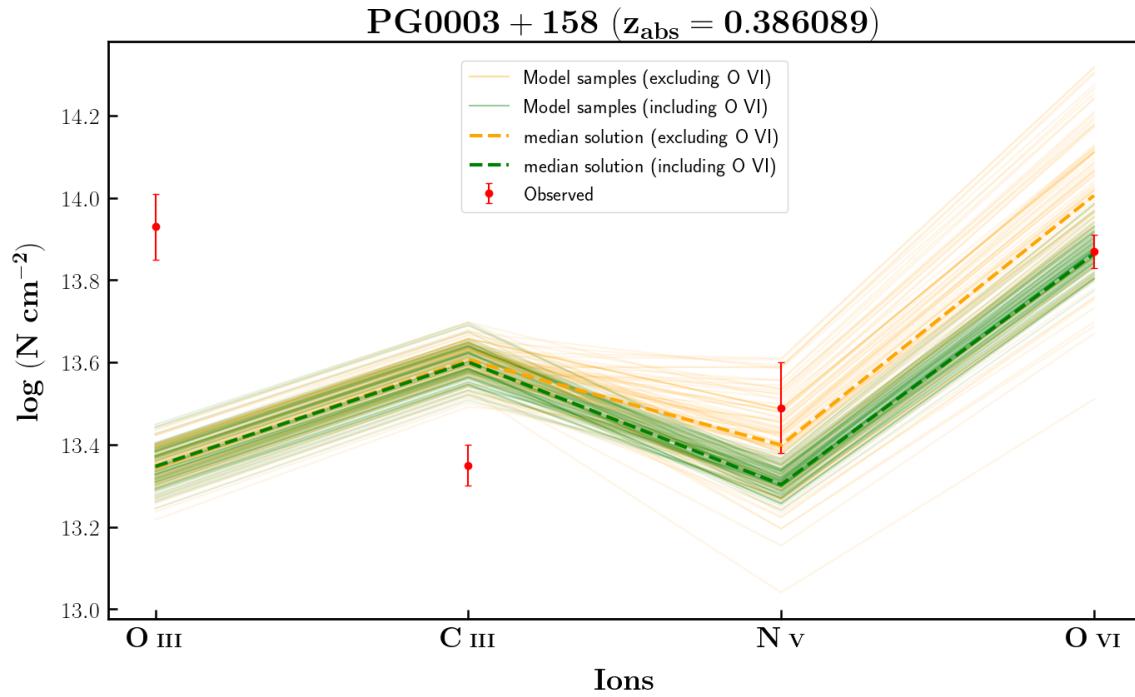
PG0003 + 158 ( $z_{\text{abs}} = 0.386089$ )



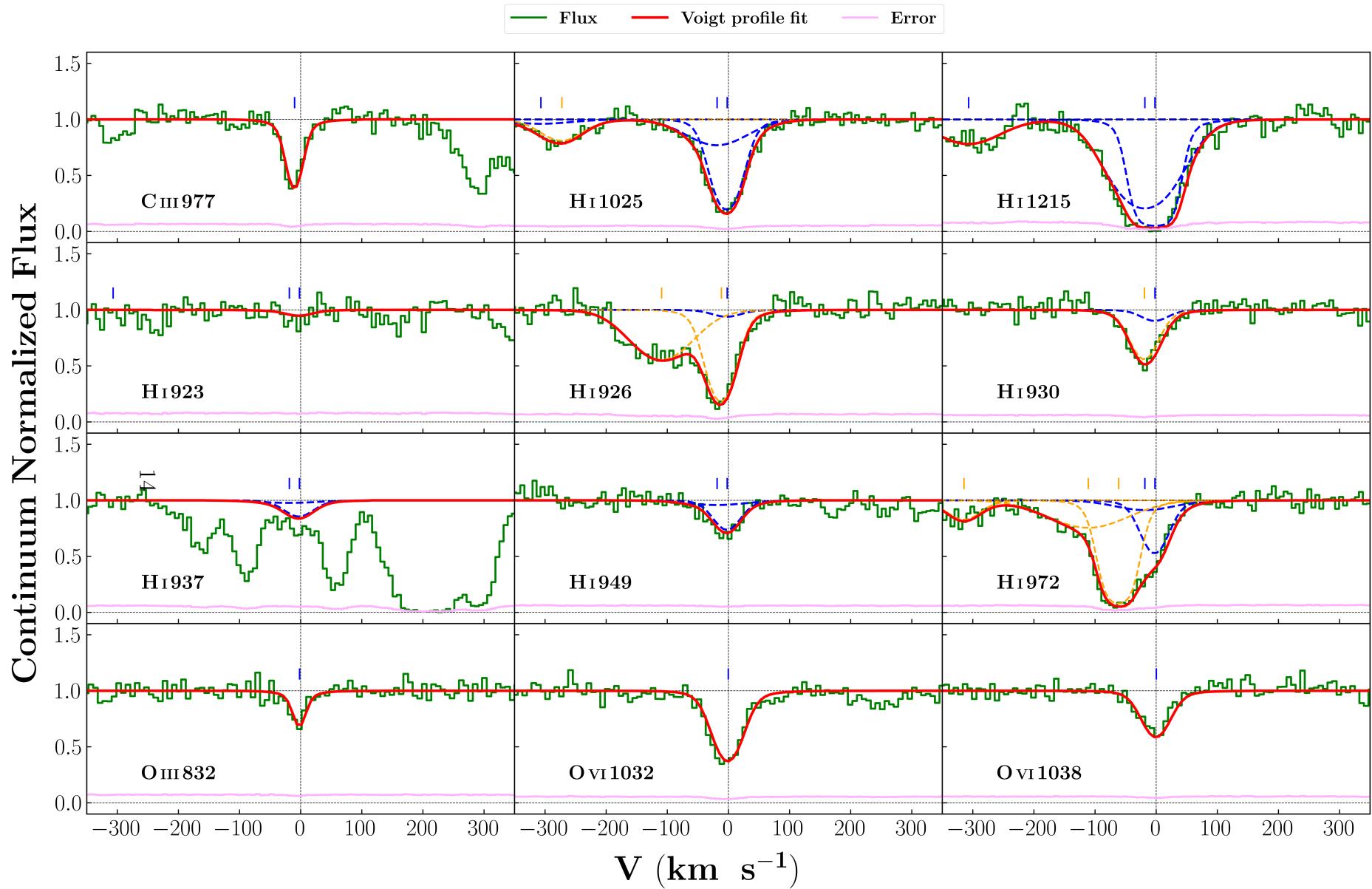
Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
O III	-18 ± 2	9 ± 5	13.93 ± 0.08
C III	-11 ± 1	13 ± 2	13.35 ± 0.05
N V	-7 ± 1	33 ± 11	13.49 ± 0.11
O VI	0 ± 2	25 ± 3	13.87 ± 0.04
O VI	54 ± 3	25 ± 4	13.71 ± 0.06
H I	-10 ± 1	29 ± 0	14.81 ± 0.03
H I	40 ± 9	40 ± 4	14.1 ± 0.05

$$N(HI) = 14.81$$

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



PG0003 + 158 ( $z_{\text{abs}} = 0.421923$ )

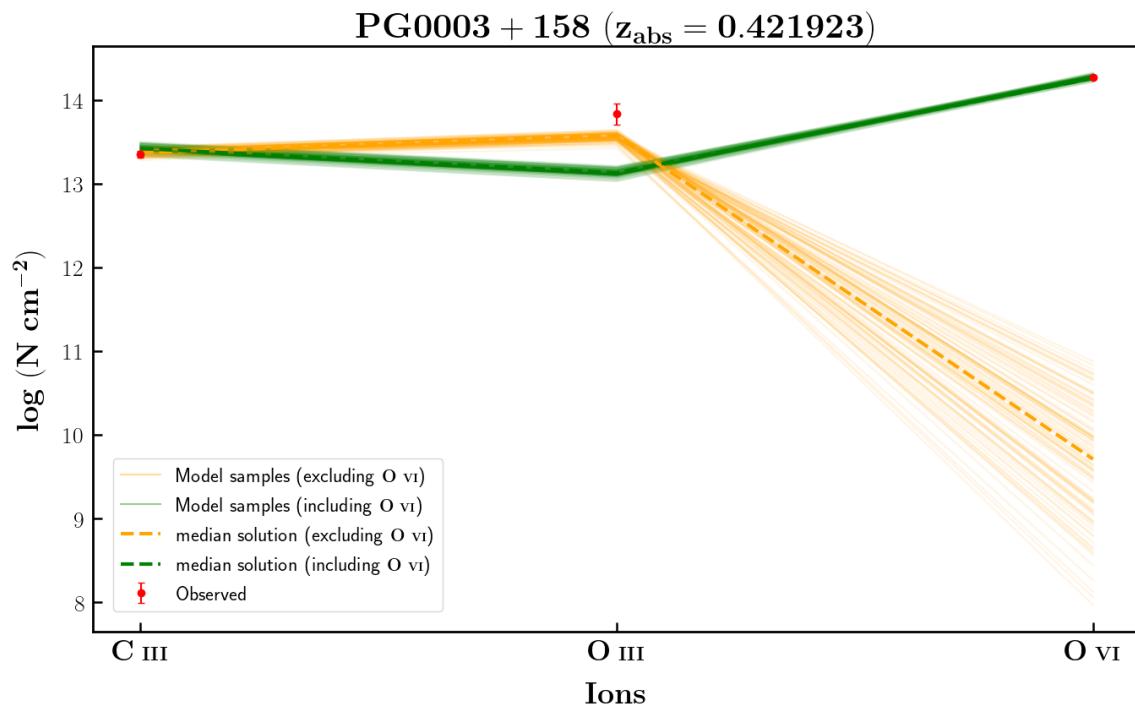


Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
C III	-9 ± 1	13 ± 1	13.35 ± 0.04
O III	-1 ± 2	7 ± 5	13.83 ± 0.13
O VI	0 ± 1	27 ± 1	14.27 ± 0.02
H I	-272 ± 6	66 ± 10	13.37 ± 0.05
H I	-16 ± 1	64 ± 3	14.17 ± 0.04
H I	-2 ± 1	26 ± 1	14.71 ± 0.02

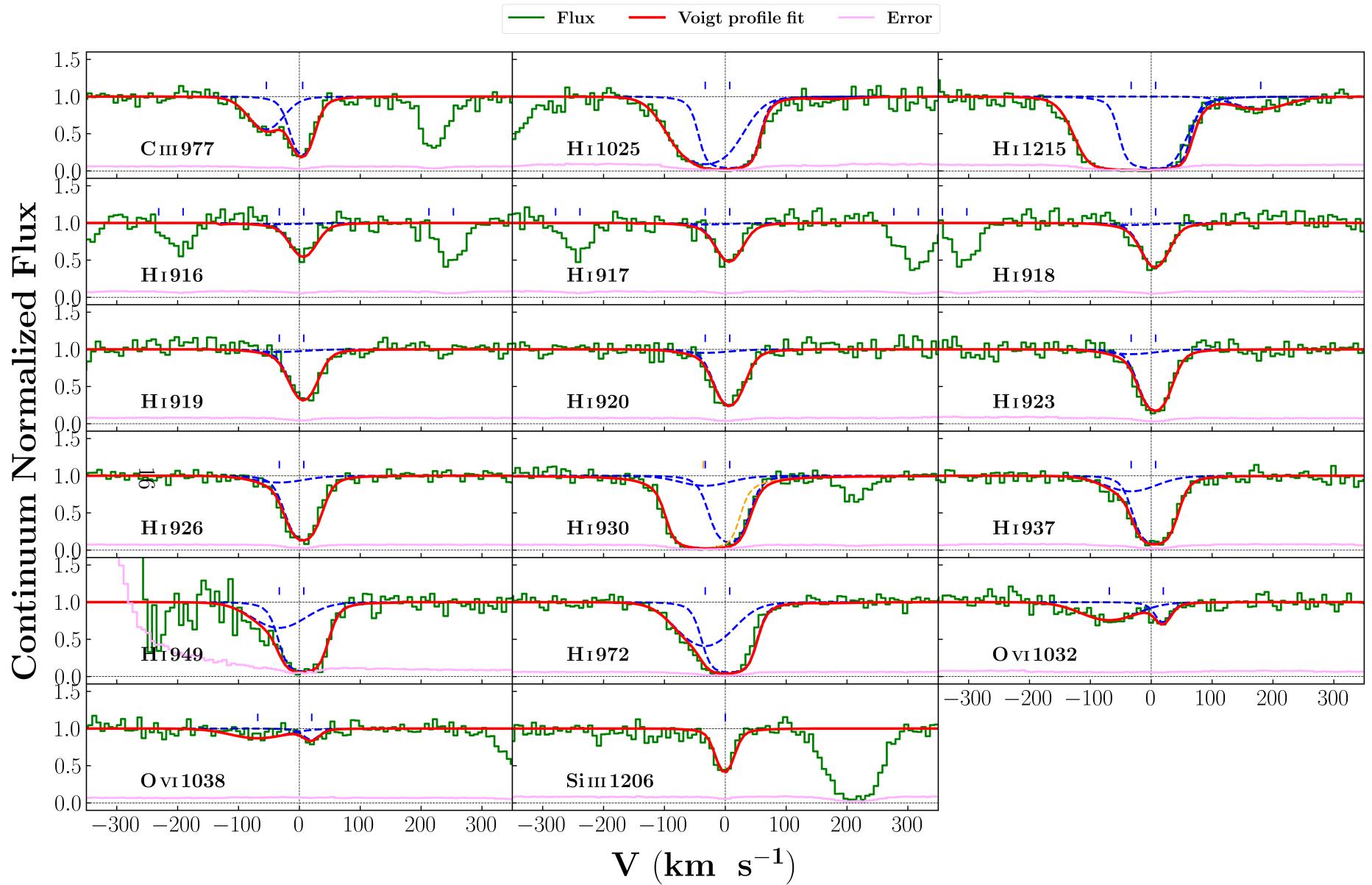
N(H I)=14.17

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



PG1216 + 069 ( $z_{\text{abs}} = 0.282286$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	0 ± 1	14 ± 3	12.92 ± 0.05
C III	-51 ± 3	32 ± 5	13.33 ± 0.05
C III	5 ± 1	16 ± 2	13.76 ± 0.07
O VI	-64 ± 6	58 ± 9	13.93 ± 0.05
O VI	19 ± 2	12 ± 5	13.54 ± 0.09
H I	-31 ± 1	52 ± 3	15.1 ± 0.05
H I	7 ± 1	22 ± 1	16.4 ± 0.03
H I	169 ± 22	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

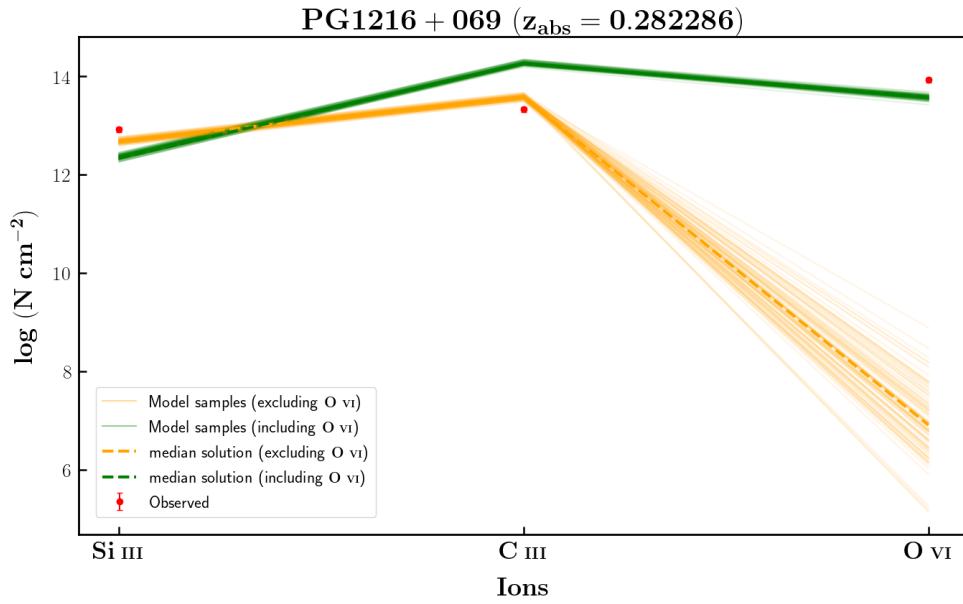


Figure 7: N(H I)=15.10

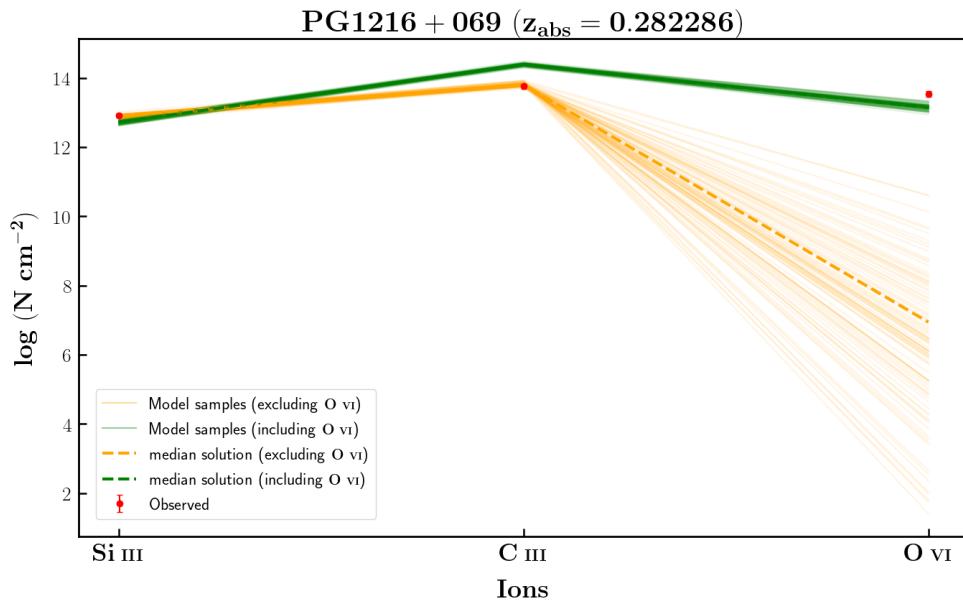
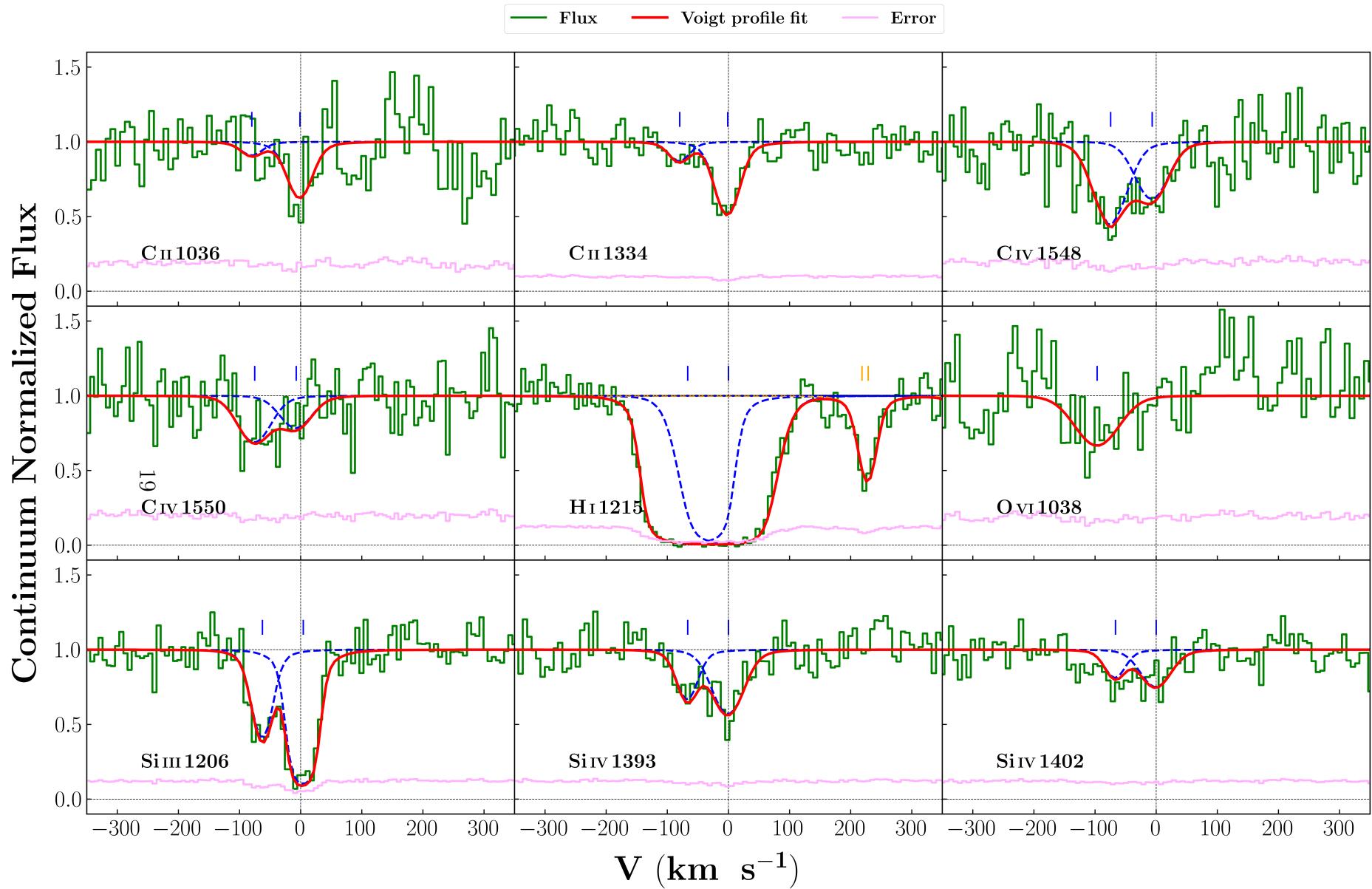


Figure 8: N(H I)=16.40

SDSSJ135712.61 + 170444 ( $z_{\text{abs}} = 0.097869$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-62 ± 2	17 ± 3	12.94 ± 0.05
Si III	4 ± 1	13 ± 10	14.67 ± 2.87
C IV	-74 ± 6	33 ± 1	13.82 ± 0.09
C IV	-7 ± 8	32 ± 12	13.63 ± 0.12
Si IV	-66 ± 4	18 ± 6	13.02 ± 0.08
Si IV	0 ± 4	29 ± 5	13.3 ± 0.05
C II	-79 ± 8	19 ± 14	13.17 ± 0.16
C II	-1 ± 2	22 ± 3	13.92 ± 0.04
O VI	-96 ± 10	43 ± 16	14.3 ± 0.11
H I	-536 ± 3	29 ± 5	13.36 ± 0.05
H I	-66 ± 0	29 ± 8	16.49 ± 0.12
H I	0 ± 0	46 ± 4	15.01 ± 0.16
H I	424 ± 3	34 ± 4	13.52 ± 0.04

N(H I)=16.49 (log  $Z_{ref}=-1$ )

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

log $Z_{ref}=-1$	
Excluding O VI : $n_H = -3.25 \pm 0.04$	$Z = 0.93 \pm 0.04$
Including O VI : $n_H = -3.84 \pm 0.03$	$Z = 0.75 \pm 0.03$

log $Z_{ref}=1$	
Excluding O VI : $n_H = -3.7 \pm 0.03$	$Z = 1.35 \pm 0.04$
Including O VI : $n_H = -4.30 \pm 0.03$	$Z = 1.00 \pm 0.03$

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

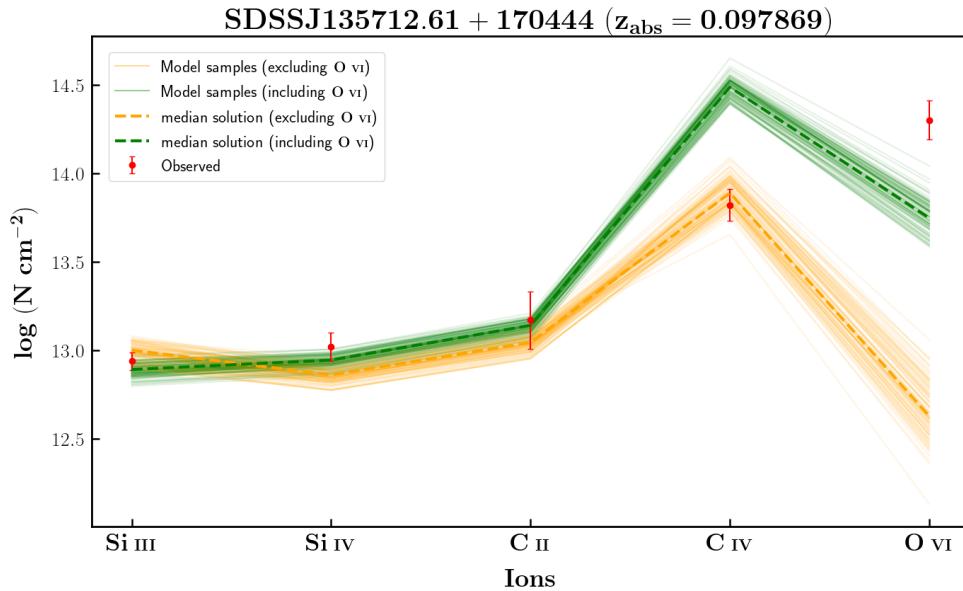


Figure 9:  $N(\text{H I})=16.49$ ,  $\log Z_{\text{ref}}=-1$

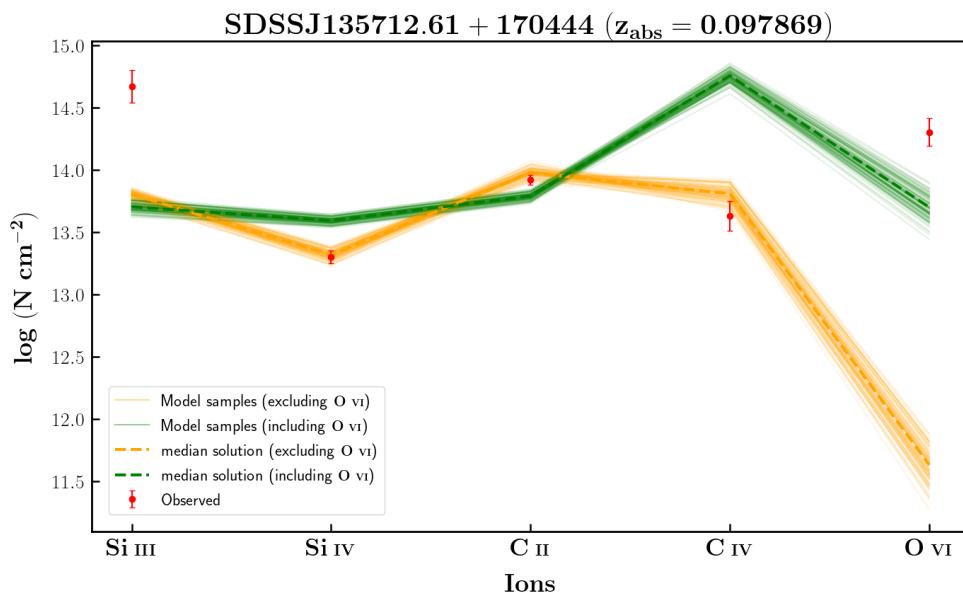


Figure 10:  $N(\text{H I})=15.01$ ,  $\log Z_{\text{ref}}=-1$

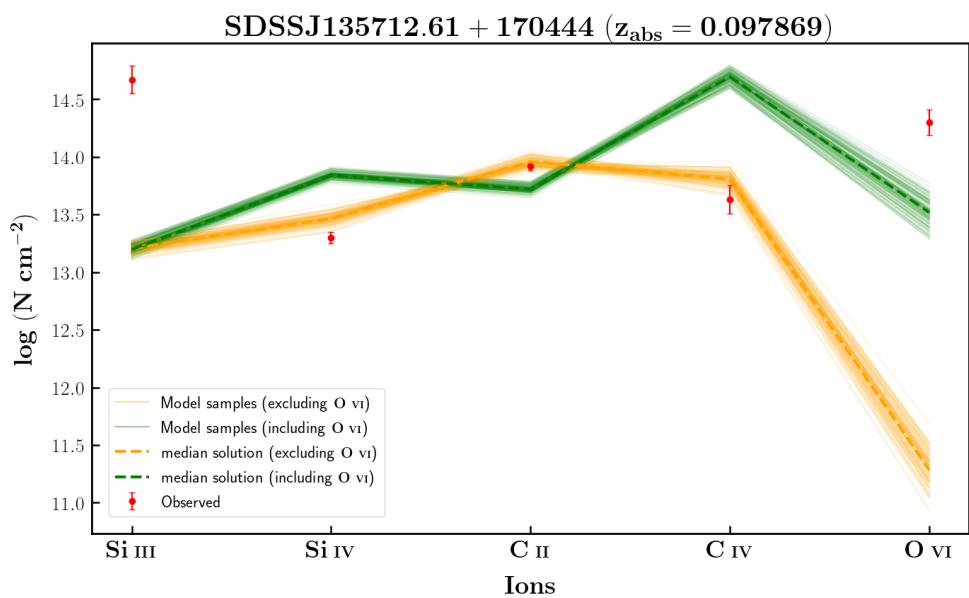
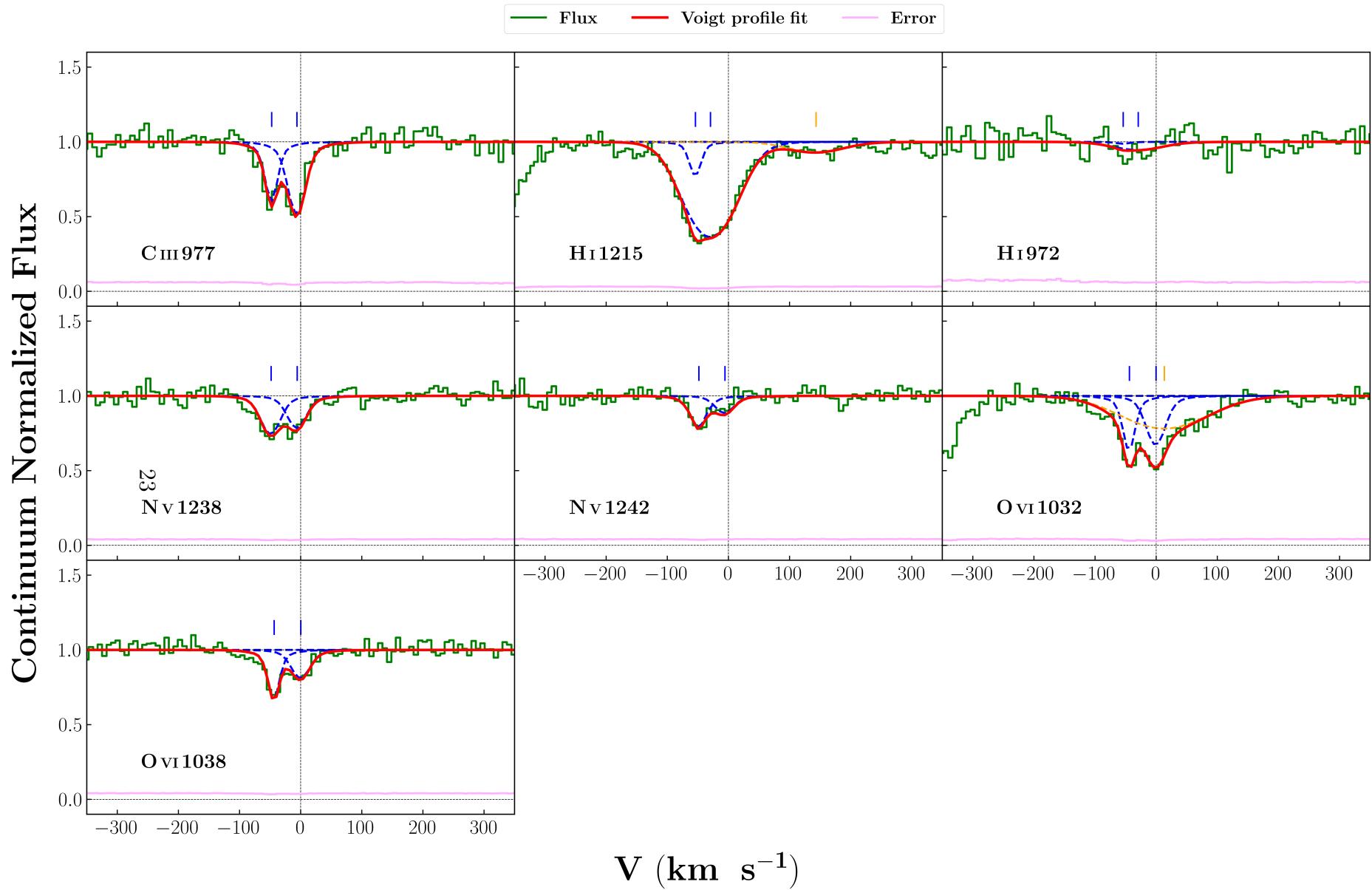


Figure 11:  $N(\text{H I})=15.01$ ,  $\log Z_{\text{ref}}=1$

1ES1553 + 113 ( $z_{\text{abs}} = 0.187764$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
C III	-46 ± 1	5 ± 4	13.17 ± 0.46
C III	-6 ± 1	13 ± 2	13.21 ± 0.03
N V	-47 ± 2	17 ± 0	13.43 ± 0.05
N V	-5 ± 2	16 ± 4	13.33 ± 0.06
O VI	-42 ± 1	3 ± 1	14.23 ± 0.33
O VI	0 ± 1	15 ± 3	13.71 ± 0.03
O VI	511 ± 3	28 ± 5	13.49 ± 0.05
H I	-52 ± 3	8 ± 6	12.76 ± 0.15
H I	-28 ± 1	51 ± 1	13.88 ± 0.01
H I	425 ± 3	25 ± 5	13.02 ± 0.07
H I	496 ± 2	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 :  $n_H = -4.44 \pm 0.02$        $Z = -0.06 \pm 0.02$

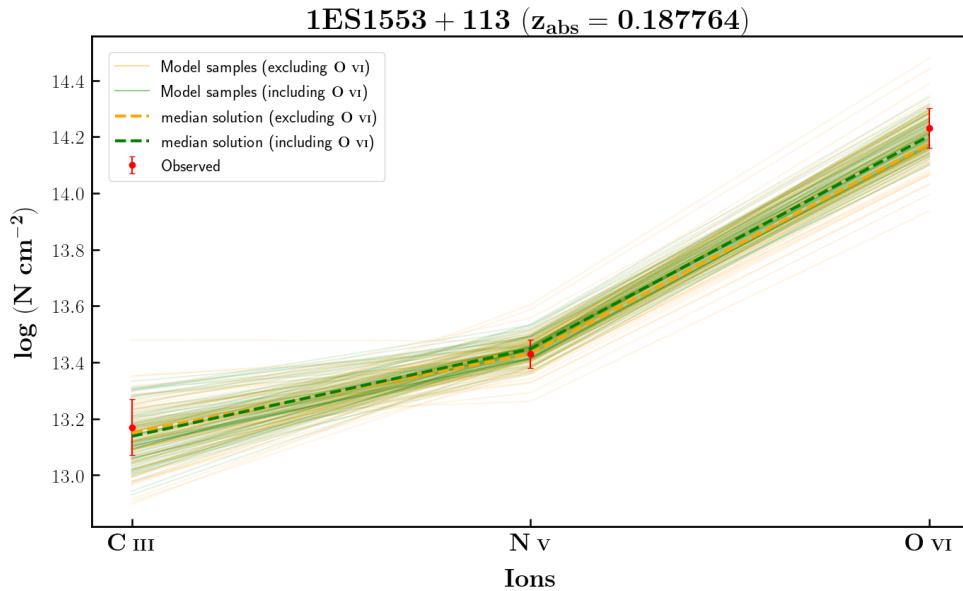


Figure 12:  $\text{N(HI)}=12.76$

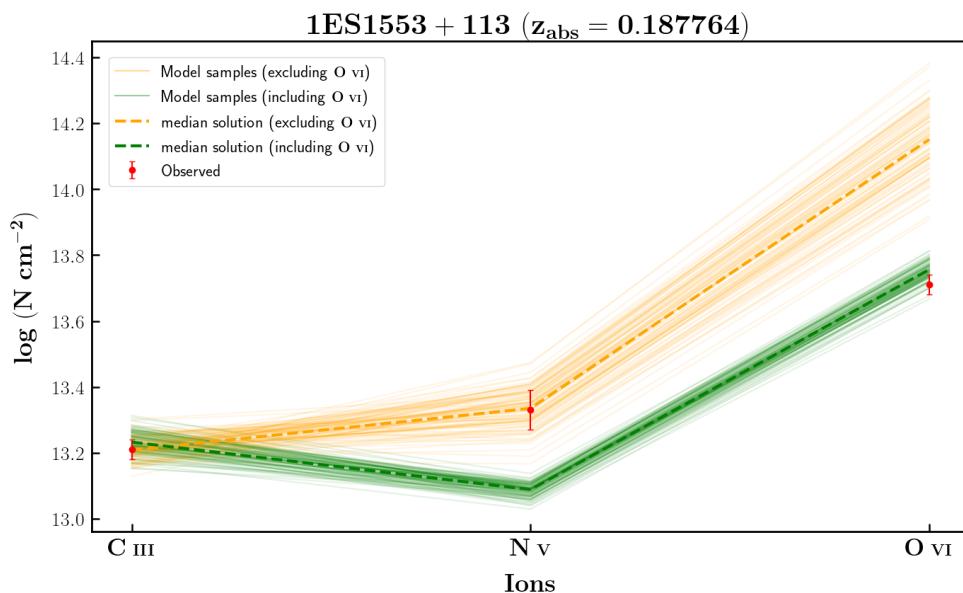
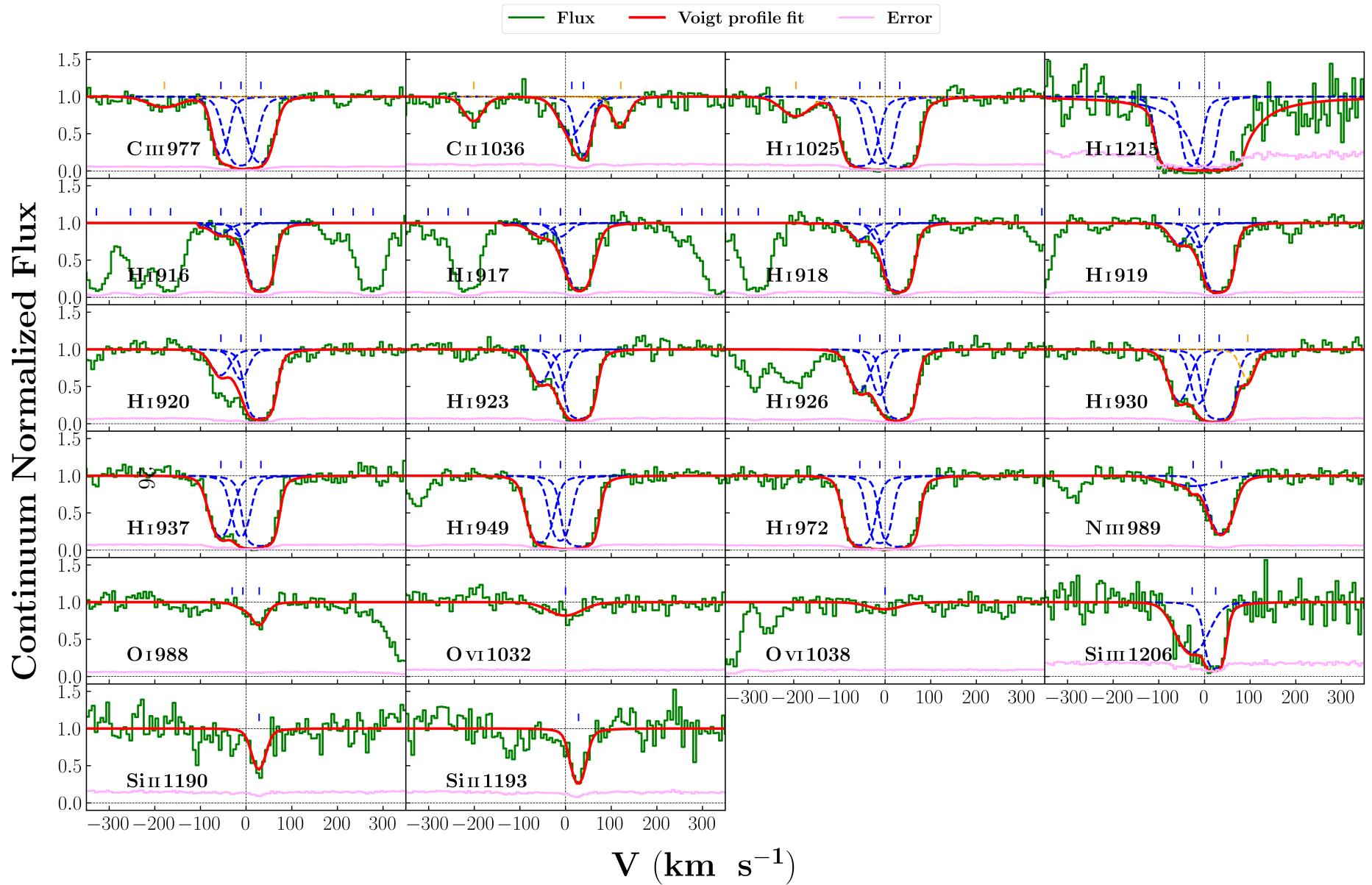


Figure 13:  $\text{N(HI)}=13.88$

# SBS1108 + 560 ( $z_{\text{abs}} = 0.463207$ )



<b>Ion</b>	<b>v (km s<sup>-1</sup>)</b>	<b>b (km s<sup>-1</sup>)</b>	<b>log [N cm<sup>-2</sup>]</b>
O I	25 ± 2	18 ± 4	14.13 ± 0.05
Si III	-23 ± 9	39 ± 12	13.26 ± 0.12
Si III	21 ± 2	13 ± 15	14.61 ± 0.24
C II	12 ± 9	31 ± 4	14.15 ± 0.05
C II	34 ± 2	12 ± 5	14.67 ± 0.1
C III	-48 ± 3	15 ± 1	13.66 ± 0.08
C III	-10 ± 3	26 ± 7	14.16 ± 0.07
C III	28 ± 3	24 ± 1	13.95 ± 0.05
N III	-22 ± 59	67 ± 61	13.77 ± 0.1
N III	32 ± 2	26 ± 4	14.49 ± 0.09
Si II	25 ± 1	15 ± 1	13.57 ± 0.08
O VI	0 ± 6	45 ± 10	13.71 ± 0.07
H I	-48 ± 0	22 ± 2	15.77 ± 0.02
H I	-10 ± 2	16 ± 0	15.79 ± 0.11
H I	28 ± 1	16 ± 1	18.1 ± 0.12

$\log Z_{ref} = -1$   
 $N(HI) = 18.10$

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

$N(HI) = 15.79$

Excluding O VI :  $n_H = -2.65 \pm 0.22$        $Z = 1.6 \pm 0.22$   
Including O VI :  $n_H = -3.56 \pm 0.03$        $Z = 1.16 \pm 0.05$

$\log Z_{ref} = 1$   
 $N(HI) = 18.10$

Excluding O VI :  $n_H = -2.55 \pm 0.03$        $Z = -0.83 \pm 0.04$   
Including O VI :  $n_H = -3.49 \pm 0.01$        $Z = -0.92 \pm 0.03$

N(H I)=15.79

Excluding O VI :  $n_H = -3.33 \pm 0.10$        $Z = -0.02 \pm 0.12$   
Including O VI :  $n_H = -3.99 \pm 0.02$        $Z = -0.44 \pm 0.05$

NOTE : With  $\log Z_{ref} = 1$ , logZ is coming -ve for both the components

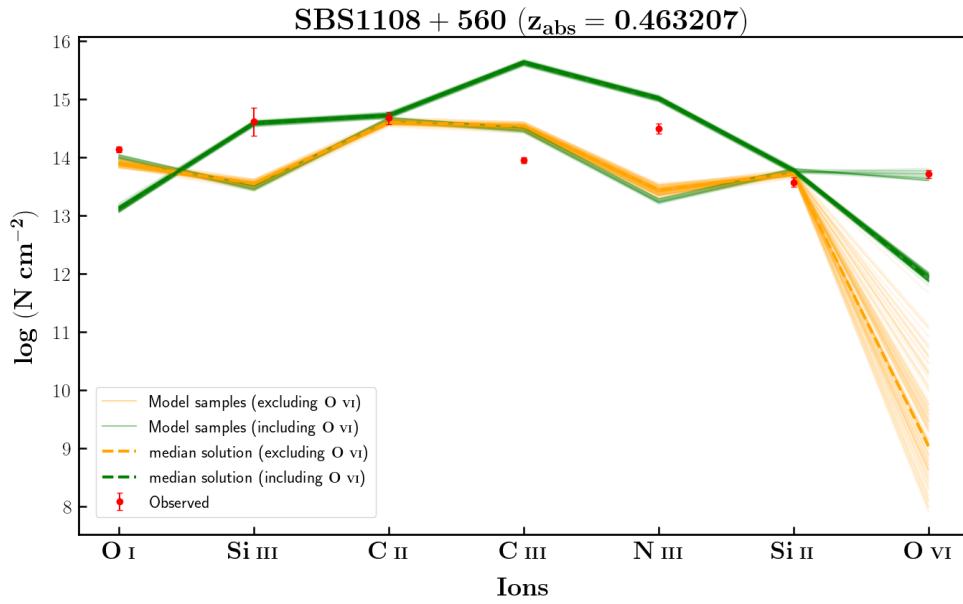


Figure 14:  $\text{N(HI)}=18.10$ ,  $\log Z_{\text{ref}}=-1$

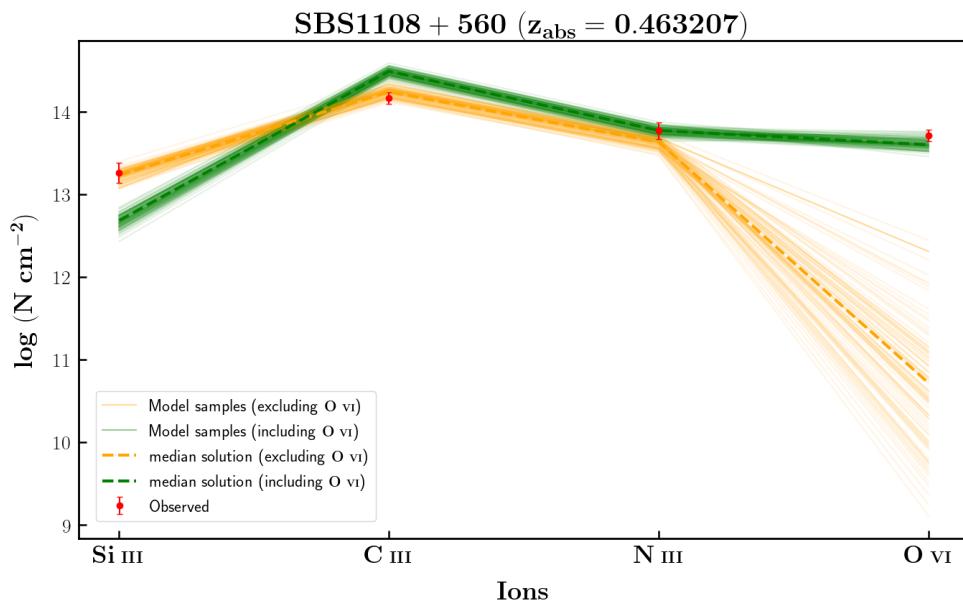


Figure 15:  $\text{N(HI)}=15.79$ ,  $\log Z_{\text{ref}}=-1$

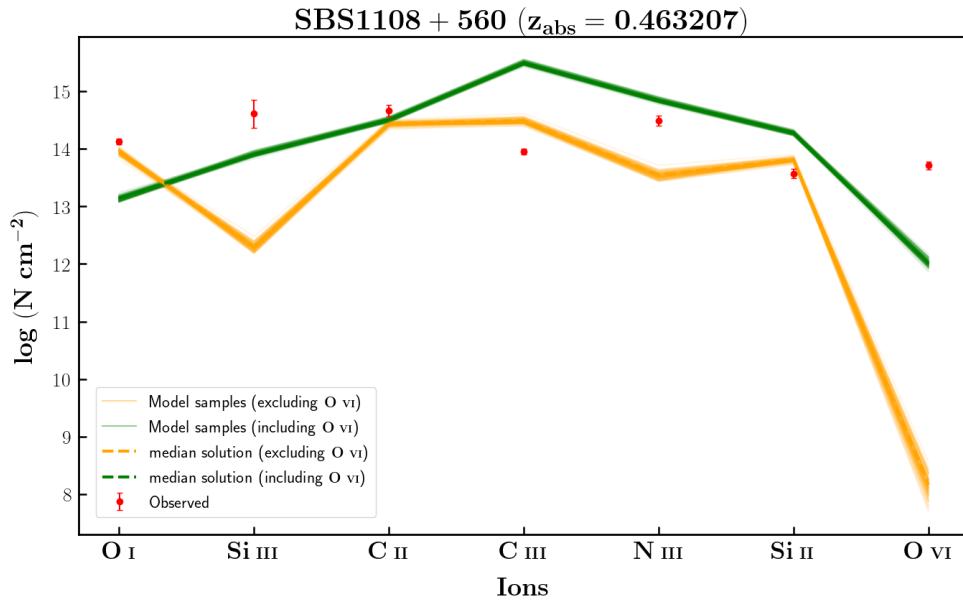


Figure 16:  $N(\text{H I})=18.10$ ,  $\log Z_{\text{ref}}=1$

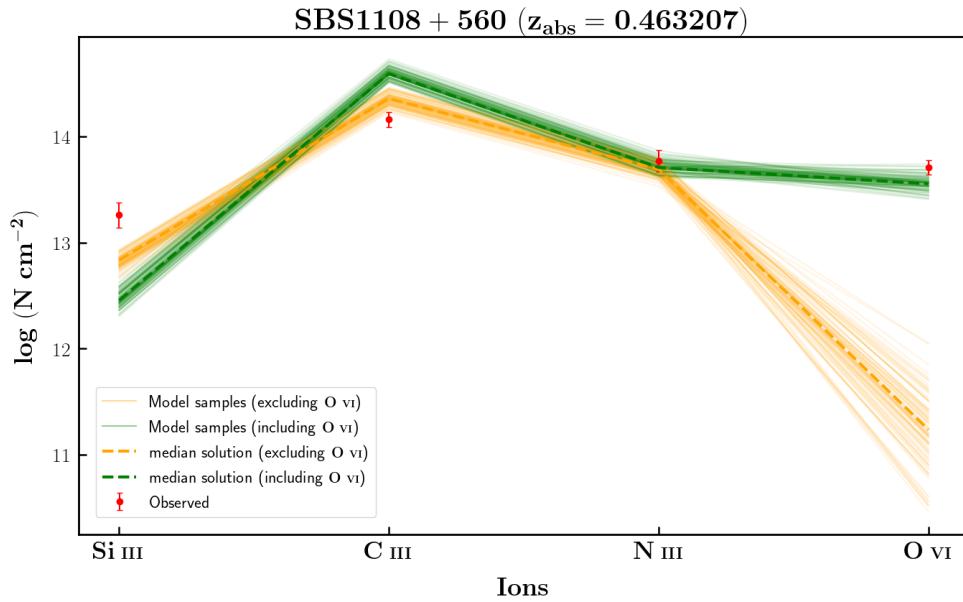
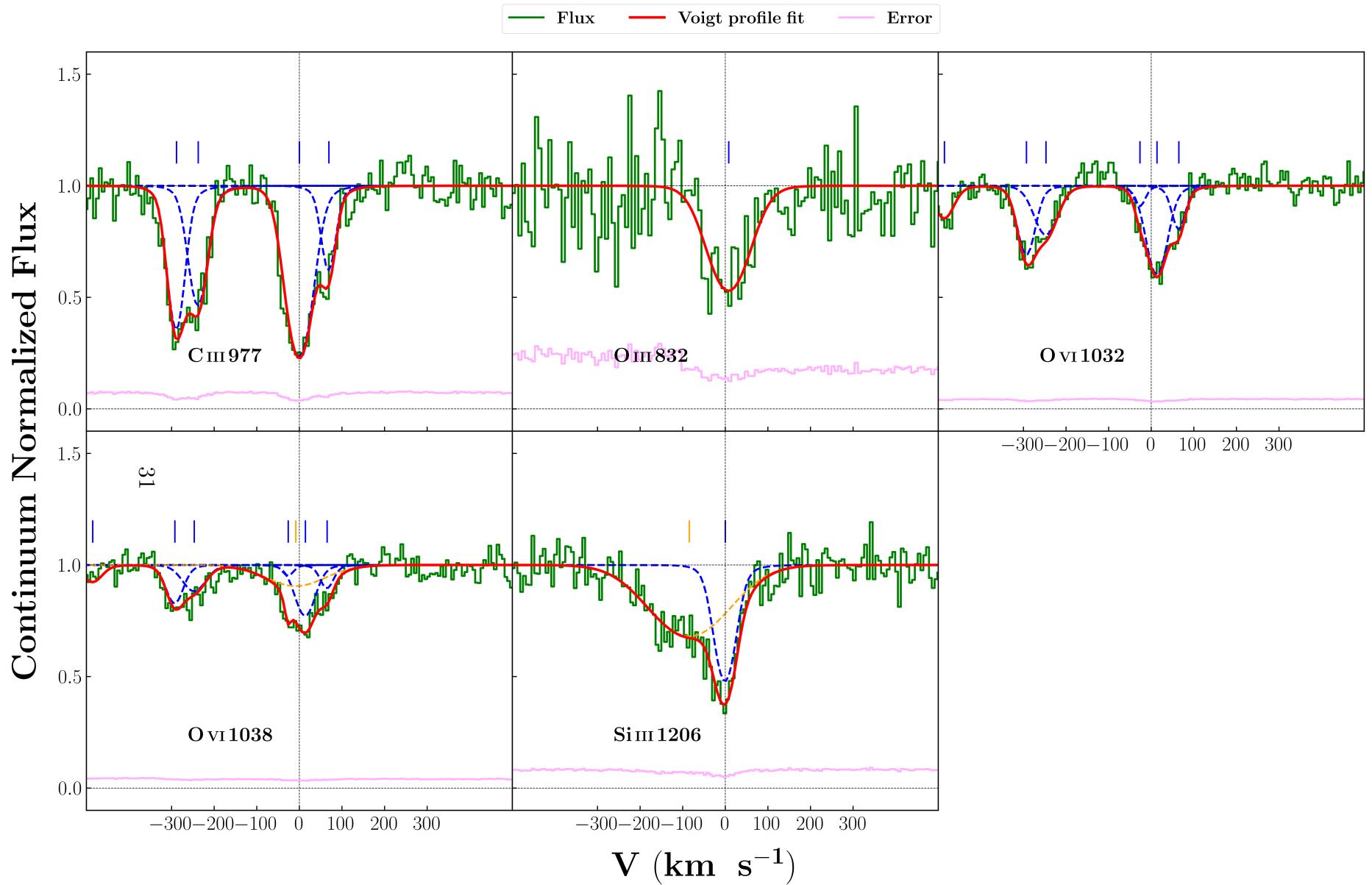


Figure 17:  $N(\text{H I})=15.79$ ,  $\log Z_{\text{ref}}=1$

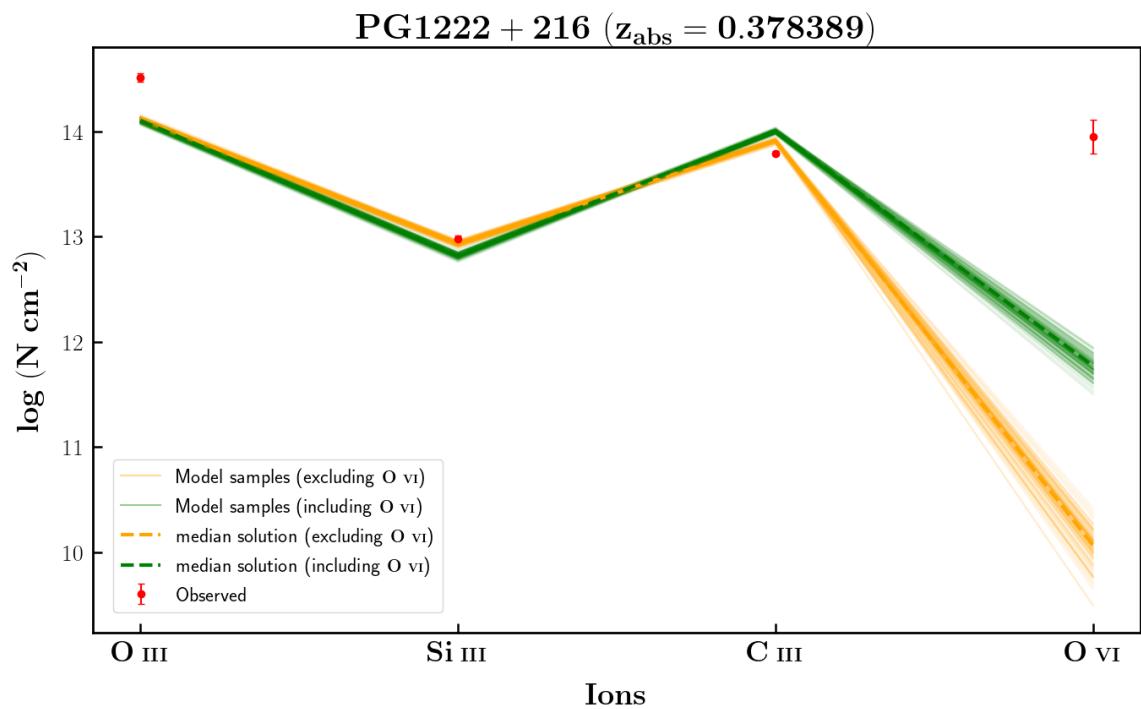
PG1222 + 216 ( $z_{\text{abs}} = 0.378389$ )



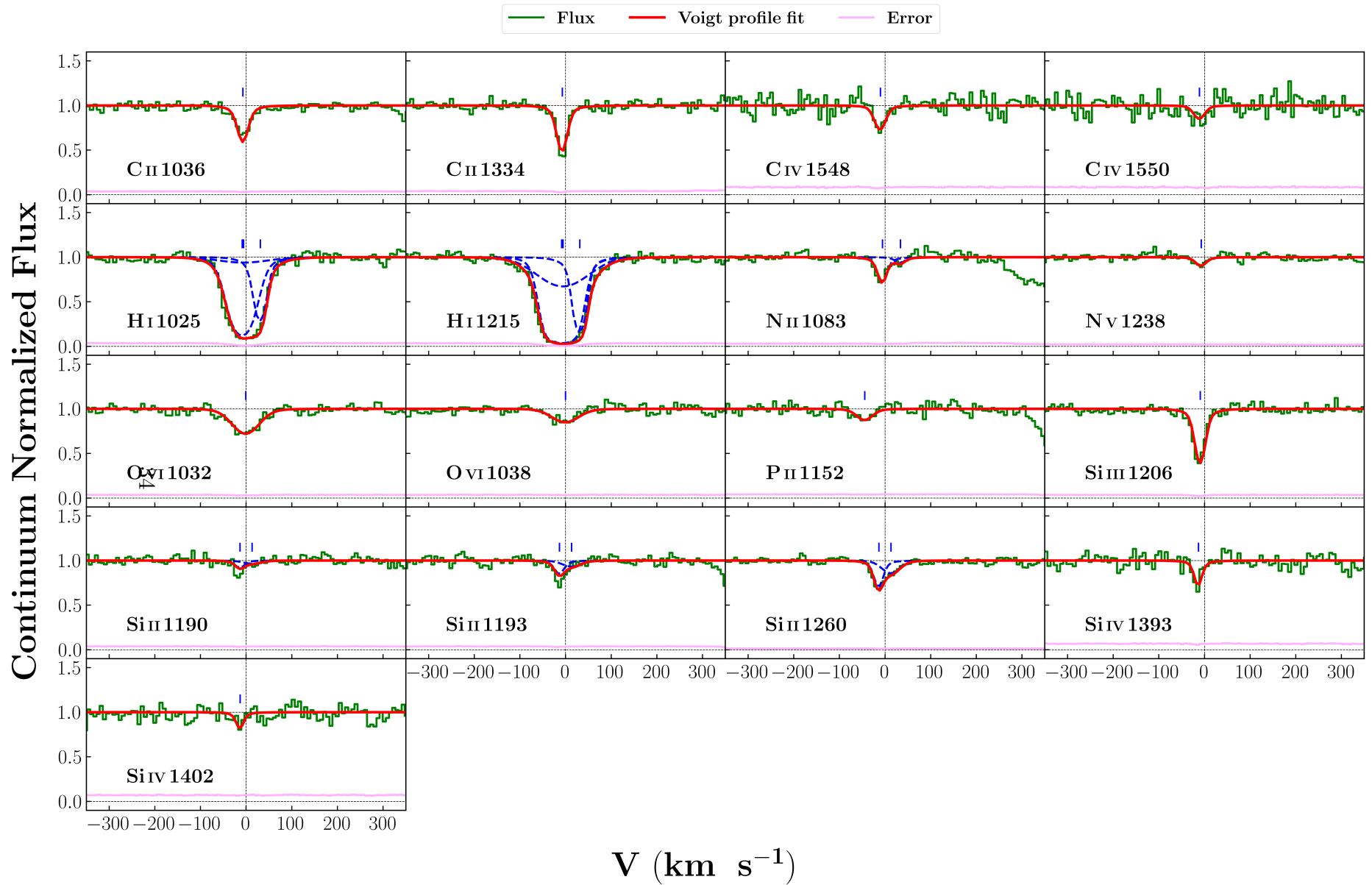
Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
O III	7 ± 5	61 ± 8	14.51 ± 0.04
Si III	0 ± 2	30 ± 3	12.98 ± 0.03
C III	-261 ± 3	17 ± 5	13.54 ± 0.06
C III	-215 ± 5	22 ± 6	13.40 ± 0.08
C III	0 ± 2	32 ± 3	13.79 ± 0.02
C III	63 ± 3	13 ± 6	13.12 ± 0.07
O VI	-439 ± 3	28 ± 5	13.42 ± 0.06
O VI	-264 ± 6	24 ± 6	13.75 ± 0.2
O VI	-223 ± 14	34 ± 13	13.68 ± 0.24
O VI	-24 ± 12	14 ± 18	13.00 ± 0.11
O VI	13 ± 4	29 ± 13	13.95 ± 0.16
O VI	59 ± 6	18 ± 7	13.42 ± 0.23
H I	-455 ± 3	26 ± 4	13.40 ± 0.06
H I	-353 ± 9	64 ± 19	13.54 ± 0.11
H I	-268 ± 1	16 ± 6	13.70 ± 0.14
H I	-227 ± 5	52 ± 4	14.34 ± 0.05
H I	-27 ± 2	23 ± 1	14.73 ± 0.08
H I	31 ± 2	43 ± 1	15.43 ± 0.04

$$N(HI) = 15.43$$

Excluding O VI : $n_H = -2.66 \pm 0.05$	Z = $-0.25 \pm 0.06$
Including O VI : $n_H = -3.16 \pm 0.03$	Z = $-0.66 \pm 0.02$



PG1116 + 215 ( $z_{\text{abs}} = 0.138527$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
N V	-7 ± 3	12 ± 6	12.84 ± 0.09
N II	-5 ± 1	6 ± 3	13.62 ± 0.11
N II	33 ± 6	8 ± 13	12.85 ± 0.15
P II	-44 ± 5	19 ± 8	12.94 ± 0.09
Si II	-13 ± 1	9 ± 1	12.46 ± 0.06
Si II	13 ± 1	23 ± 3	12.31 ± 0.04
Si III	-9 ± 1	10 ± 1	12.92 ± 0.04
Si IV	-13 ± 2	4 ± 3	12.84 ± 0.09
O VI	-1 ± 1	35 ± 3	13.84 ± 0.02
C IV	-10 ± 3	13 ± 4	13.17 ± 0.07
C II	-7 ± 1	9 ± 1	13.85 ± 0.04
H I	-8 ± 3	27 ± 2	14.97 ± 0.05
H I	-5 ± 9	71 ± 14	13.6 ± 0.23
H I	31 ± 2	6 ± 2	16.04 ± 1.77

$$N(HI) = 13.60$$

$$\log Z_{ref} = -1$$

Excluding O VI : $n_H = -3.24 \pm 0.03$	$Z = 1.92 \pm 0.03$
Including O VI : $n_H = -3.88 \pm 0.01$	$Z = 1.87 \pm 0.02$

$$\log Z_{ref} = 1$$

Excluding O VI : $n_H = -3.92 \pm 0.02$	$Z = 2.0 \pm 0.0$
Including O VI : $n_H = -4.35 \pm 0.0$	$Z = 2.0 \pm 0.0$

NOTE : logZ coming near 2 for both the cases and for logZ=1 also, P II is not Included

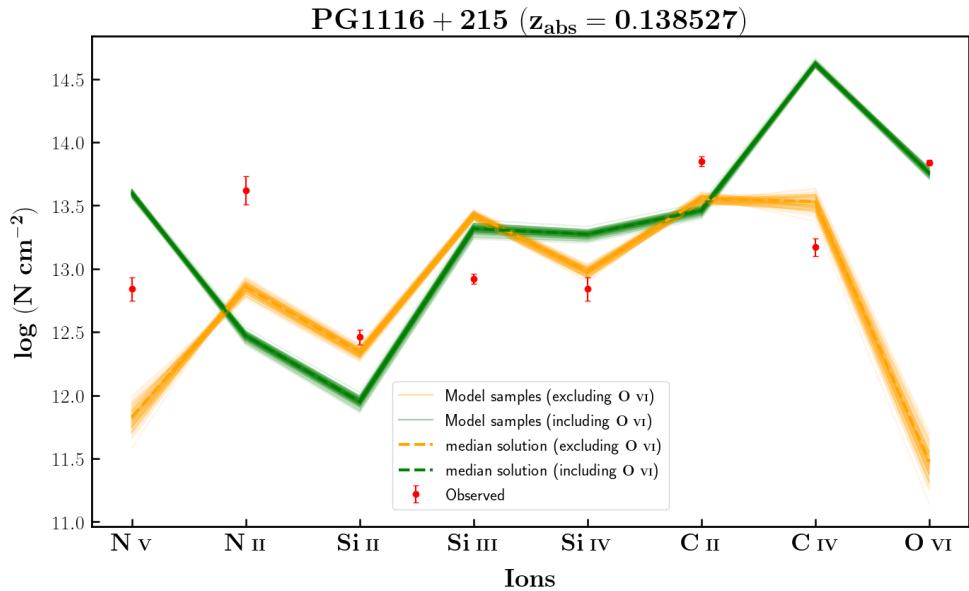


Figure 18:  $\text{N}(\text{H I})=13.60$ ,  $\log Z_{\text{ref}} = -1$

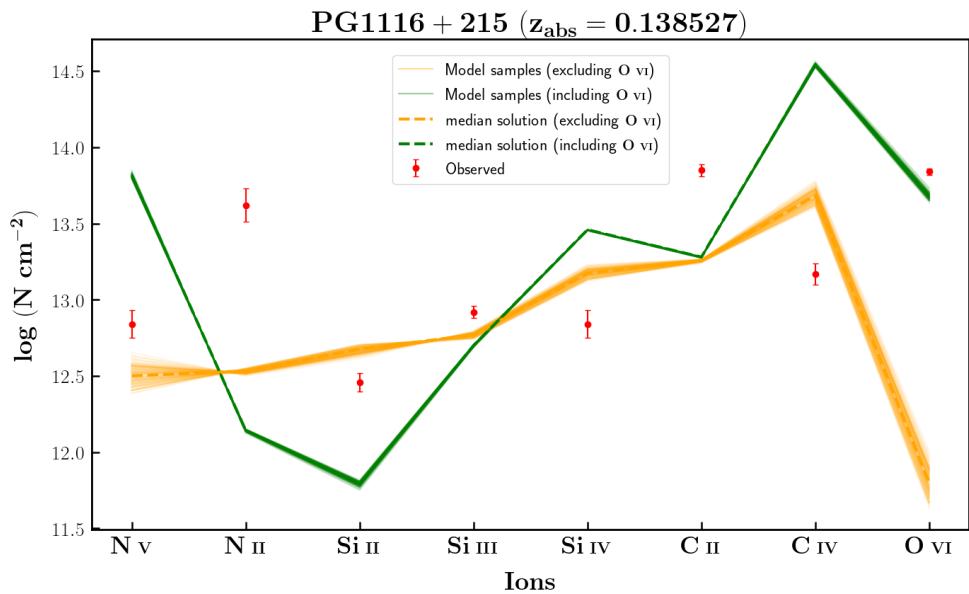
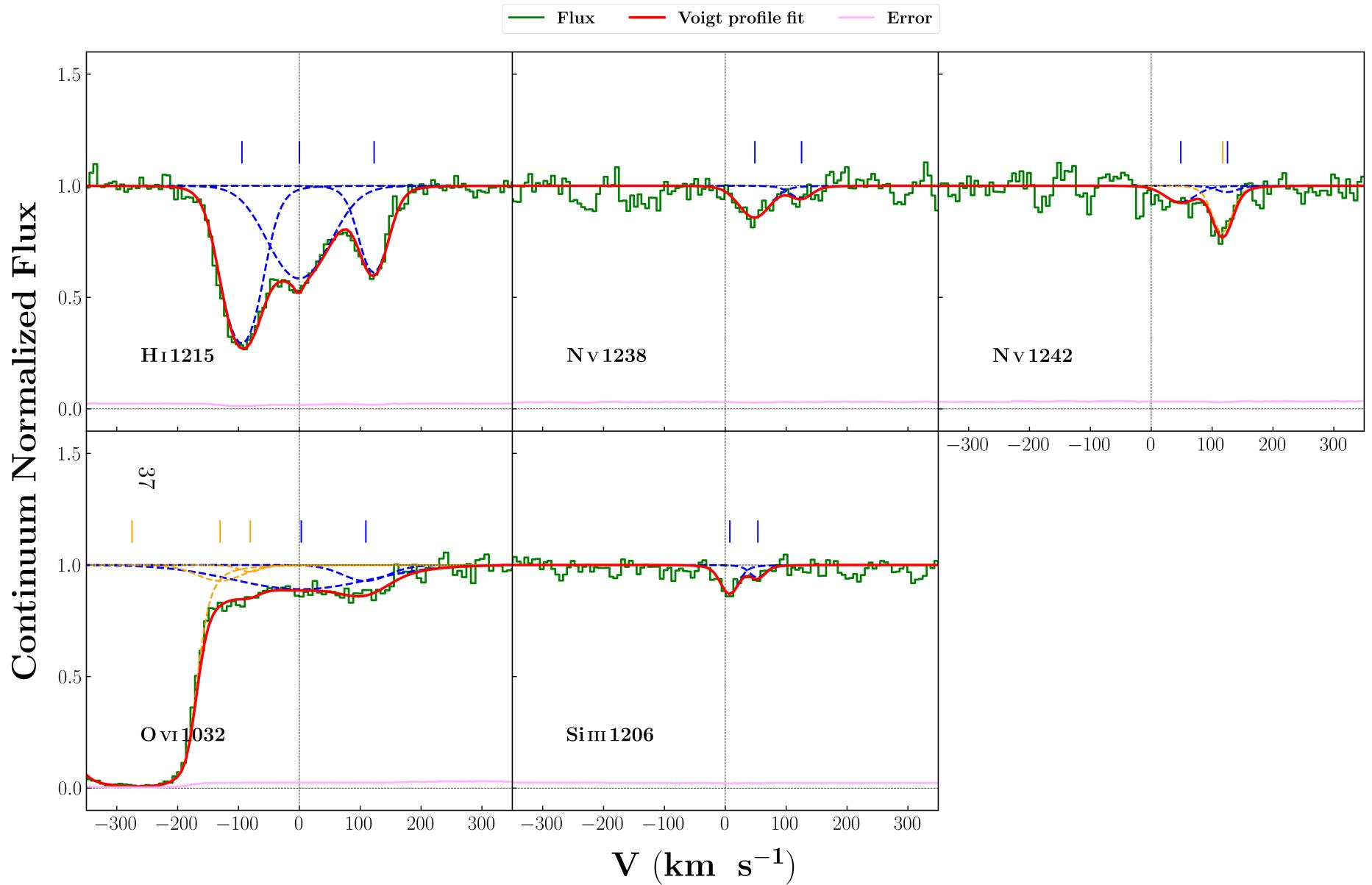


Figure 19:  $\text{N}(\text{H I})=13.60$ ,  $\log Z_{\text{ref}} = 1$

H1821 + 643 ( $z_{\text{abs}} = 0.170006$ )



<b>Ion</b>	<b>v (km s<sup>-1</sup>)</b>	<b>b (km s<sup>-1</sup>)</b>	<b>log [N cm<sup>-2</sup>]</b>
Si III	7 ± 3	17 ± 5	12.05 ± 0.07
Si III	52 ± 6	14 ± 10	11.62 ± 0.17
N V	47 ± 3	31 ± 5	13.29 ± 0.05
N V	122 ± 7	21 ± 11	12.74 ± 0.14
O VI	3 ± 28	152 ± 20	13.94 ± 0.06
O VI	107 ± 9	48 ± 12	13.29 ± 0.11
H I	-92 ± 1	36 ± 1	13.85 ± 0.02
H I	0 ± 2	63 ± 3	13.68 ± 0.02
H I	120 ± 1	28 ± 1	13.35 ± 0.02

$$\log Z_{ref} = -1$$

$$N(HI) = 13.68$$

$$\text{Excluding O VI : } n_H = -4.10 \pm 0.02 \quad Z = 0.91 \pm 0.04$$

$$\text{Including O VI : } n_H = -4.14 \pm 0.02 \quad Z = 0.94 \pm 0.04$$

$$N(HI) = 13.35$$

$$\text{Excluding O VI : } n_H = -4.07 \pm 0.06 \quad Z = 0.75 \pm 0.11$$

$$\text{Including O VI : } n_H = -4.11 \pm 0.05 \quad Z = 0.79 \pm 0.10$$

$$\log Z_{ref} = 1$$

$$N(HI) = 13.68$$

$$\text{Excluding O VI : } n_H = -4.33 \pm 0.02 \quad Z = 1.30 \pm 0.05$$

$$\text{Including O VI : } n_H = -4.43 \pm 0.01 \quad Z = 1.25 \pm 0.05$$

$$N(HI) = 13.35$$

$$\text{Excluding O VI : } n_H = -4.30 \pm 0.05 \quad Z = 1.18 \pm 0.13$$

$$\text{Including O VI : } n_H = -4.41 \pm 0.02 \quad Z = 1.15 \pm 0.12$$

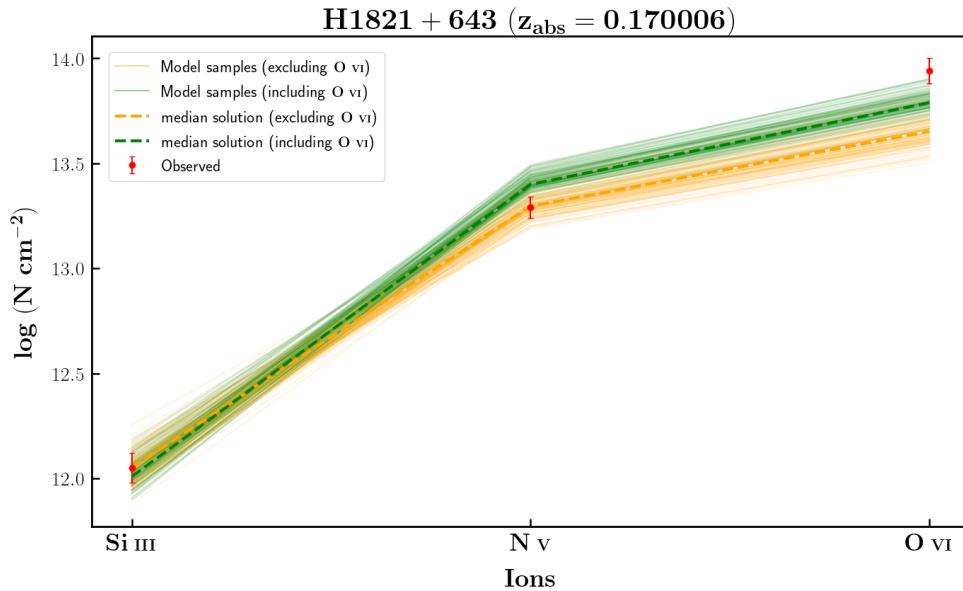


Figure 20:  $\text{N(H I)}=13.68$ ,  $\log Z_{\text{ref}} = -1$

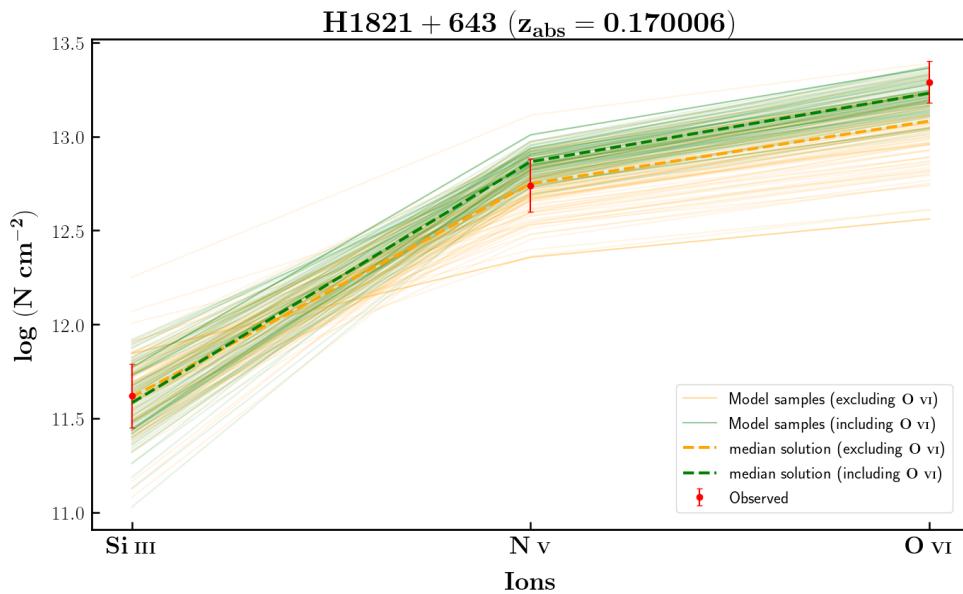


Figure 21:  $\text{N(H I)}=13.35$ ,  $\log Z_{\text{ref}} = -1$

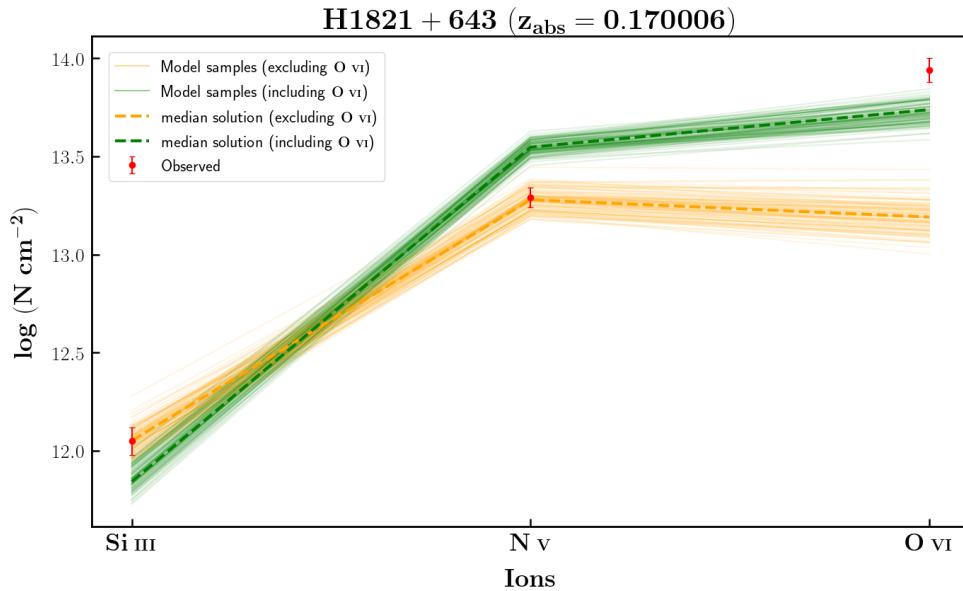


Figure 22:  $\text{N(HI)}=13.68$ ,  $\log Z_{\text{ref}} = 1$

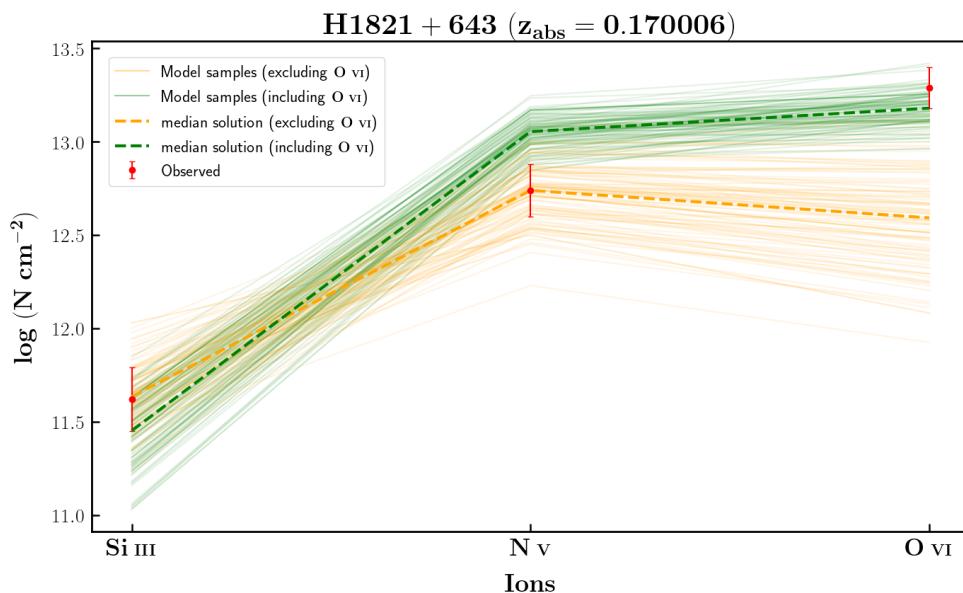
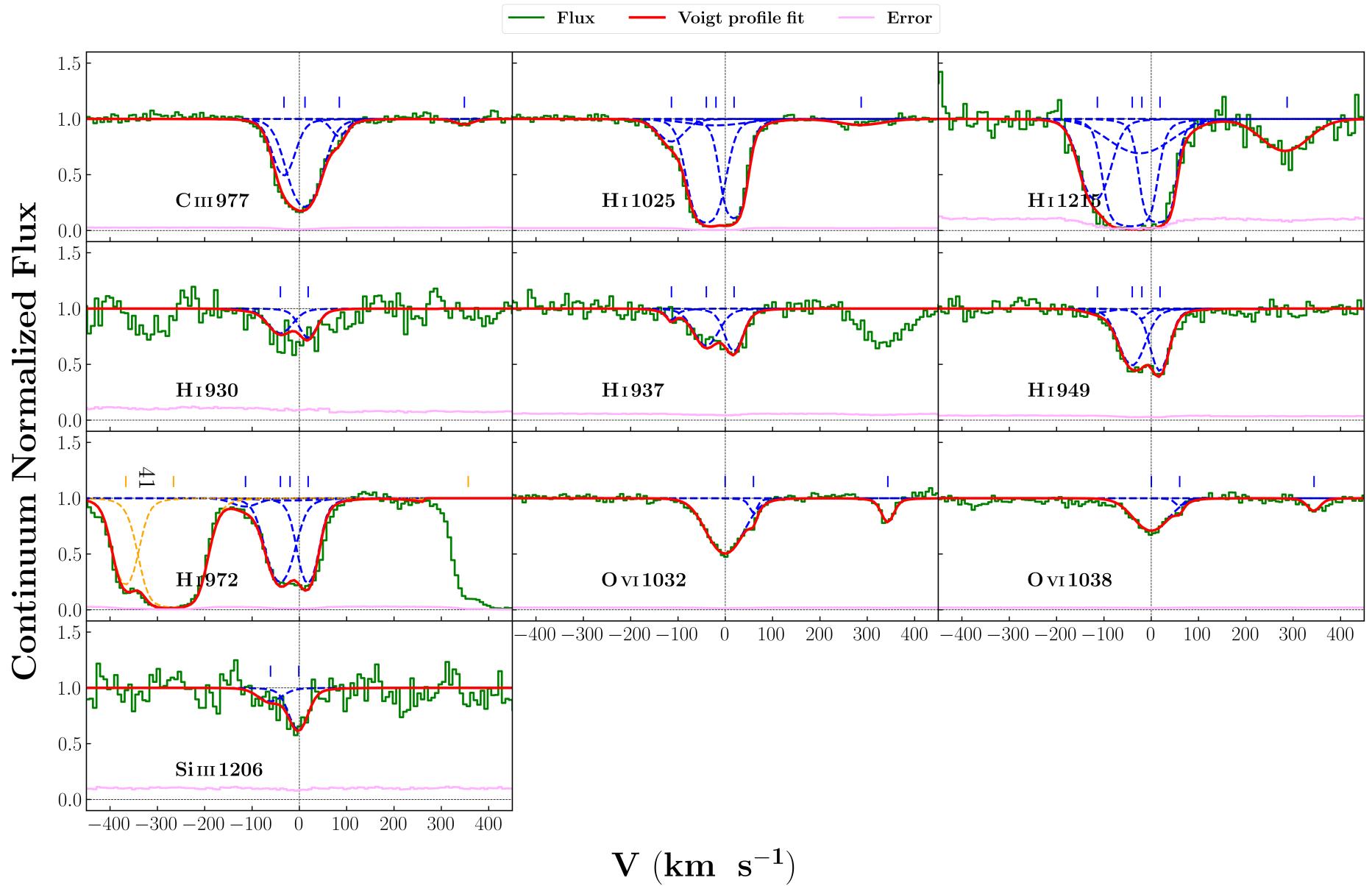


Figure 23:  $\text{N(HI)}=13.35$ ,  $\log Z_{\text{ref}} = 1$

H1821 + 643 ( $z_{\text{abs}} = 0.224981$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-59 ± 13	31 ± 18	12.23 ± 0.15
Si III	-1 ± 6	22 ± 9	12.71 ± 0.13
C III	-31 ± 1	24 ± 2	13.36 ± 0.07
C III	12 ± 1	36 ± 2	13.84 ± 0.02
C III	81 ± 3	15 ± 5	12.6 ± 0.09
C III	335 ± 7	20 ± 10	12.13 ± 0.11
O VI	0 ± 1	45 ± 1	14.24 ± 0.01
O VI	57 ± 2	3 ± 3	13.12 ± 0.1
O VI	330 ± 1	13 ± 2	13.42 ± 0.03
H I	-109 ± 3	33 ± 0	13.87 ± 0.09
H I	-38 ± 1	30 ± 1	15.16 ± 0.02
H I	-19 ± 10	84 ± 13	13.64 ± 0.11
H I	18 ± 1	19 ± 1	15.13 ± 0.03
H I	276 ± 7	62 ± 11	13.48 ± 0.06

N(H I)= 15.16

Excluding O VI :  $n_H = -3.29 \pm 0.08$        $Z = -0.95 \pm 0.07$   
 Including O VI :  $n_H = -4.36 \pm 0.02$        $Z = -0.81 \pm 0.04$

N(H I)= 15.13

Excluding O VI :  $n_H = -3.29 \pm 0.03$        $Z = -0.44 \pm 0.03$   
 Including O VI :  $n_H = -3.83 \pm 0.04$        $Z = -0.77 \pm 0.03$

NOTE : Solution using  $\chi^2$ , MCMC didn't converge good, shows hint of two solution, another solution with high density and metallicity for both the components

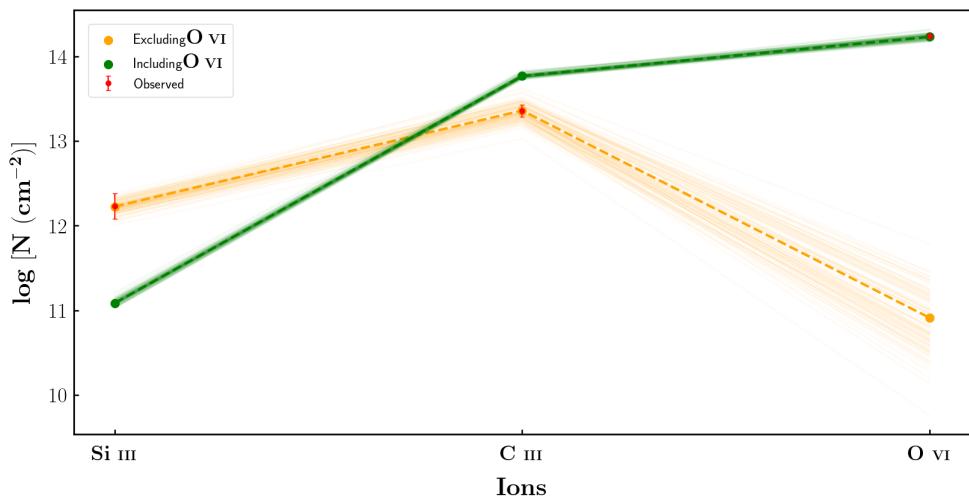


Figure 24:  $N(\text{H I})=15.16$

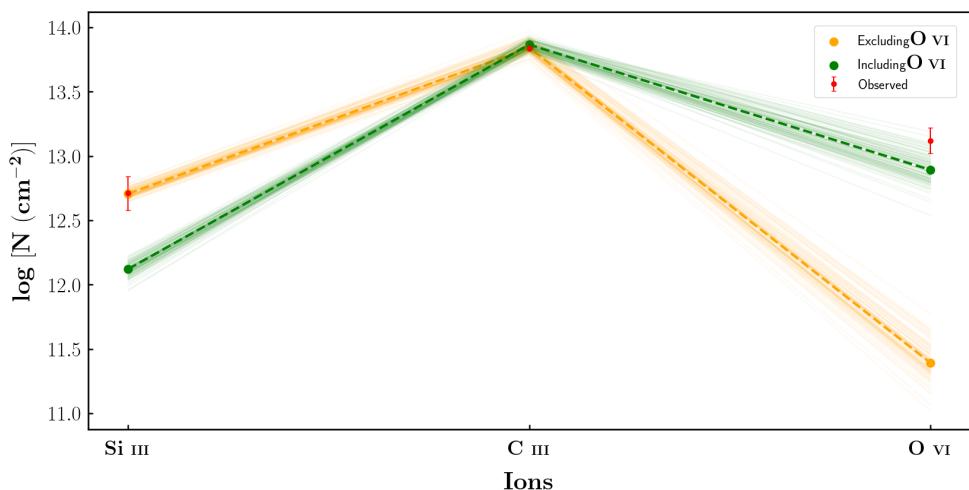
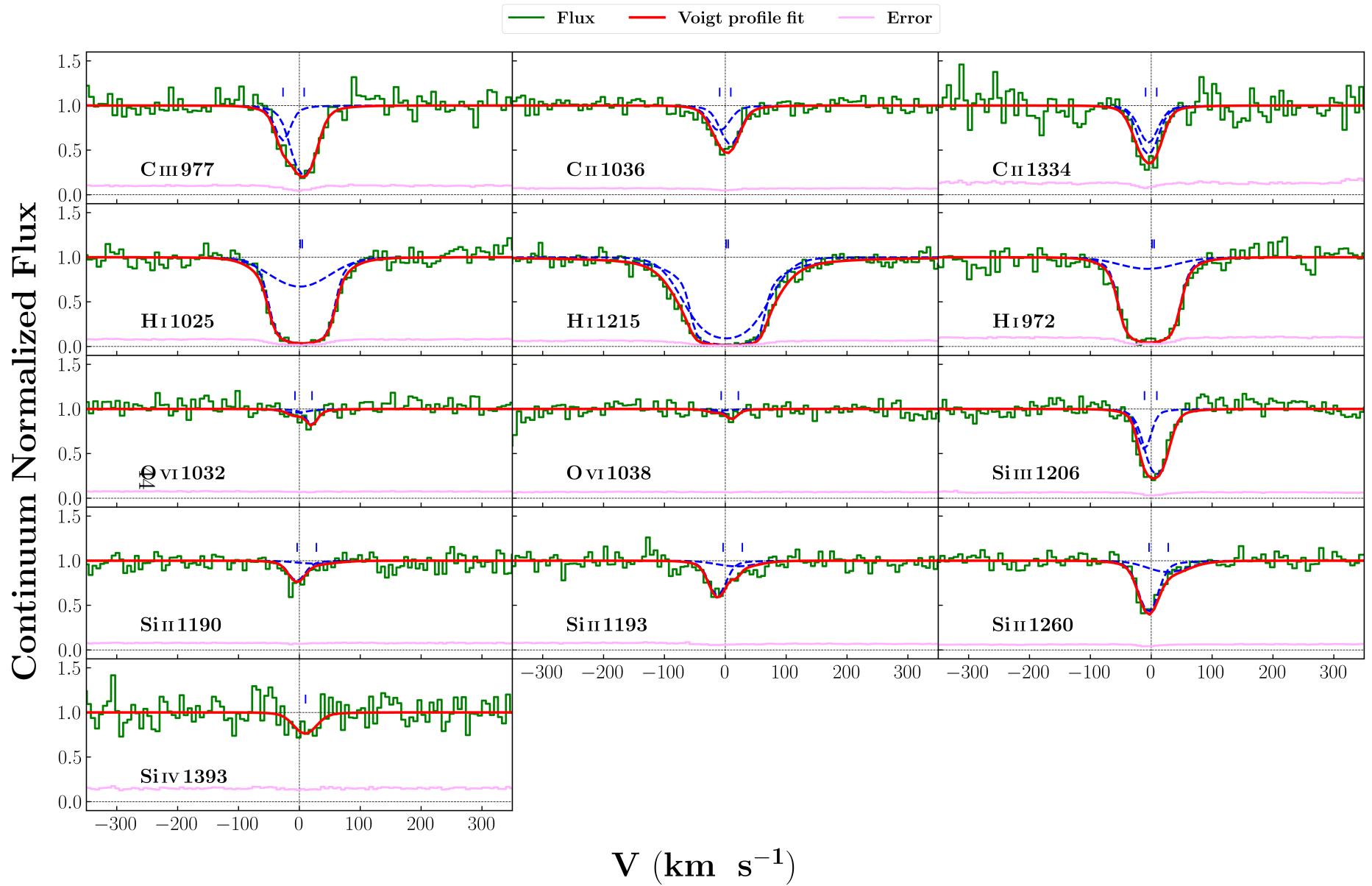


Figure 25:  $N(\text{H I})=15.13$

PG1121 + 422 ( $z_{\text{abs}} = 0.192393$ )



Ion	v (km s <sup>-1</sup> )	b (km s <sup>-1</sup> )	log [N cm <sup>-2</sup> ]
Si III	-11 ± 13	10 ± 3	12.62 ± 0.10
Si III	9 ± 13	18 ± 4	13.14 ± 0.04
C III	-26 ± 10	10 ± 7	13.04 ± 0.09
C III	8 ± 5	18 ± 6	13.74 ± 0.11
C II	-9 ± 3	17 ± 5	13.69 ± 0.08
C II	9 ± 2	16 ± 3	13.93 ± 0.05
Si IV	10 ± 7	22 ± 11	12.86 ± 0.13
Si II	-3 ± 1	15 ± 2	13.04 ± 0.06
Si II	27 ± 19	42 ± 1	12.48 ± 0.23
O VI	-7 ± 13	11 ± 16	12.84 ± 0.19
O VI	20 ± 3	3 ± 4	13.37 ± 0.12
H I	1 ± 2	60 ± 6	14.34 ± 0.09
H I	5 ± 1	19 ± 1	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.

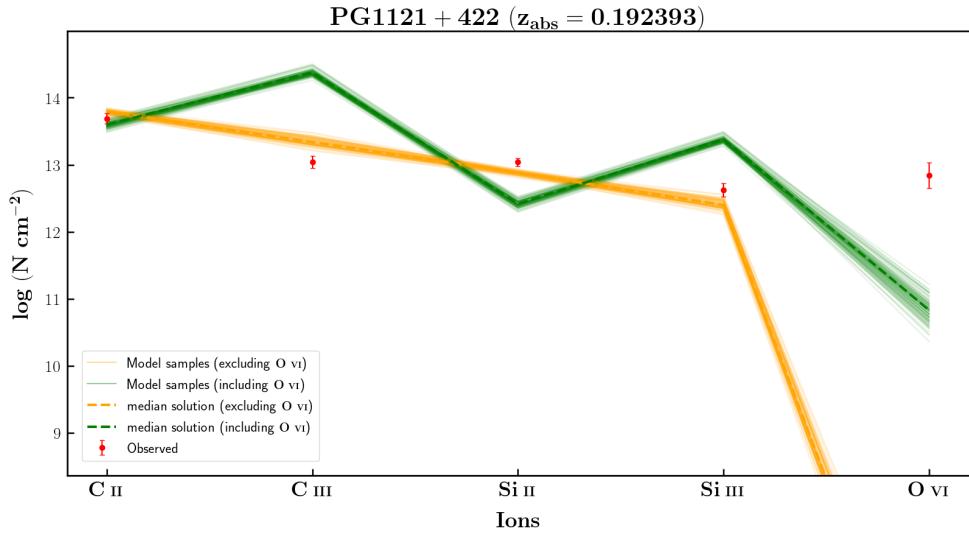


Figure 26:  $N(\text{H I})=14.34$ ,  $\log Z_{\text{ref}}=-1$

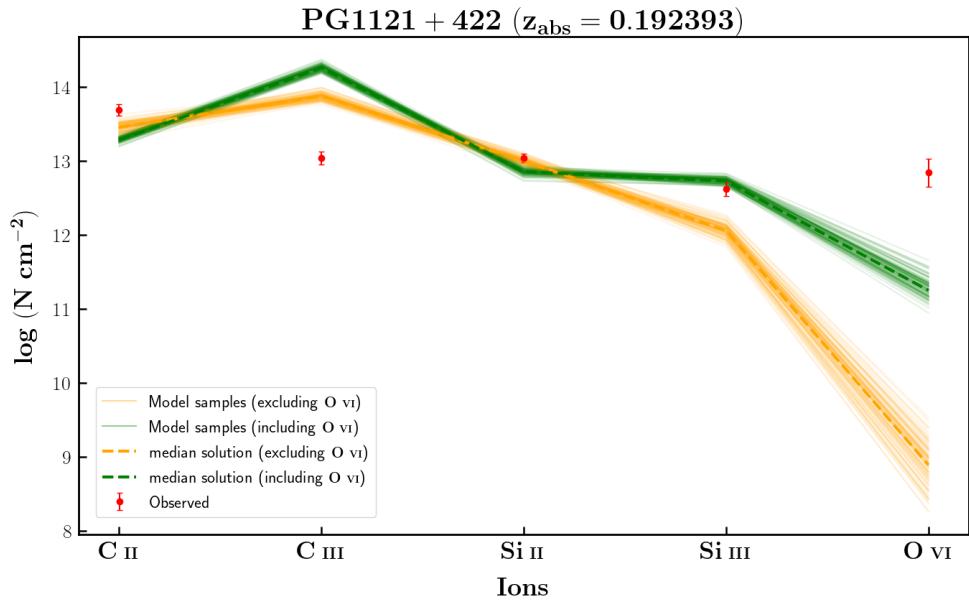


Figure 27:  $N(\text{H I})=14.34$ ,  $\log Z_{\text{ref}}=1$

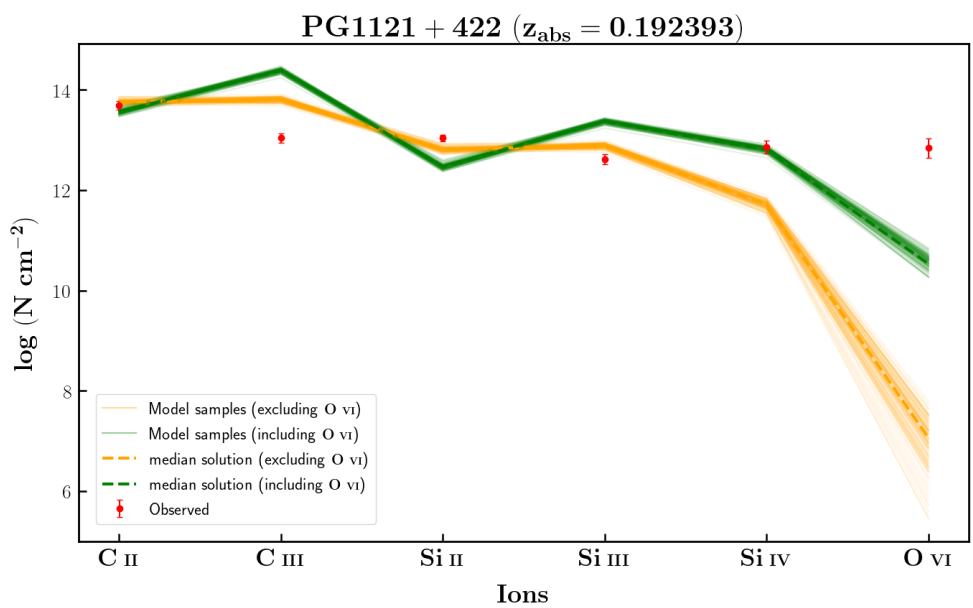
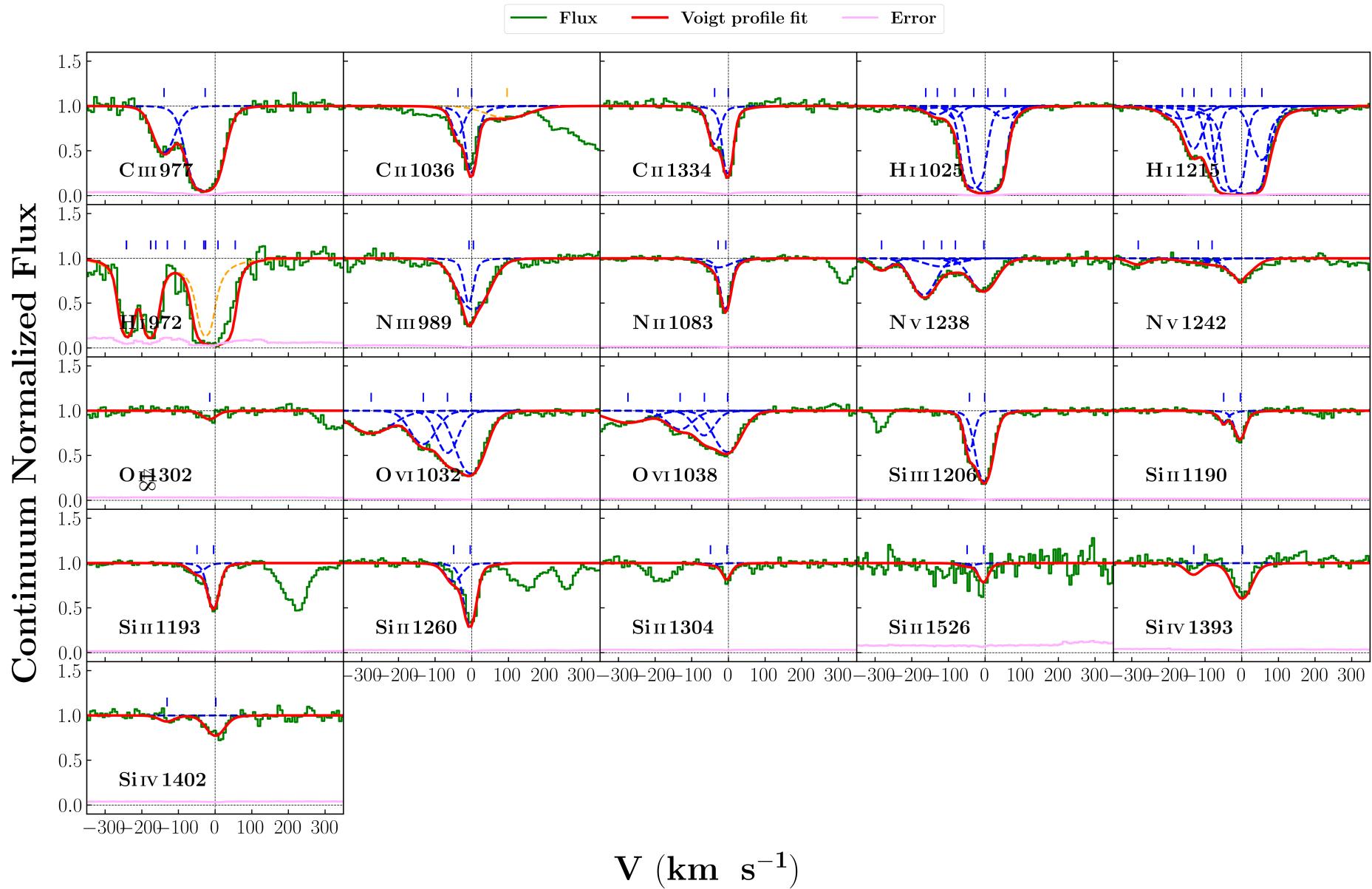


Figure 28:  $N(\text{H I})=17.70$ ,  $\log Z_{\text{ref}}=-1$

PKS0405 – 123 ( $z_{\text{abs}} = 0.167125$ )



<b>Ion</b>	<b>v (km s<sup>-1</sup>)</b>	<b>b (km s<sup>-1</sup>)</b>	<b>log [N cm<sup>-2</sup>]</b>
O I	-14 ± 5	23 ± 7	13.52 ± 0.08
C II	-37 ± 2	16 ± 2	13.76 ± 0.02
C II	-1 ± 1	6 ± 1	16.27 ± 0.12
C III	-136 ± 2	32 ± 2	13.45 ± 0.02
C III	-26 ± 0	37 ± 2	14.33 ± 0.04
N II	-27 ± 6	44 ± 5	13.47 ± 0.09
N II	-7 ± 1	12 ± 1	14.11 ± 0.02
N III	-7 ± 0	9 ± 4	14.06 ± 0.08
N III	5 ± 0	50 ± 2	14.43 ± 0.02
N V	-276 ± 3	30 ± 0	13.25 ± 0.05
N V	-116 ± 0	59 ± 9	13.32 ± 0.08
N V	-79 ± 13	24 ± 12	12.77 ± 0.19
N V	-3 ± 2	43 ± 3	13.89 ± 0.03
Si III	-41 ± 3	13 ± 4	12.66 ± 0.10
Si III	-1 ± 2	22 ± 2	13.28 ± 0.03
Si IV	-128 ± 0	25 ± 5	12.61 ± 0.06
Si IV	2 ± 1	31 ± 2	13.25 ± 0.02
Si II	-48 ± 5	26 ± 8	12.54 ± 0.09
Si II	-4 ± 1	15 ± 0	13.24 ± 0.02
O VI	-268 ± 0	74 ± 5	14.05 ± 0.02
O VI	-129 ± 8	41 ± 3	14.05 ± 0.10
O VI	-64 ± 5	32 ± 2	14.11 ± 0.17
O VI	-2 ± 4	43 ± 3	14.49 ± 0.05
H I	-158 ± 0	56 ± 9	13.09 ± 0.06
H I	-127 ± 4	26 ± 3	13.46 ± 0.04
H I	-80 ± 1	18 ± 2	13.54 ± 0.04
H I	-30 ± 0	18 ± 2	15.98 ± 0.34
H I	8 ± 49	19 ± 0	17.53 ± 0.07
H I	54 ± 90	30 ± 2	13.66 ± 0.04

$$N(HI) = 13.46$$

$$\begin{array}{ll} \text{Excluding O VI : } n_H = -3.98 \pm 0.03 & Z = 0.62 \pm 0.02 \\ \text{Including O VI : } n_H = -4.17 \pm 0.02 & Z = 0.63 \pm 0.02 \end{array}$$

$$N(HI) = 15.98$$

$$\begin{array}{ll} \text{Excluding O VI : } n_H = -2.73 \pm 0.04 & Z = -0.18 \pm 0.02 \\ \text{Including O VI : } n_H = -3.27 \pm 0.03 & Z = -0.33 \pm 0.02 \end{array}$$

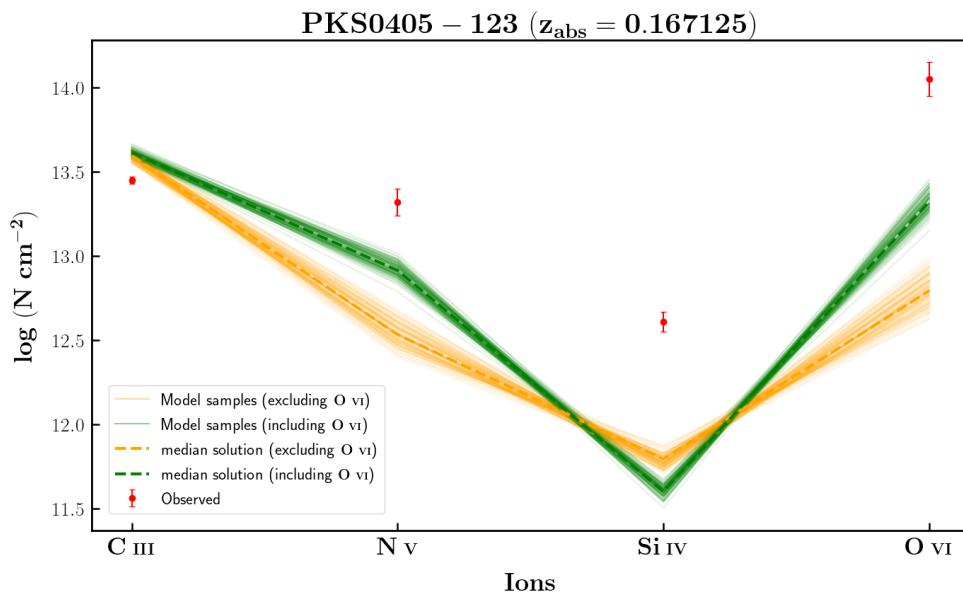


Figure 29:  $\text{N(HI)}=13.46$

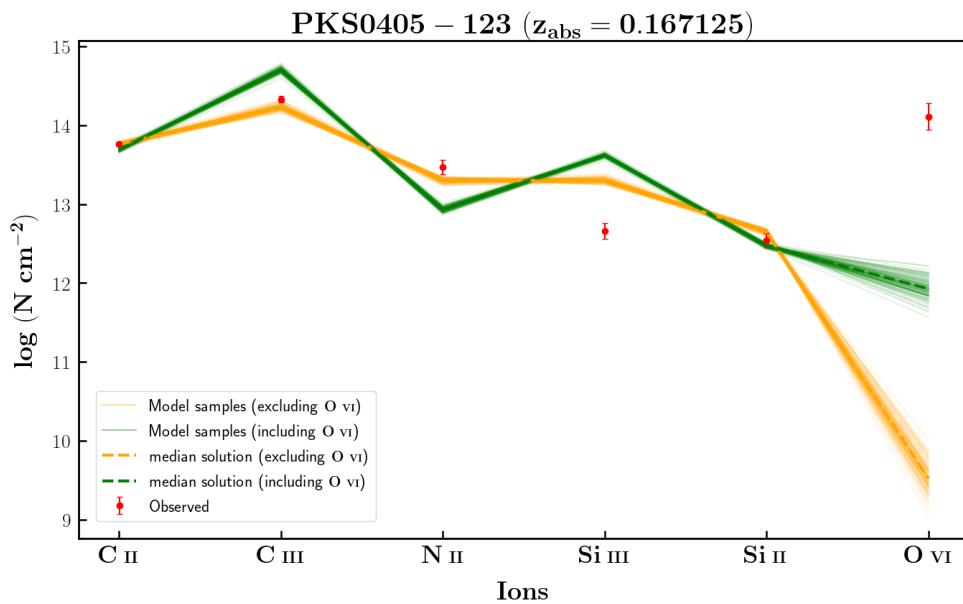


Figure 30:  $\text{N(HI)}=15.98$