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ABSTRACT. The hydrogen and helium line equivalent widths from stellar atmosphere models for early B stars are presented. The models, which range in helium number fraction from 0.10 to 0.85, result from the non-LTE statistical equilibrium code of Mihalas.

I. RESULTS

Model atmospheres were computed with the non-LTE code of Mihalas (1972), with modifications listed by Abbott and Hummer (1985). The code assumes a plane-parallel atmosphere in radiative and hydrostatic equilibrium, allows for only hydrogen and helium composition, and does not include backwarming by a wind. The inaccuracies due to inclusion of only two bound levels of helium in non-LTE become more serious with higher helium abundance.

Our initial purpose for computing these models was to compare them to line profiles of intermediate helium rich stars, but there are several other applications as more distant B stars are observed with improved instrumentation. They will be useful in connection with the general study of helium abundances and gradients within the Galaxy, the chemical evolution of the Galaxy, and the relative rates of change of helium and heavy elements, as well as similar studies of B stars in other nearby galaxies.

Tables I through III list the equivalent widths of the five hydrogen lines and 14 helium lines for which profiles have been computed, as well as the temperature, gravity and helium number fraction of the atmospheres. In addition, for each of these lines, the intensity as a function of wavelength and zenith angle is available for computing line profiles which are rotationally broadened and/or arise from spotted surfaces. Odell will provide these results on computer tape, if contacted at the address below.

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II. REFERENCES

- Abbott, D. C., and Hummer, D. G. 1985, *Ap. J.* 294, 286.
 Mihalas, D. 1972, *Non-LTE Atmospheres for B and O Stars* (NCAR-TN/STR-76).

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TABLE I
Hydrogen Line Equivalent Widths

Teff	Log g	NHE/NTOT	ALPHA	BETA	GAMMA	DELTA	EPSILON
24000	3.85	0.35	3.42	4.48	4.64	4.84	5.18
24000	3.85	0.60	3.25	4.18	4.31	4.50	4.82
24000	4.30	0.35	4.25	5.66	5.91	6.19	6.67
24000	4.30	0.60	4.07	5.33	5.55	5.81	6.25
22500	3.40	0.35	2.92	3.81	3.90	4.04	4.29
22500	3.40	0.60	2.84	3.61	3.68	3.82	4.07
22500	3.85	0.10	3.57	4.81	4.99	5.19	5.55
22500	3.85	0.35	3.76	4.98	5.16	5.37	5.76
22500	3.85	0.60	3.73	4.84	4.98	5.19	5.57
22500	3.85	0.85	3.28	4.08	4.16	4.31	4.60
22500	4.30	0.10	4.46	6.07	6.35	6.64	7.15
22500	4.30	0.35	4.72	6.34	6.61	6.92	7.46
22500	4.30	0.60	4.79	6.31	6.55	6.83	7.36
22500	4.30	0.85	4.51	5.76	5.91	6.13	6.56
20000	3.85	0.35	4.25	5.69	5.87	6.11	6.55
20000	3.85	0.60	4.51	5.91	6.06	6.29	6.75
20000	4.30	0.35	5.33	7.22	7.52	7.85	8.45
20000	4.30	0.60	5.71	7.62	7.89	8.21	8.85
18000	3.85	0.10	4.71	6.49	6.73	6.99	7.47
18000	3.85	0.35	5.41	7.41	7.68	7.97	8.53
18000	3.85	0.60	6.03	8.23	8.50	8.82	9.45
18000	3.85	0.85	6.61	8.88	9.13	9.44	10.13
18000	4.30	0.10	5.79	8.04	8.41	8.77	9.41
18000	4.30	0.35	6.56	9.09	9.52	9.92	10.66
18000	4.30	0.60	7.24	10.02	10.48	10.91	11.79

The equivalent widths are total widths, to continuum at $\pm 30 \text{ \AA}$.

NHE/NTOT refers to the helium number fraction $NHE/(NH+NHE)$.

TABLE II

Blue Helium I Line Equivalent Widths

Teff	Log g	NHE/NTOT	3889	4026	4121	4387	4438	4471	4713
24000	3.85	0.35	0.43	2.31	0.37	1.53	0.23	1.97	0.32
24000	3.85	0.60	0.59	3.17	0.51	2.06	0.33	2.65	0.44
24000	4.30	0.35	0.57	3.01	0.48	1.90	0.29	2.52	0.42
24000	4.30	0.60	0.77	3.97	0.65	2.50	0.39	3.28	0.55
22500	3.40	0.35	0.34	1.85	0.31	1.27	0.22	1.60	0.27
22500	3.40	0.60	0.49	2.64	0.43	1.75	0.30	2.24	0.37
22500	3.85	0.10	0.28	1.29	0.22	0.85	0.14	1.17	0.28
22500	3.85	0.35	0.48	2.53	0.40	1.62	0.26	2.14	0.35
22500	3.85	0.60	0.67	3.49	0.56	2.21	0.35	2.90	0.48
22500	3.85	0.85	0.88	4.46	0.73	2.80	0.44	3.68	0.63
22500	4.30	0.10	0.36	1.72	0.27	1.05	0.15	1.53	0.27
22500	4.30	0.35	0.62	3.20	0.51	1.97	0.30	2.67	0.44
22500	4.30	0.60	0.85	4.28	0.70	2.63	0.40	3.51	0.59
22500	4.30	0.85	1.10	5.38	0.91	3.31	0.52	4.39	0.77
20000	3.85	0.35	0.53	2.69	0.43	1.66	0.26	2.26	0.38
20000	3.85	0.60	0.74	3.75	0.60	2.29	0.36	3.09	0.51
20000	4.30	0.35	0.66	3.27	0.51	1.93	0.28	2.71	0.45
20000	4.30	0.60	0.89	4.37	0.71	2.60	0.39	3.56	0.61
18000	3.85	0.10	0.33	1.31	0.21	0.71	0.10	1.15	0.22
18000	3.85	0.35	0.55	2.47	0.38	1.36	0.20	2.02	0.35
18000	3.85	0.60	0.74	3.39	0.54	1.87	0.27	2.71	0.46
18000	3.85	0.85	1.00	4.55	0.76	2.55	0.38	3.60	0.63
18000	4.30	0.10	0.36	1.49	0.22	0.75	0.10	1.27	0.22
18000	4.30	0.35	0.60	2.71	0.41	1.42	0.19	2.19	0.36
18000	4.30	0.60	0.79	3.60	0.57	1.91	0.26	2.85	0.48

TABLE III

Red Helium I Line Equivalent Widths

Teff	Log g	NHE/NTOT	4921	5015	5047	5876	6678	7065	7281
24000	3.85	0.35	1.30	0.45	0.27	0.78	0.91	0.17	0.32
24000	3.85	0.60	1.69	0.58	0.35	1.05	1.17	0.26	0.38
24000	4.30	0.35	1.56	0.55	0.31	1.02	1.07	0.27	0.35
24000	4.30	0.60	1.98	0.70	0.41	1.34	1.36	0.36	0.42
22500	3.40	0.35	1.11	0.39	0.25	0.63	0.79	0.10	0.29
22500	3.40	0.60	1.48	0.51	0.31	0.86	1.01	0.17	0.34
22500	3.85	0.10	0.79	0.31	0.17	0.55	0.61	0.17	0.24
22500	3.85	0.35	1.37	0.48	0.28	0.85	0.94	0.21	0.32
22500	3.85	0.60	1.79	0.63	0.37	1.15	1.21	0.29	0.39
22500	3.85	0.85	2.18	0.79	0.47	1.49	1.49	0.40	0.46
22500	4.30	0.10	0.94	0.36	0.18	0.69	0.69	0.24	0.25
22500	4.30	0.35	1.60	0.57	0.32	1.09	1.08	0.31	0.35
22500	4.30	0.60	2.05	0.74	0.43	1.43	1.38	0.40	0.42
22500	4.30	0.85	2.48	0.93	0.56	1.80	1.70	0.52	0.52
20000	3.85	0.35	1.38	0.50	0.28	0.91	0.92	0.26	0.31
20000	3.85	0.60	1.81	0.66	0.37	1.23	1.19	0.34	0.38
20000	4.30	0.35	1.55	0.57	0.30	1.10	1.01	0.35	0.33
20000	4.30	0.60	1.99	0.74	0.41	1.43	1.29	0.43	0.40
18000	3.85	0.10	0.64	0.27	0.12	0.59	0.48	0.26	0.17
18000	3.85	0.35	1.08	0.42	0.20	0.85	0.68	0.33	0.23
18000	3.85	0.60	1.42	0.54	0.27	1.07	0.85	0.39	0.27
18000	3.85	0.85	1.84	0.71	0.39	1.38	1.10	0.47	0.34
18000	4.30	0.10	0.65	0.26	0.11	0.61	0.45	0.25	0.14
18000	4.30	0.35	1.11	0.42	0.20	0.89	0.67	0.34	0.20
18000	4.30	0.60	1.43	0.54	0.27	1.11	0.83	0.40	0.24