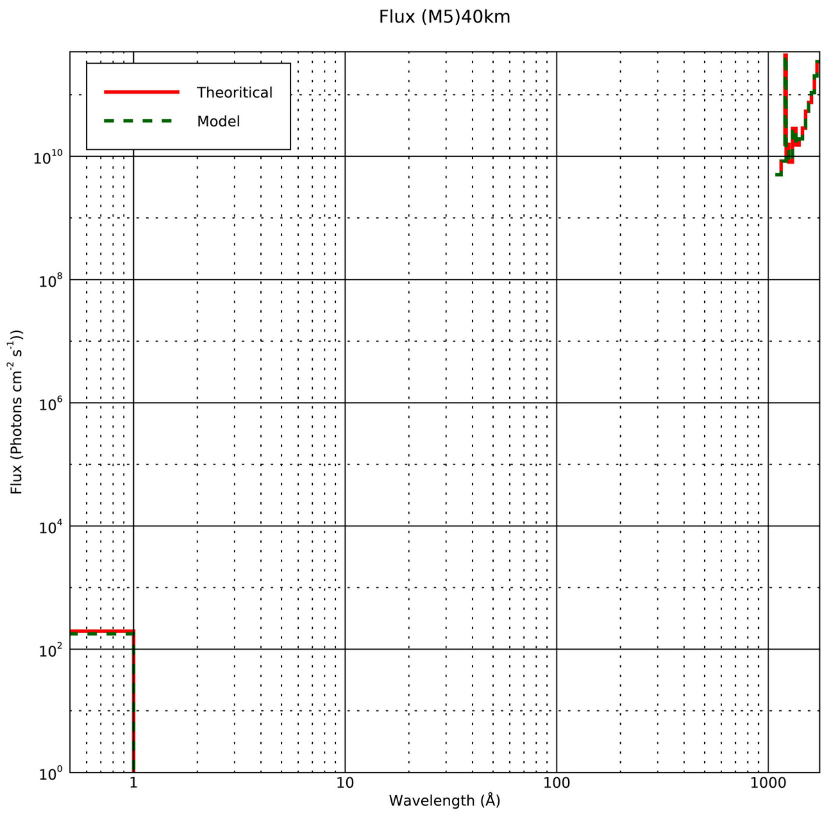
I used the formula to calculate the photoionisation

$$I(z)=I_{\infty}\exp(-\sigma^{a} sec\,\chi H\,n(z))$$

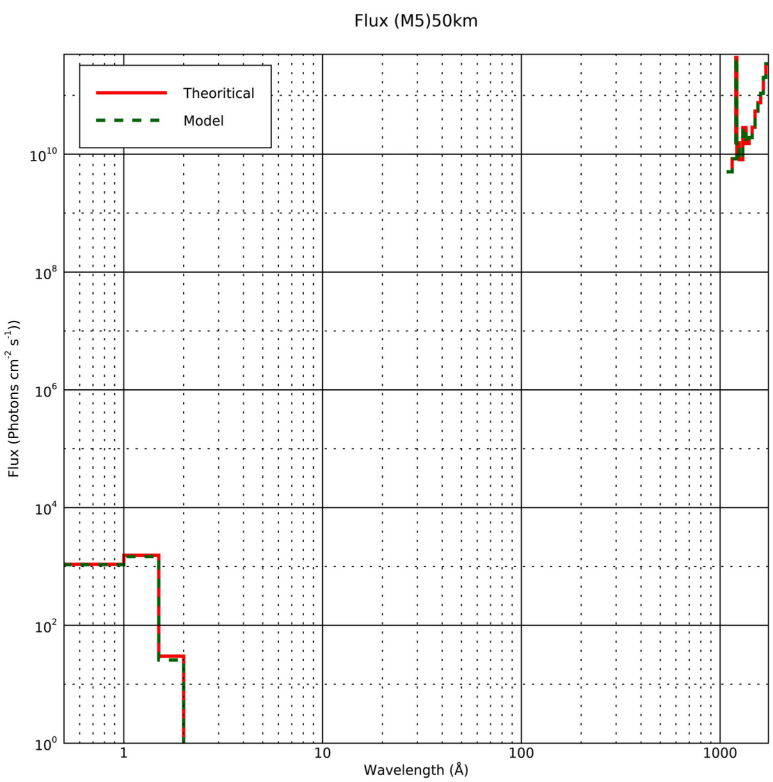
where I assumed the zenith angle = 0 degrees.
I plotted the spectrum of photons for a given altitude. There are total of 17 altitudes from 40- 200 km, 10 km apart.
In the middle of, the flux is giving 0 values because the expression inside the exponential is very large, so the exp(-infinity)=0

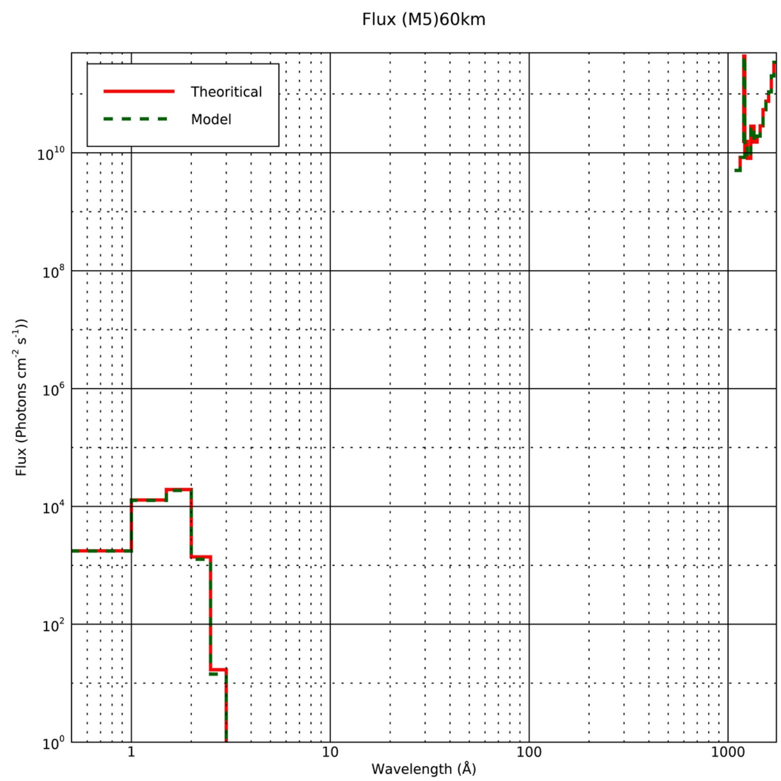


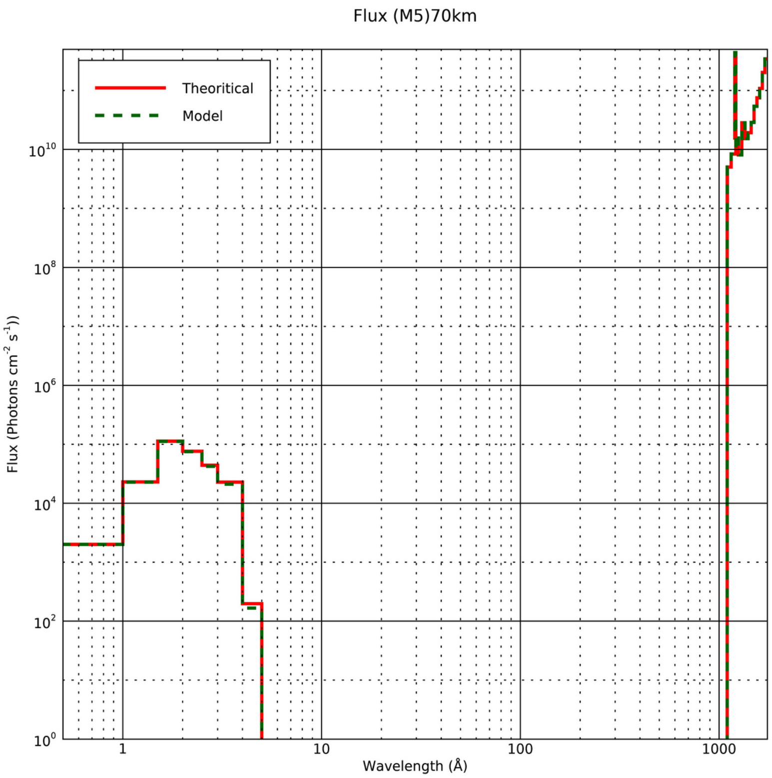
this table is for altitude of 60 km

wave_low	wave_high	tau	exp(-tau)
0.5-	1.0	0.17	0.84
1.0-	1.5	0.75	0.47
1.5-	2.0	2.28	0.10
2.0-	2.5	5.18	0.006
2.5-	3.0	10.16	3.85e-05
3.0-	4.0	19.42	3.67e-09
4.0-	5.0	42.41	3.81e-19
5.0-	6.0	76.40	6.623e-34
6.0-	8.0	153.60	0.00
8.0-	10.0	311.25	0.00
10.0-	14.0	676.99	0.00000
14.0-	18.0	1441.95	0.00000
18.0-	32.0	3209.99	0.00000

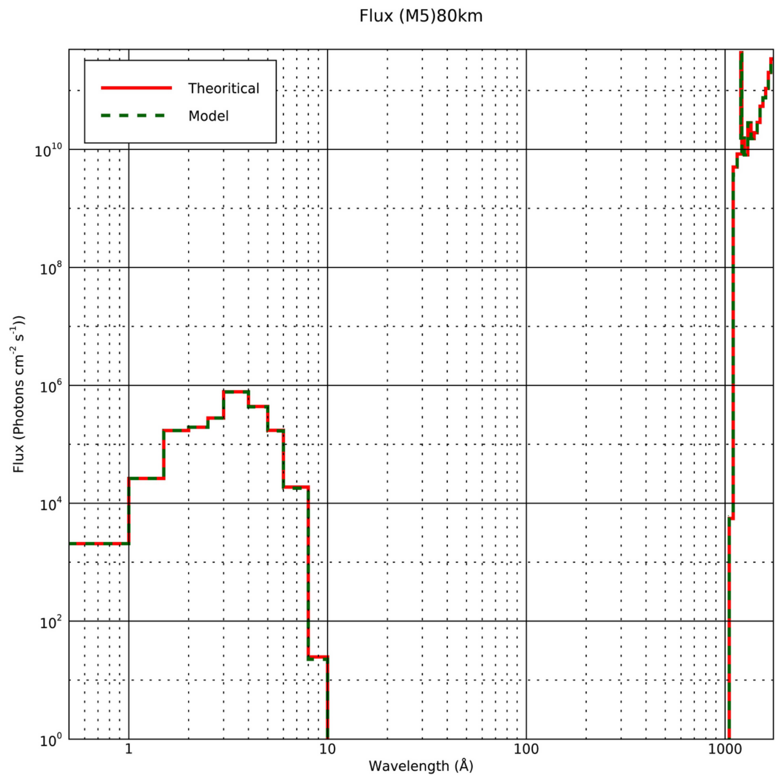
32.0-	70.0	1232.72	0.00
70.0-	155.0	8247.42	0.00
155.0-	224.0	25722.3	0.00
224.0-	290.0	46530.3	0.00
290.0-	320.0	54808.9	0.00
320.0-	540.0	94906.9	0.00
540.0-	650.0	102148.	0.00
650.0-	798.0	128093.	0.00
650.0-	798.0	128093.	0.00
798.0-	913.0	64516.3	0.00
798.0-	913.0	64516.3	0.00
798.0-	913.0	64516.3	0.00
913.0-	957.0	51527.1	0.00
913.0-	975.0	159569.	0.00
913.0-	975.0	159569.	0.00
975.0-	987.0	25311.6	0.00
987.0-	1027.0	2477.93	0.00
1027.0-	1050.0	903.475	0.00



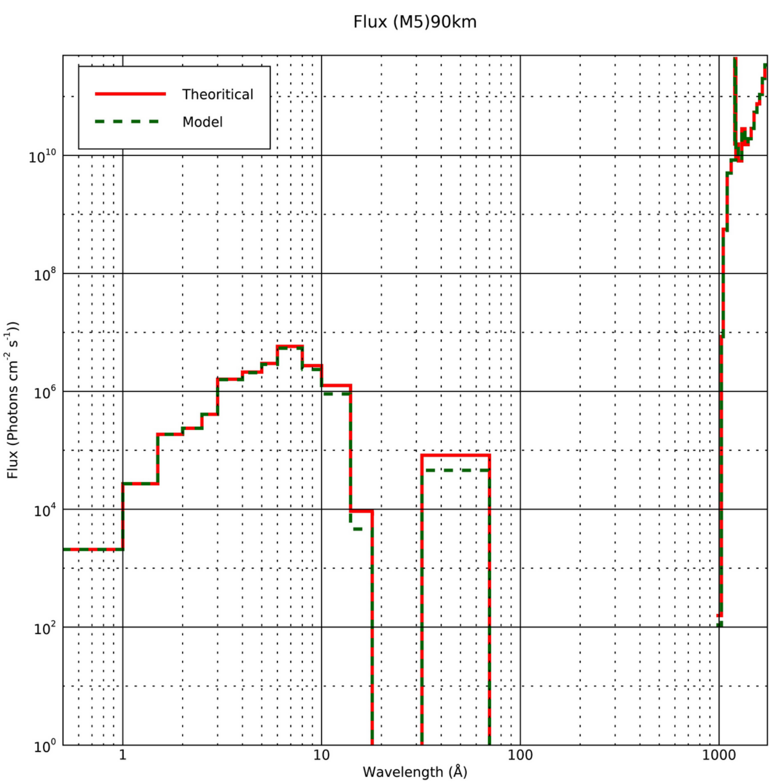




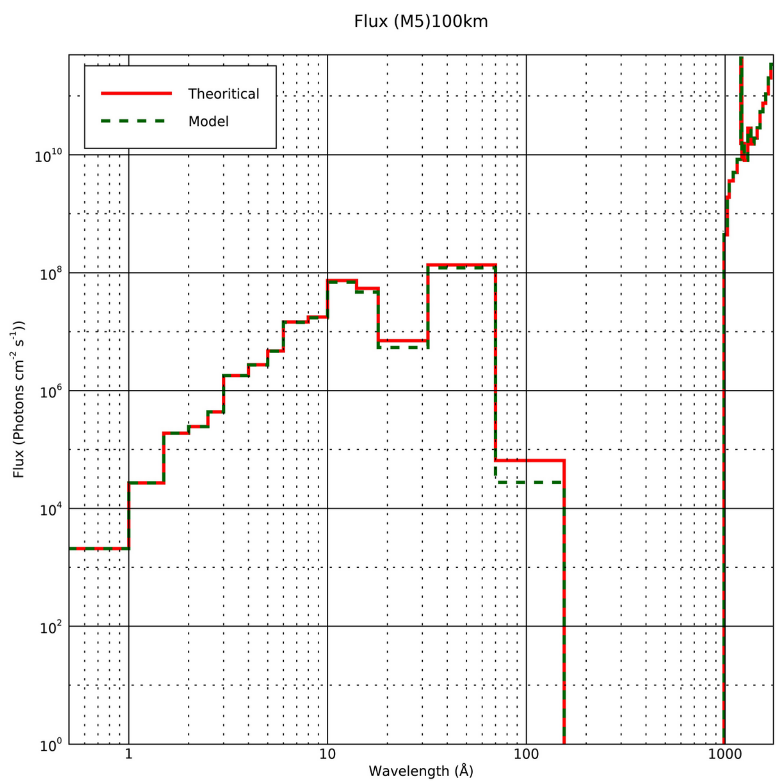
Flux (M5)70km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)



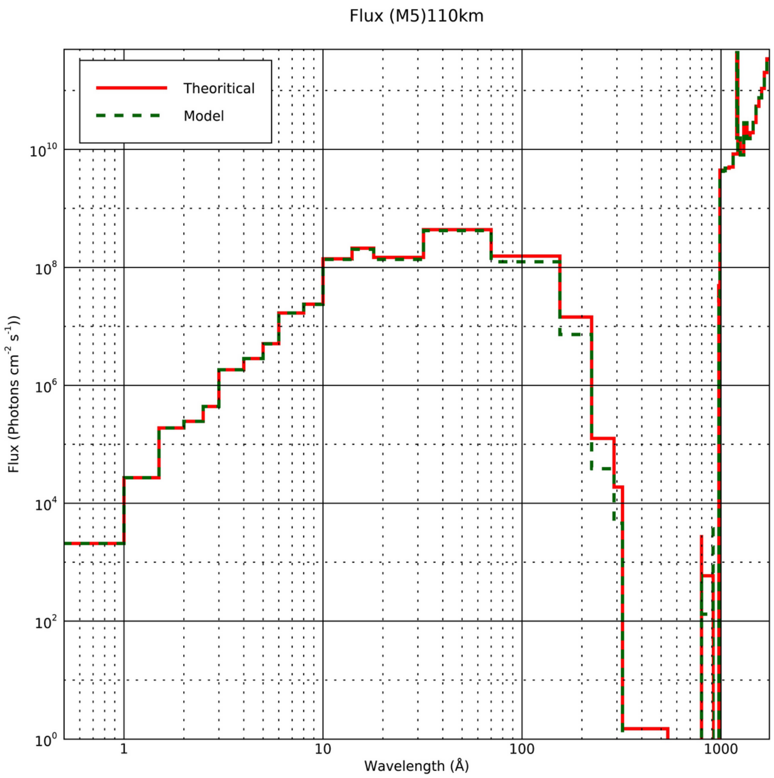
Flux (M5)80km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

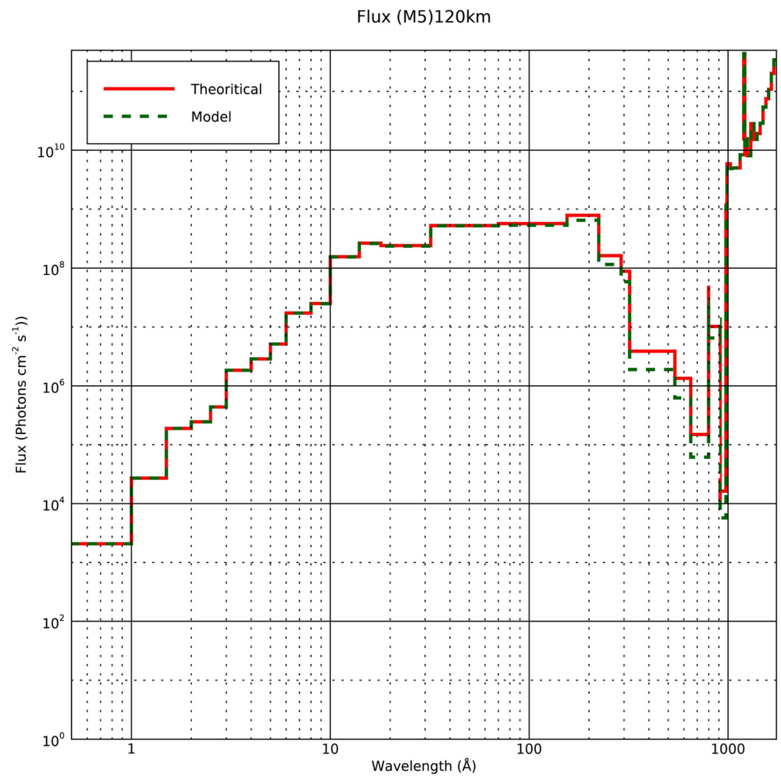


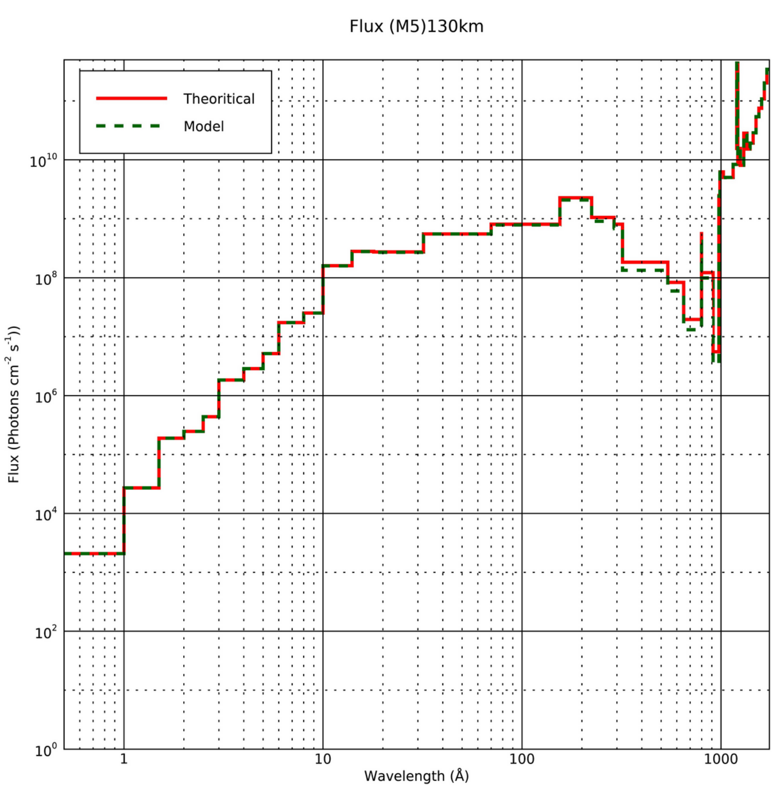
Flux (M5)90km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

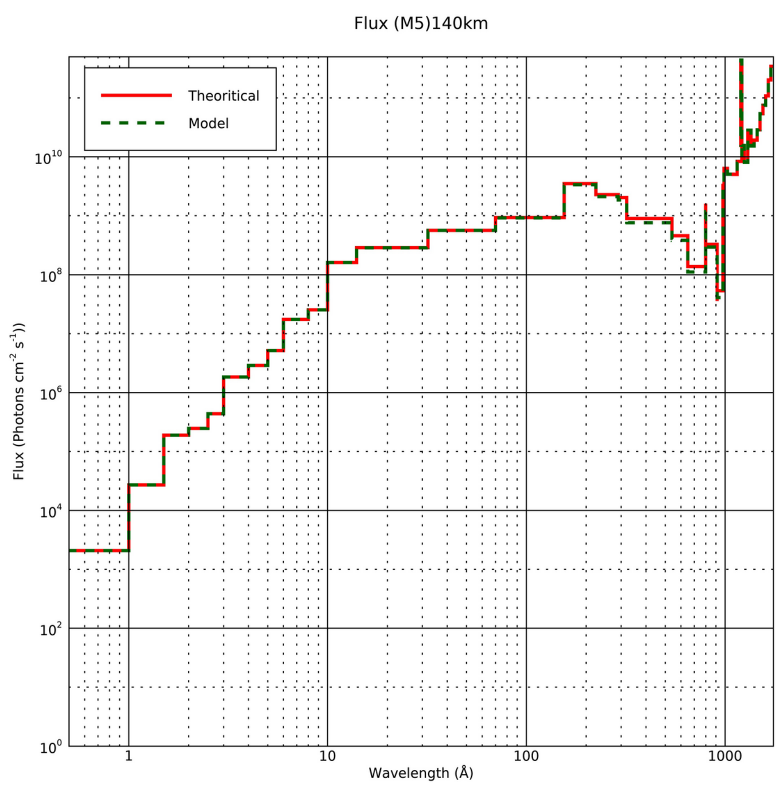


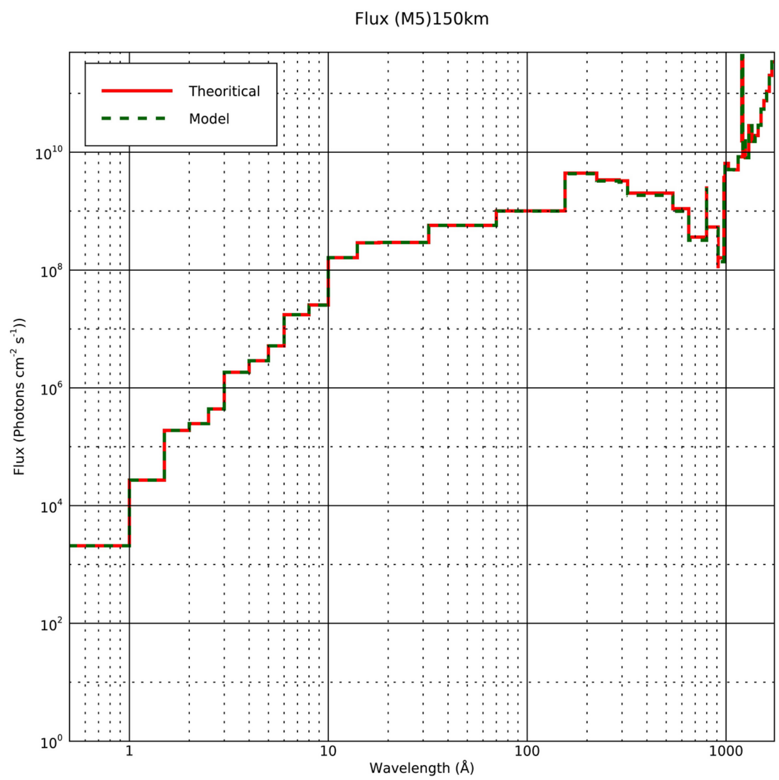
Flux (M5)100km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

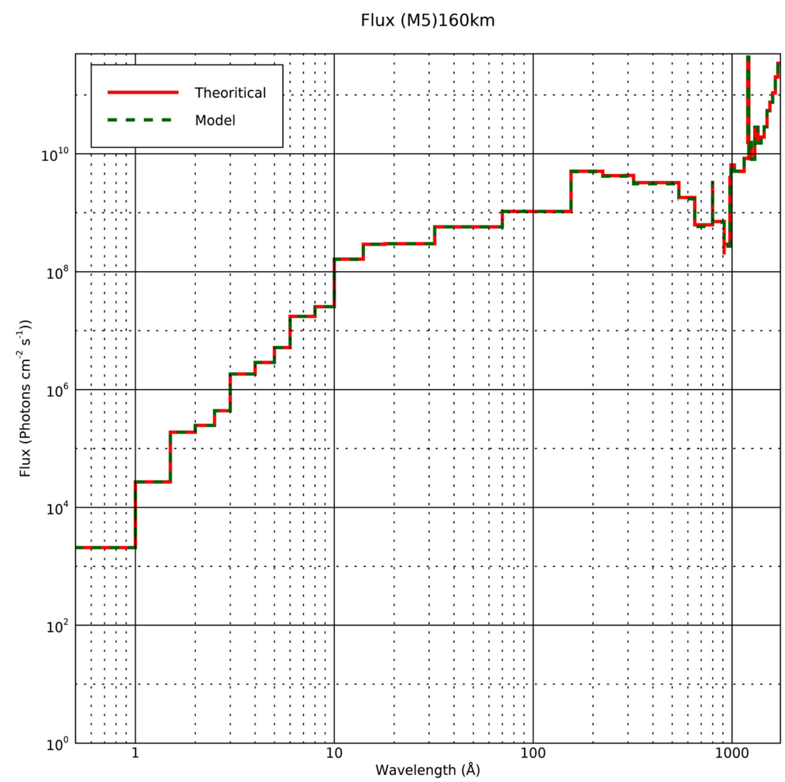

Flux (M5)110km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

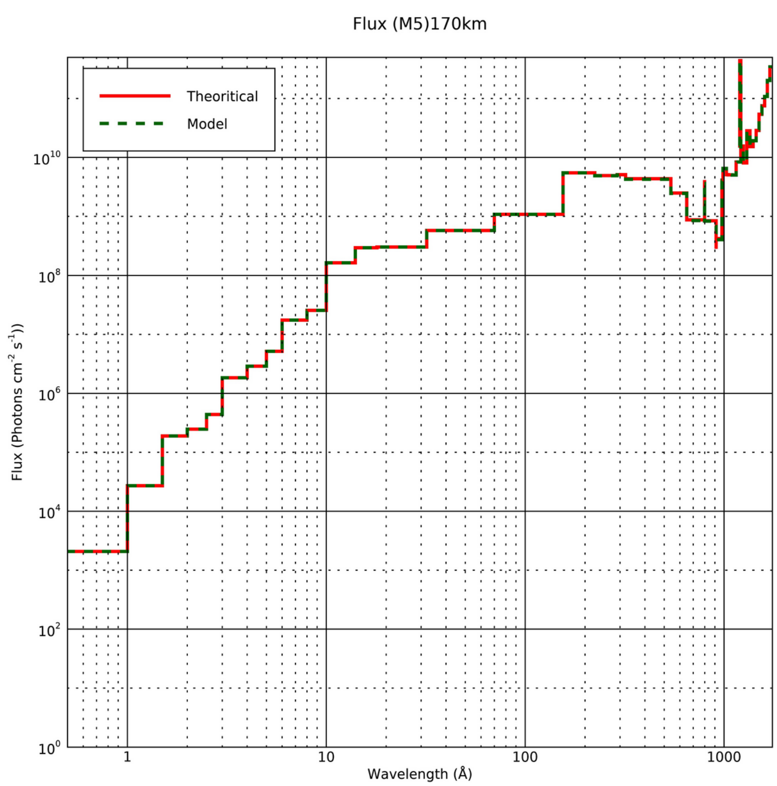

Flux (M5)120km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

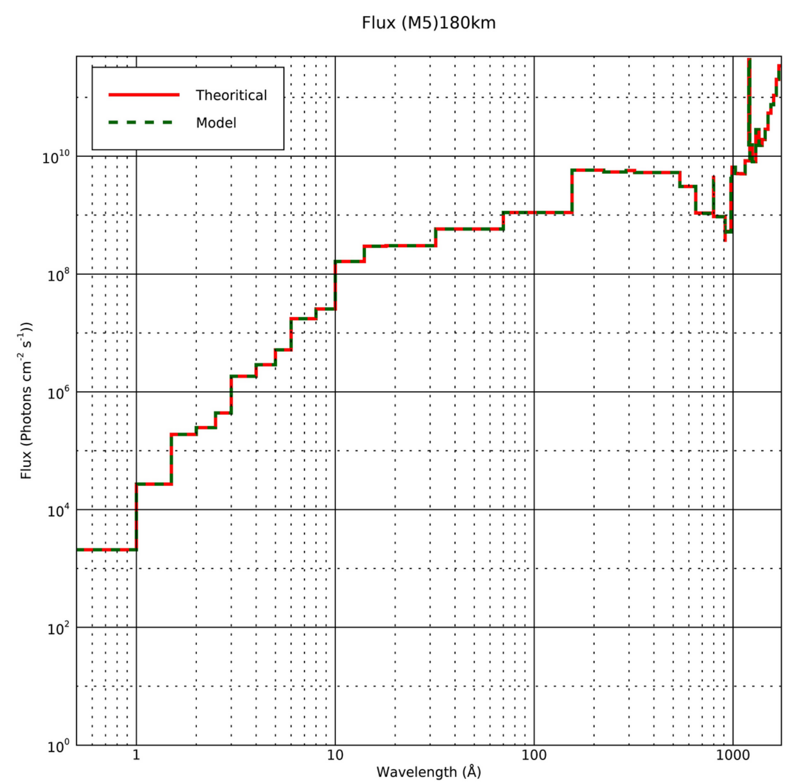

Flux (M5)130km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

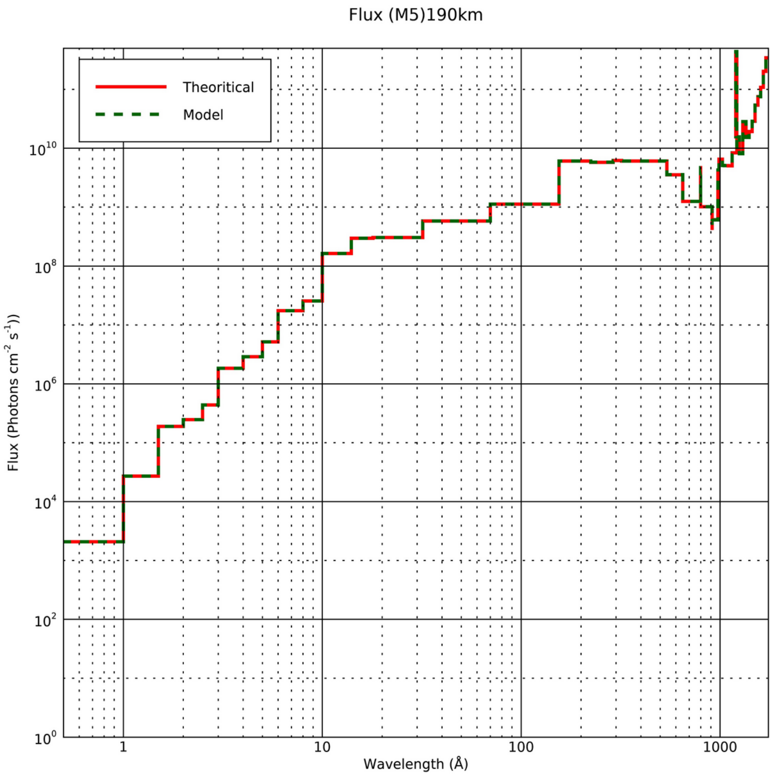

Flux (M5)140km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)


Flux (M5)150km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)

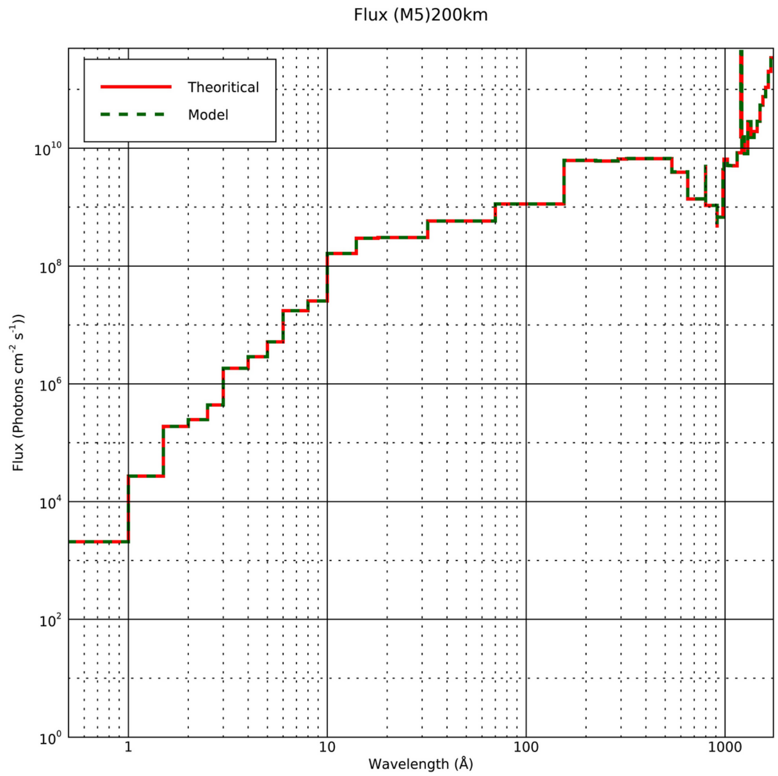

Flux (M5)160km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)


Flux (M5)170km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)


Flux (M5)180km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)



Flux (M5)190km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)
1
10
100
1000
10^0
10^2
10^4
10^6
10^8
10^{10}



Flux (M5)200km
Theoritical
Model
Flux (Photons cm^{-2} s^{-1}))
Wavelength (Å)
1
10
100
1000
10^0
10^2
10^4
10^6
10^8
10^{10}

O Absorption Cross-sections

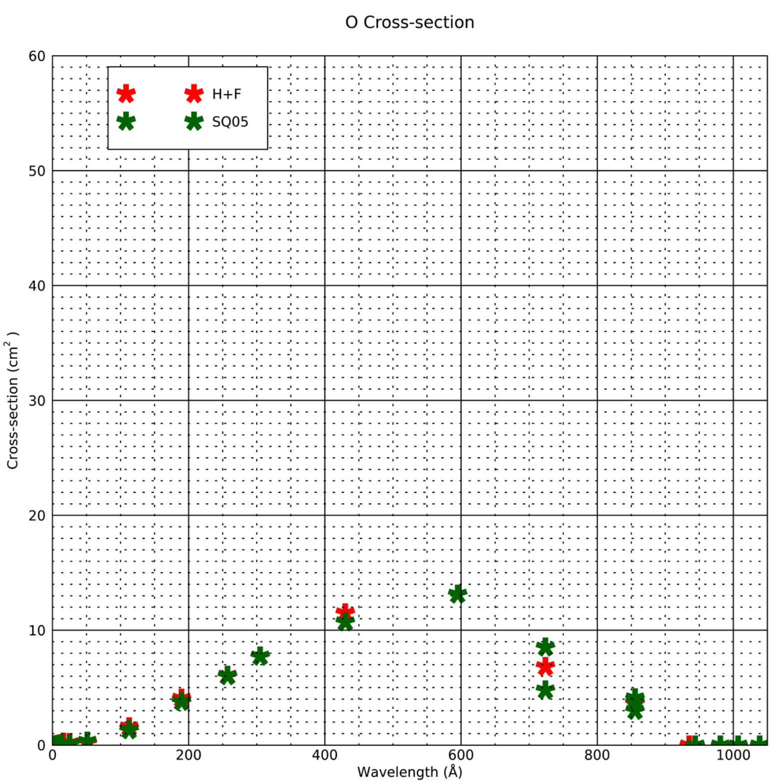
swave_lo	wave_hi	SQ'05 (1e-18 cm^2)	H+F (1e-18 cm^2)
0.5	1.0		
1.0	1.5		
1.5	2.0		
2.0	2.5		
2.5	3.0		
3.0	4.0		
4.0	5.0		
5.0	6.0		
6.0	8.0		
8.0	10.0		
10.0	14.0		
14.0	18.0		
18.0	32.0	0.105000	0.194691
32.0	70.0	0.324700	0.210339
70.0	155.0	1.31900	1.57087
155.0	224.0	3.78320	4.06944
224.0	290.0	6.02390	6.06957
290.0	320.0	7.72050	7.73863
320.0	540.0	10.7175	11.5000
540.0	650.0	13.1253	13.1253
650.0	798.0	8.51590	6.82296
650.0	798.0	4.78890	6.82296
798.0	913.0	3.00310	3.68578
798.0	913.0	4.10480	3.68578
798.0	913.0	3.79470	3.68578
913.0	975.0	0.00000	0.00000
913.0	975.0	0.00000	0.00000
913.0	975.0	0.00000	0.00000
975.0	987.0	0.00000	0.00000
987.0	1027.0	0.00000	0.00000
1027.0	1050.0	0.00000	0.00000

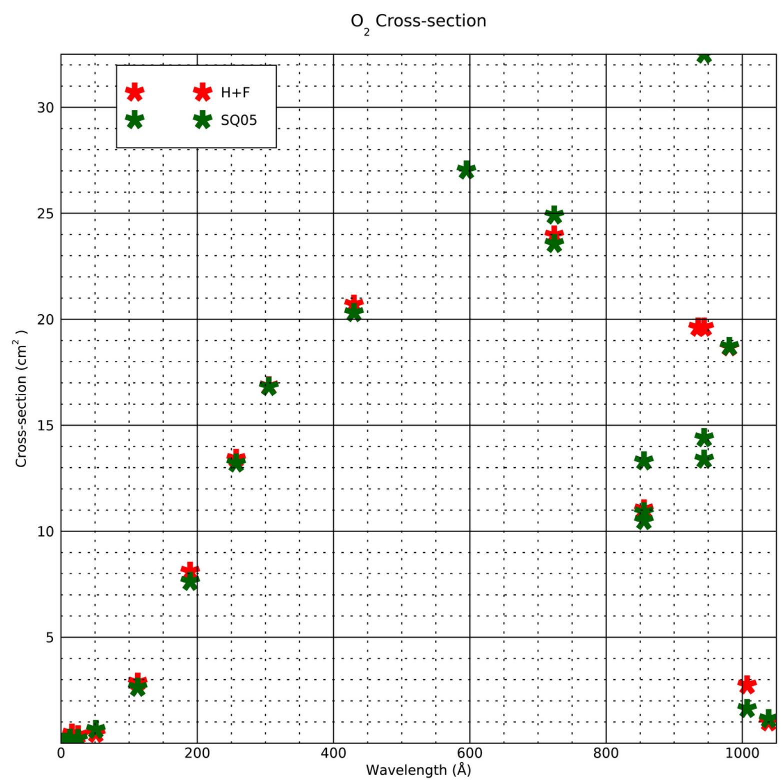
O$_2$ Absorption Cross-sections

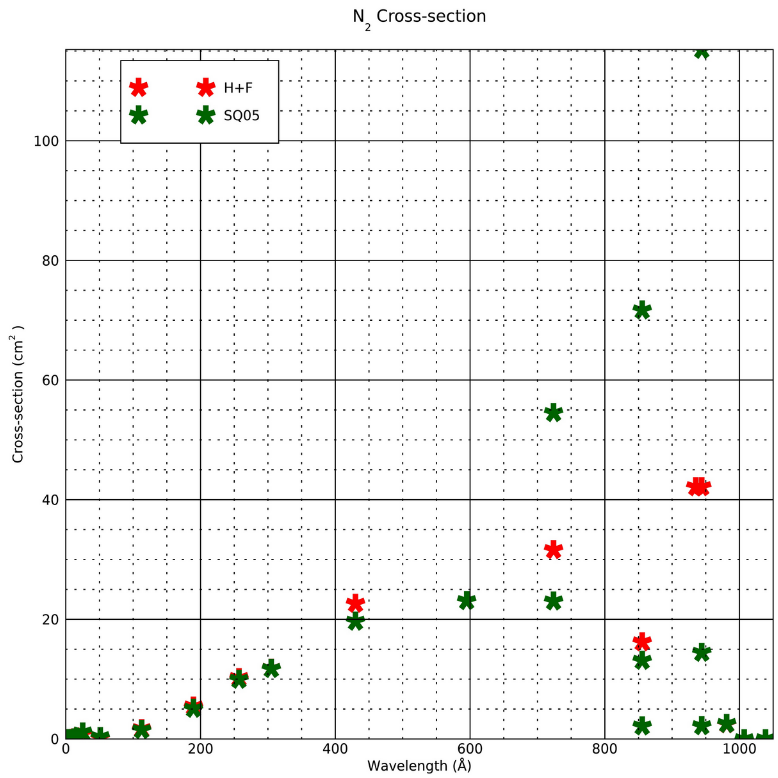
wave_lo	wave_hi	SQ'05 (1e-18 cm^2)	H+F (1e-18 cm^2)
0.5-	1.0		
1.0-	1.5		
1.5-	2.0		
2.0-	2.5		
2.5	3.0		
3.0-	4.0		
4.0-	5.0		
5.0-	6.0		
6.0-	8.0		
8.0-	10.0		
10.0-	14.0		
14.0-	18.0		
18.0-	32.0	0.210100	0.388444
32.0-	70.0	0.646000	0.455387
70.0-	155.0	2.63190	2.87530
155.0-	224.0	7.62830	8.10876
224.0-	290.0	13.2125	13.4297
290.0-	320.0	16.8233	16.8501
320.0-	540.0	20.3066	20.7000
540.0-	650.0	27.0314	27.0314
650.0-	798.0	23.5669	23.9652
650.0-	798.0	24.9102	23.9652
798.0-	913.0	10.4980	11.0465
798.0-	913.0	10.9075	11.0465
798.0-	913.0	13.3122	11.0465
913.0-	957.0	13.3950	19.6188
913.0-	975.0	14.4042	19.6188
913.0-	975.0	32.5038	19.6188
975.0-	987.0	18.7145	18.6937
987.0-	1027.0	1.63200	2.74479
1027.0-	1050.0	1.15000	1.00078

N_2 Absorption Cross-sections

wave_lo	wave_hi	SQ'05 (1e-18 cm^2)	H+F (1e-18 cm^2)
0.5	1.0		
1.0	1.5		
1.5	2.0		
2.0	2.5		
2.5	3.0		
3.0	4.0		
4.0	5.0		
5.0	6.0		
6.0	8.0		
8.0	10.0		
10.0	14.0		
14.0	18.0		
18.0	32.0	1.13700	0.849322
32.0	70.0	0.345900	0.244047
70.0	155.0	1.52730	1.67875
155.0	224.0	5.08590	5.46605
224.0	290.0	9.93750	10.2199
290.0	320.0	11.7383	11.7618
320.0	540.0	19.6514	22.6400
540.0	650.0	23.0931	23.0931
650.0	798.0	23.0346	31.6219
650.0	798.0	54.5252	31.6219
798.0	913.0	2.14340	16.2016
798.0	913.0	13.1062	16.2016
798.0	913.0	71.6931	16.2016
913.0	975.0	2.17750	42.1369
913.0	975.0	14.4390	42.1369
913.0	975.0	115.257	42.1369
975.0	987.0	2.54650	2.50563
987.0	1027.0	0.00000	0.00000
1027.0	1050.0	0.00000	0.00000

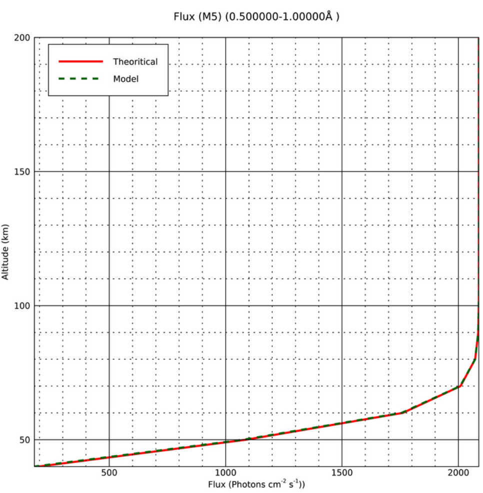

O Cross-section
H+F
SQ05
Cross-section (cm^2)
Wavelength (Å)
0
10
20
30
40
50
60
0
200
400
600
800
1000

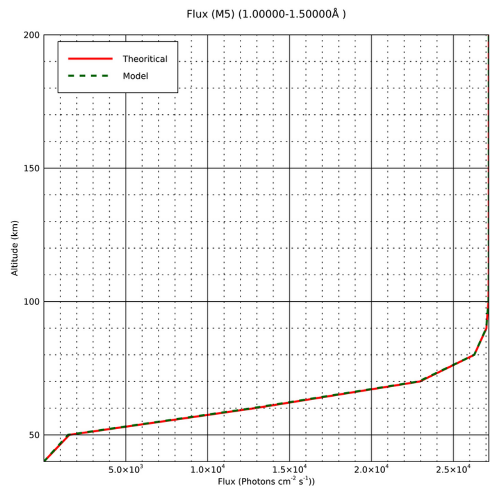

O$_2$ Cross-section
H+F
SQ05
Cross-section (cm^2)
Wavelength (Å)
5
10
15
20
25
30
0
200
400
600
800
1000

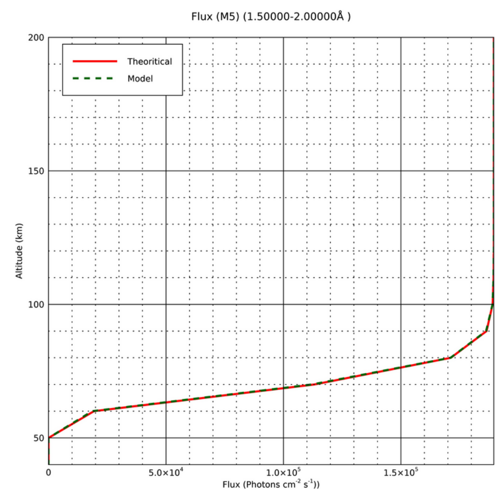


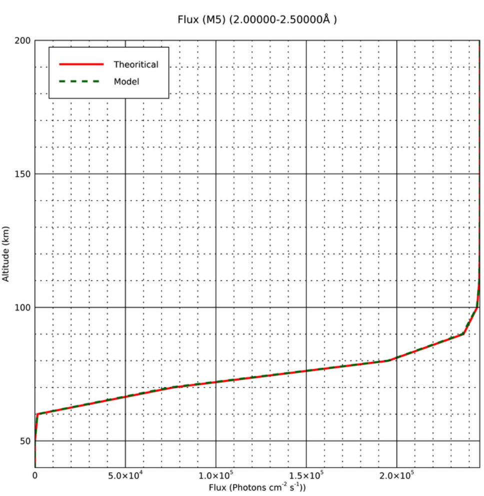
N2 Cross-section
H+F
SQ05
100
80
60
40
20
0
0
200
400
600
800
1000
Cross-section (cm2)
Wavelength (Å)

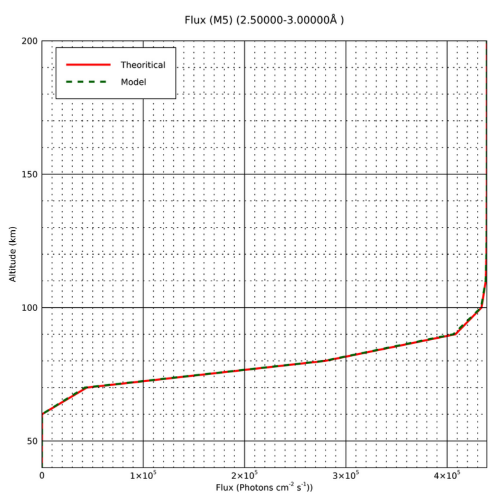
Flux vs altitude plots

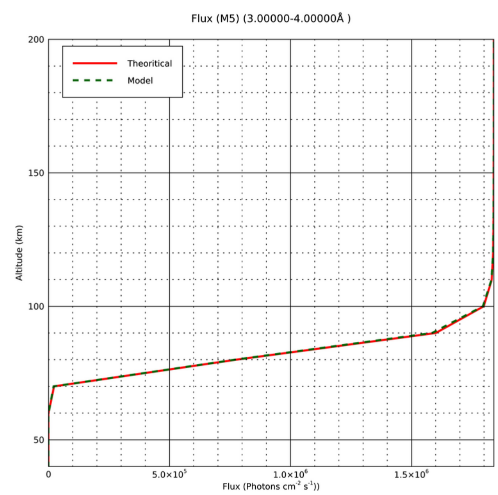


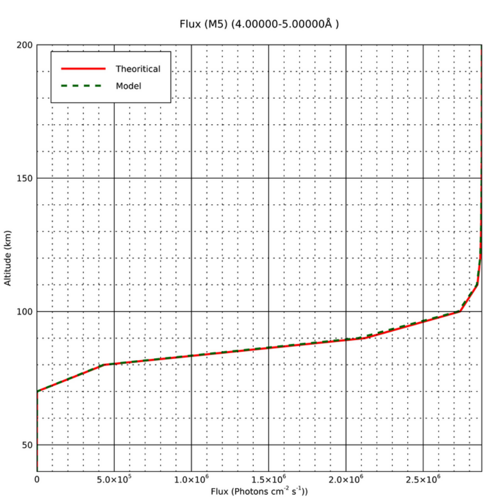


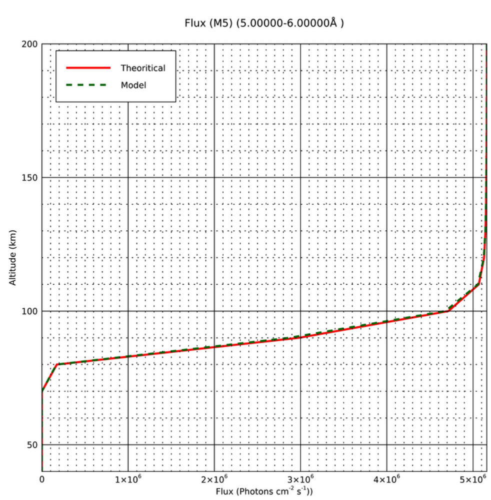


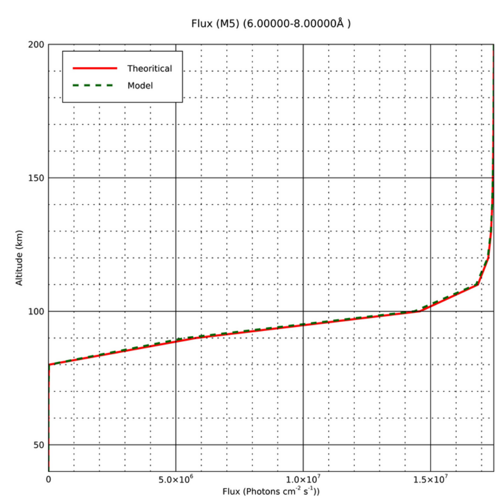


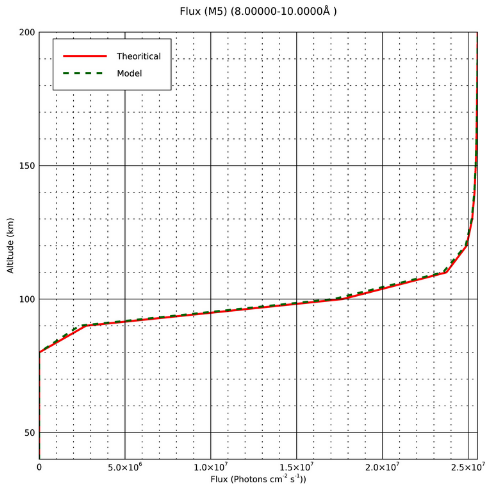


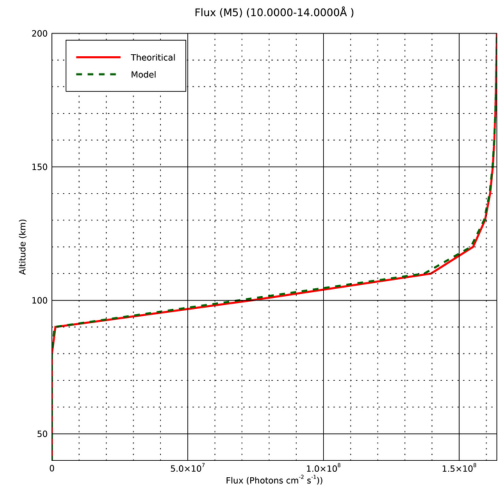


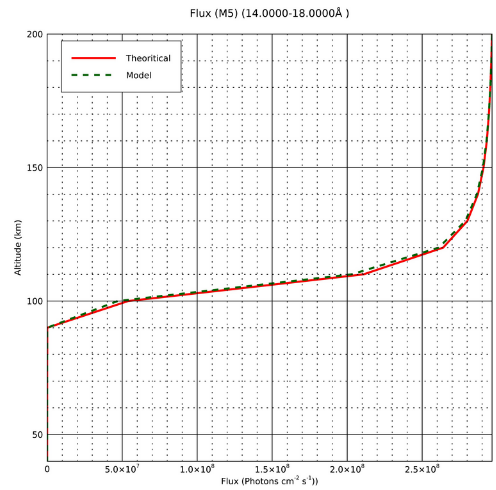


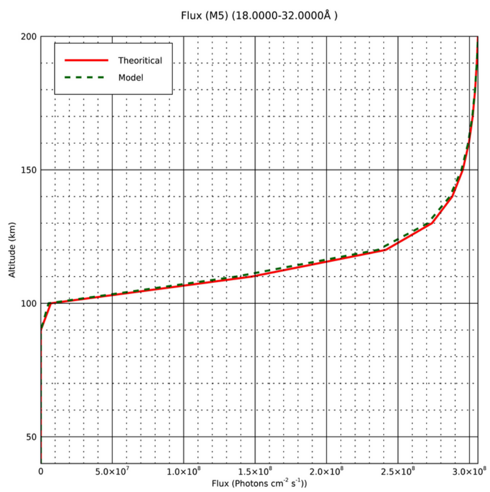


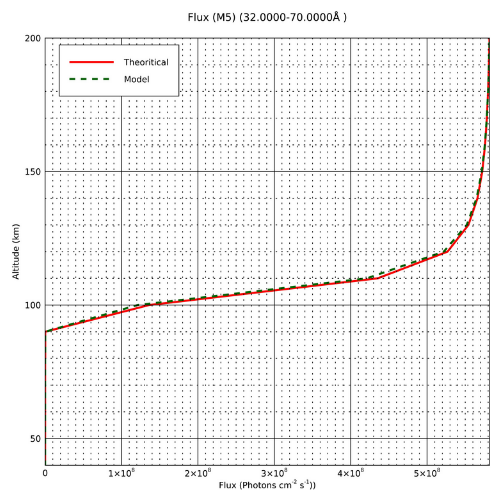


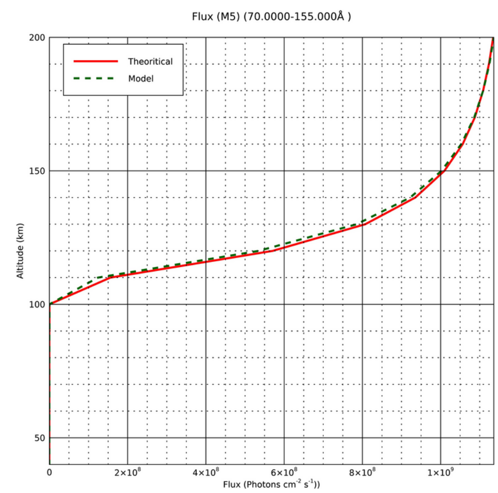

Flux (M5) (8.00000-10.0000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

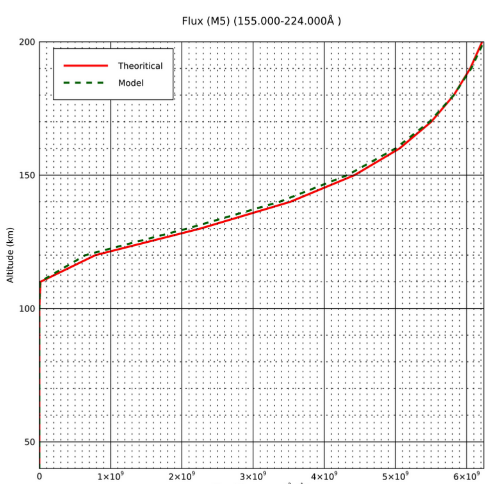

Flux (M5) (10.0000-14.0000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

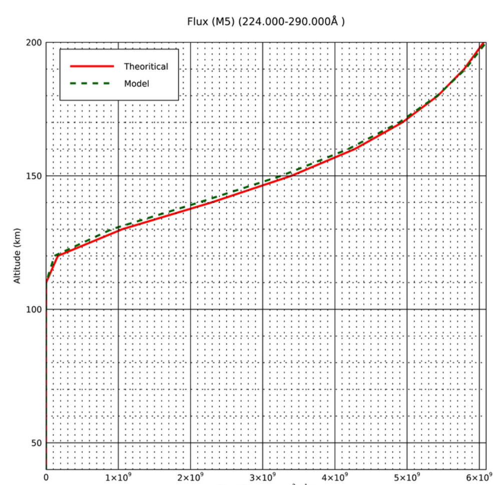

Flux (M5) (14.0000-18.0000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

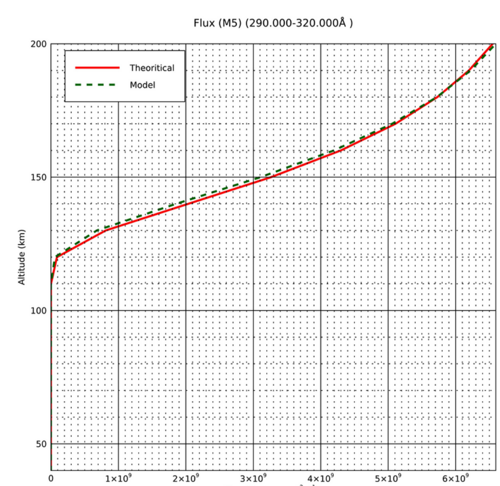

Flux (M5) (18.0000-32.0000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

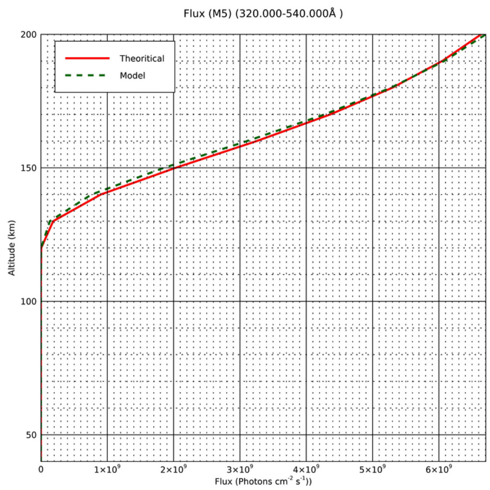

Flux (M5) (32.0000-70.0000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

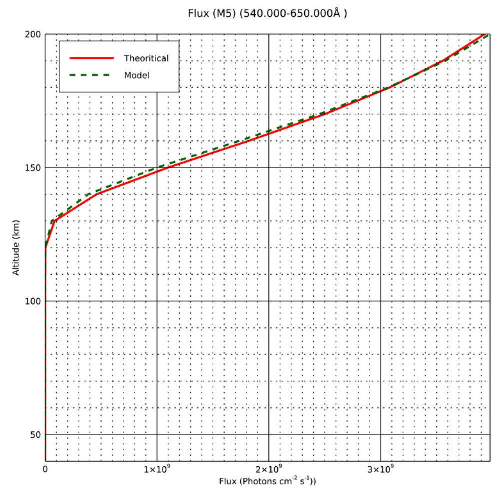

Flux (M5) (70.0000-155.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

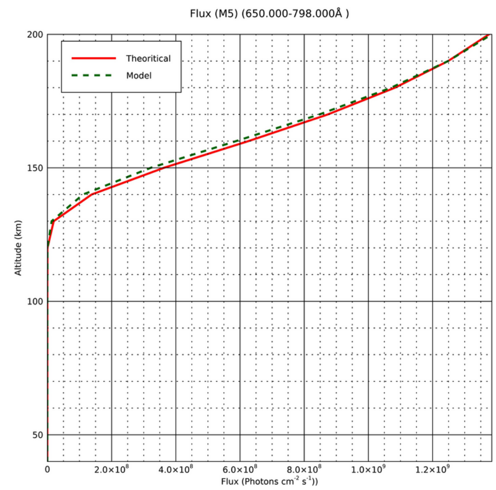

Flux (M5) (155.000-224.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

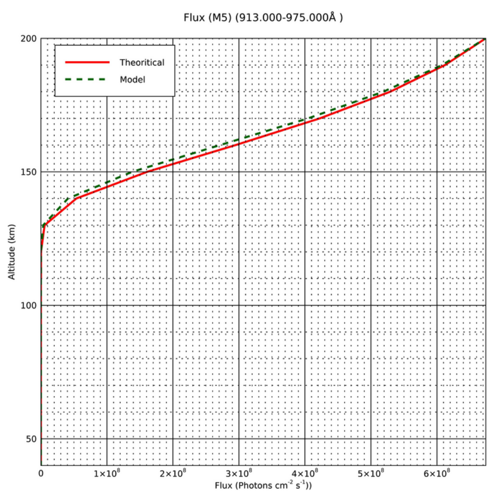

Flux (M5) (224.000-290.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

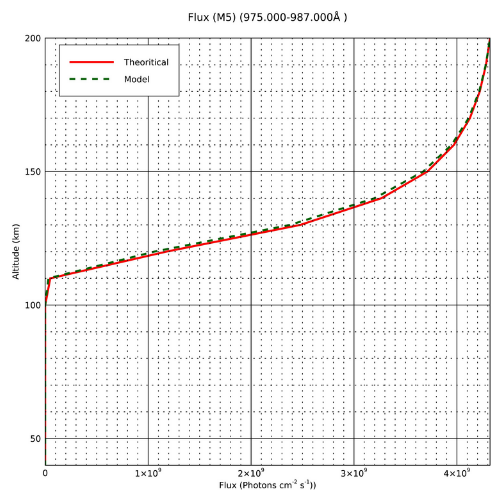

Flux (M5) (290.000-320.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

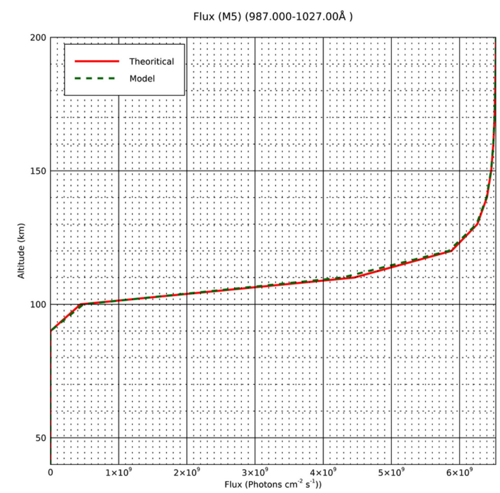

Flux (M5) (320.000-540.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

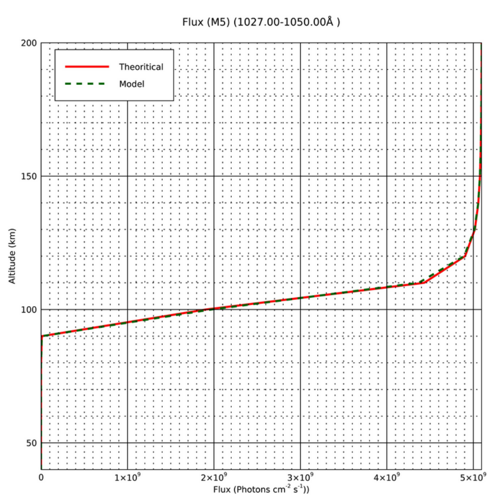

Flux (M5) (540.000-650.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))


Flux (M5) (650.000-798.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

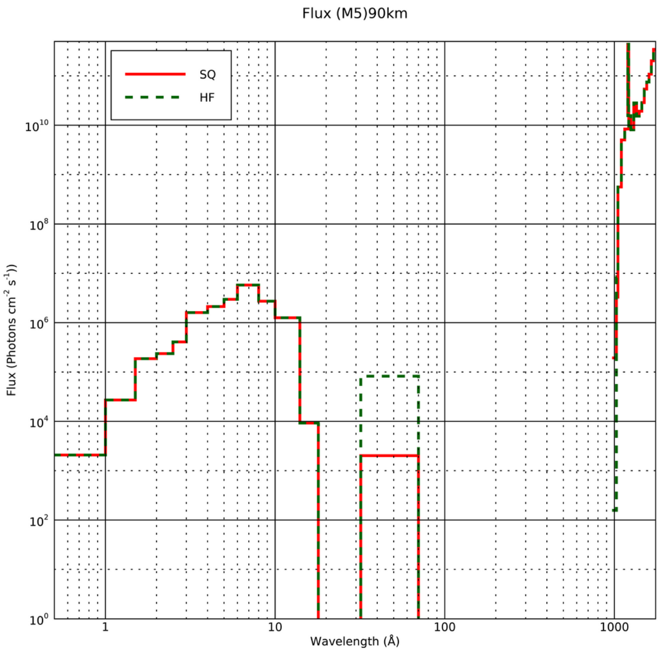

Flux (M5) (913.000-975.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

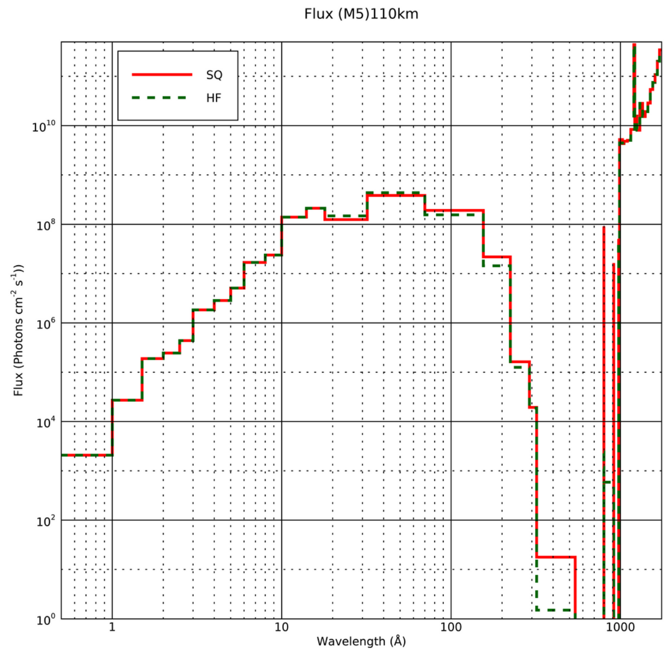

Flux (M5) (975.000-987.000Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

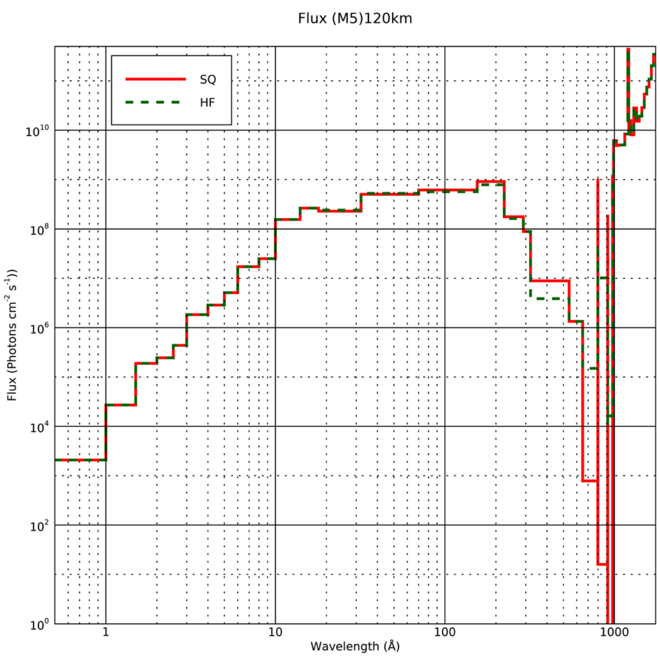

Flux (M5) (987.000-1027.00Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))


Flux (M5) (1027.00-1050.00Å)
Theoritical
Model
Altitude (km)
Flux (Photons cm^{-2} s^{-1}))

Theoretical Flux Calculation with last bins (18 A and longward) substituted by SQ absorption cross-sections

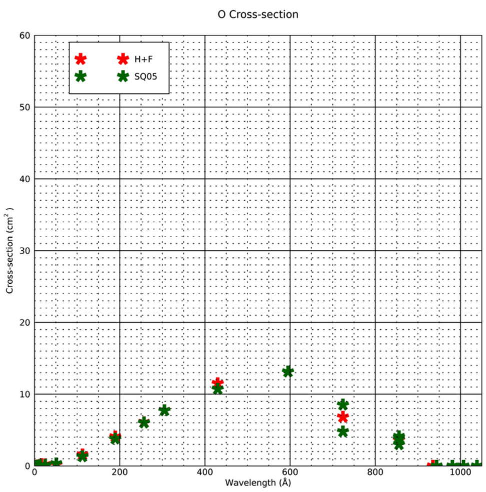


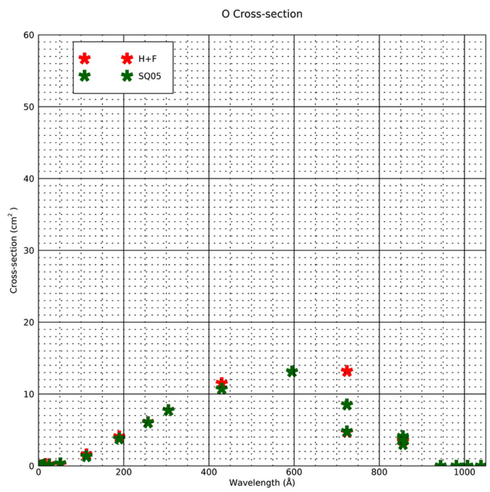


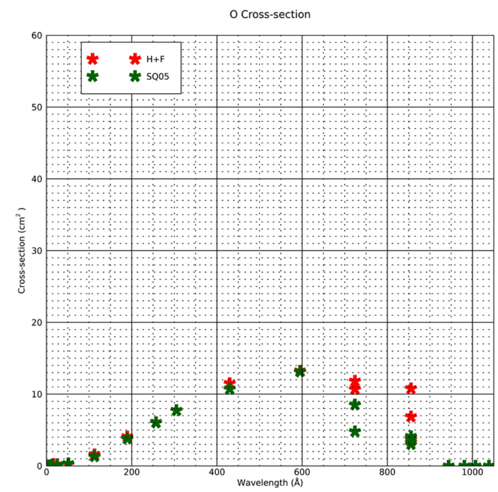


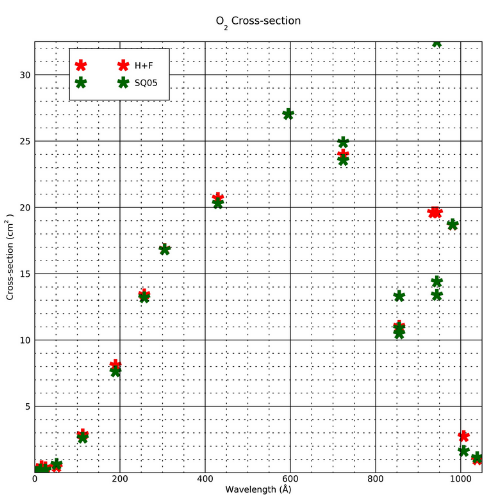
Flux weighting

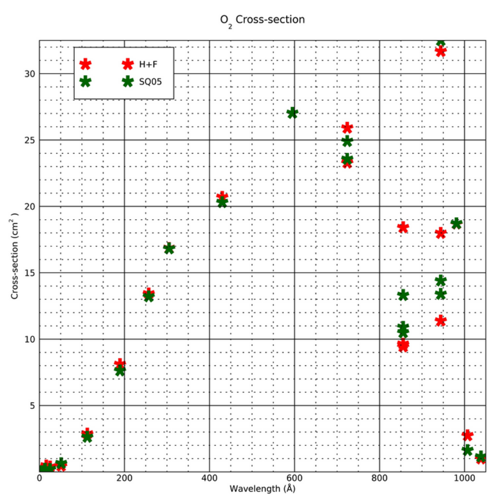
Simple average

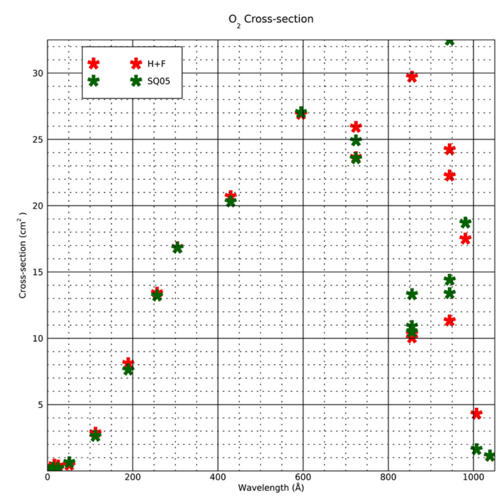


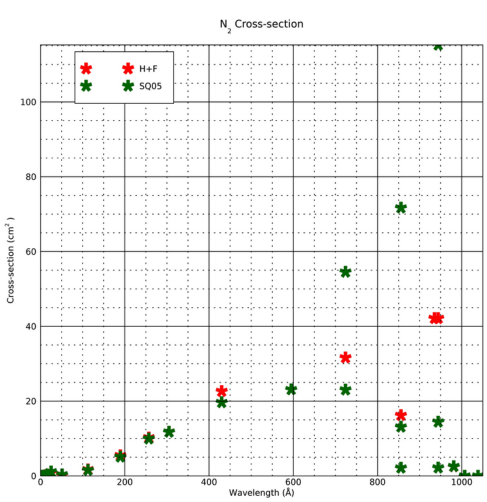


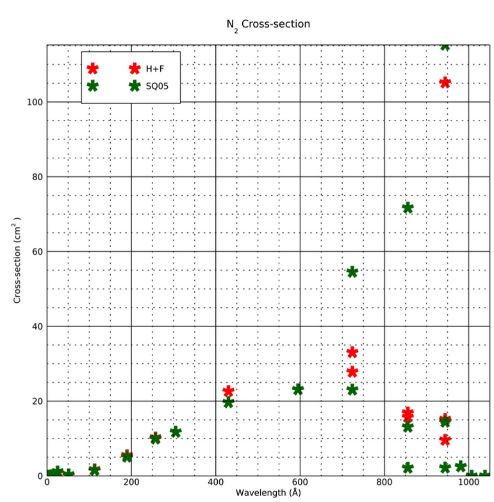


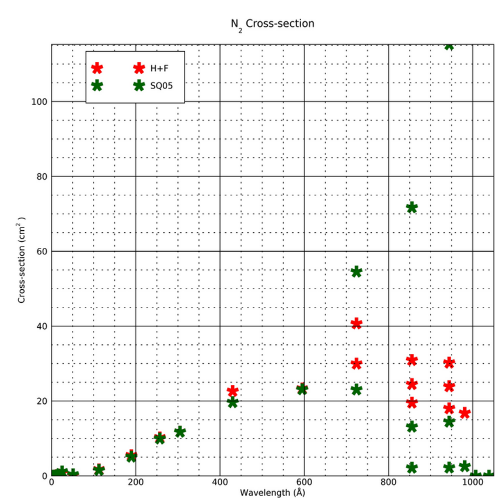












Photoionization

$$Photoionisation : P_c(z,\chi) = I(z,\chi)\beta\sigma^a n(z)$$