Most probable turbulent velocity ξ [2, 4]

h in km	0	1000	2000	above transition
ξ in km/s	2.6	8	14	10

[1] *A.Q.* **1**, § 72; **2**, § 83.
[2] C. de Jager, *Handb. Phys.*, **52**, 115, 125, 1959.
[3] O. R. White and P. R. Wilson, *Ap. J.*, **146**, 250, 1966.
[4] Z. Suemoto, *P.A.S. Japan*, **15**, 531, 1963.
[5] O. Gingerich *et al.* (HSRA), *Sol. Phys.*, **18**, 347, 1971.
[6] Y. Cuny, *Sol. Phys.*, **16**, 293, 1971.
[7] W. M. Burton *et al.*, *Phil. Trans. R.S.*, **A270**, 81, 1971.
[8] P. Ulmschneider, *Astron. Ap.*, **12**, 297, 1971.
[9] C. Jordan, Thesis, London, 1965.
[10] E. G. Chipman, *Harv. Coll. Obs.*, TR-26, 1972.
[11] P. Lantos, *Sol. Phys.*, **22**, 387, 1972.

§ 84. Corona

Radiation from the corona contains three components:

K = continuous spectrum scattered by electrons

F = Fraunhofer spectrum diffracted by interplanetary particles

L = coronal emission lines, L is negligible for coronal photometry (about 1%)

Total coronal light beyond 1.03 $\mathscr{R}_\odot$ (for typical lunar disk) [1, 3]

at sunspot maximum $= 1.3 \times 10^{-6}$ solar flux = 0.57 full moon

at sunspot minimum $= 0.8 \times 10^{-6}$ solar flux = 0.35 full moon

Total F corona $= 0.29 \times 10^{-6}$ solar flux

Spectral distribution of K component is similar to $\mathscr{F}_\lambda$ of § 82, with $B-V = 0.65$.

The F component is slightly redder, with $B-V \simeq 0.75$.

The base of the corona may be taken as the transition region at $r = 1.003\ \mathscr{R}_\odot$.

Coronal ellipticity from isophotes ϵ [3, 6, 7, 13]

$\epsilon = (A_3-P_3)/P_3 \simeq (A_1-P_1)/A_1$

where A_1 and P_1 are equatorial and polar diameters, and for A_3, P_3 the corresponding diameters are averaged with those oriented 15° on either side

ϵ at sunspot max. $\simeq 0.05$

ϵ at sunspot min. $\simeq 0.23$ near $r = 1.6\ \mathscr{R}_\odot$

Values are tabulated against $r/\mathscr{R}_\odot$

Polarization of coronal light (K+F) [1, 10, 12]

$$p = (I_t - I_r)/(I_t + I_r)$$

where I_t and I_r are intensities polarized in the tangential and radial direction (electric vector).

$p_{max} \simeq 42\%$. Other values tabulated against $r/\mathscr{R}_\odot$.

Density irregularities in the corona may be specified approximately by an irregularity factor $x = \overline{N_e^2}/(\overline{N}_e)^2$, where N_e is the electron density. Then r.m.s. $N_e = \overline{N}_e x^{1/2}$. In the striated outer corona one might write:

$$x \simeq 1/(\text{fraction of space occupied by striae})$$

Only approximate data exist (see table). x varies with $r/\mathscr{R}_\odot$.

Temperature of corona.

Quiet corona T_{max} at $r \simeq 2\mathscr{R}_\odot = 1.8 \times 10^6$ °K

T increases in dense streamers in accordance with

$$\Delta \log T = 0.4\, \Delta \log N_e \text{ [4]}$$

Radial variations of p, ϵ, x, T

$r_o/\mathscr{R}_\odot$	1.0	1.2	1.5	2	3	5	10	20	215
Polarization in %									
p at equator	21	33	42	34	20	10	4	2.6	
p at pole (sp. min)	20	28	30	17	6	2			
Ellipticity ϵ	0.06	0.11	0.17	0.16	0.08	0.09	0.18	0.25	
Irregularity x [8]	1.1	1.2	1.6	2.5	4	8	17	21	25
T in 10^6 °K [13]	0.5	1.2	1.7	1.8	1.7	1.4	1.1	0.8	0.2

Brightness of sky near Sun during a total eclipse [1, 5]

$= 1.6 \times 10^{-9}$ mean Sun brightness

Smoothed coronal brightness and electron density [1, 5, 13, 14]

r / ρ	$\log\left(\frac{r}{\mathscr{R}_\odot}-1\right)$	log (surface brightness) K max.	K min. eq.	K min. pole	log (surface brightness) F [1, 14]	$\log N_e$ max.	$\log N_e$ min. eq.	$\log N_e$ min. pole
$\mathscr{R}_\odot$		in $10^{-10} F_\lambda$ (see § 82)				in cm^{-3}		
1.003	−2.5					9.0	9.0	9.0
1.005	−2.3					8.8	8.7	8.6
1.01	−2.0	4.68	4.43	4.35	3.22	8.6	8.4	8.3
1.03	−1.5	4.55	4.30	4.15	3.16	8.45	8.25	8.12
1.06	−1.2	4.41	4.16	3.90	3.06	8.36	8.10	7.98
1.10	−1.0	4.25	4.01	3.72	3.00	8.23	7.96	7.81
1.2	−0.7	3.91	3.65	3.15	2.80	7.90	7.67	7.30
1.4	−0.4	3.34	3.08	2.39	2.46	7.44	7.18	6.64
1.6	−0.2	2.92	2.67	1.89	2.24	7.05	6.83	6.13
1.8	−0.1	2.54	2.30	1.48	2.06	6.78	6.56	5.78
2.0	0.0	2.23	2.00	1.15	1.93	6.52	6.31	5.50
2.2	+0.1	1.98	1.78	0.91	1.81	6.28	6.10	5.25
2.5	+0.2	1.63	1.44	0.6	1.65	6.00	5.81	5.00
3.0	+0.3	1.23	0.99	0.2	1.43	5.65	5.45	4.7
4	+0.5	0.70	0.44	−0.3	1.10	5.18	4.97	4.3
5	+0.6	0.3	0.05	−0.7	0.83	4.90	4.70	4.0
10	1.0	−0.5	−0.8	−1.7	0.23	4.1	4.0	
20	1.3		−1.7		−0.27		3.2	
50	1.7						2.2	
100	2.0						1.5	
215	2.3						0.7	