

THIRTEEN-COLOR PHOTOMETRY OF O STARS

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RESUMEN

Se presenta fotometría de trece colores para estrellas O (tipos espectrales B2 y más tempranas). Se incluyen datos parciales (8C o 6RC) para 27 estrellas y datos completos de 13-C para 33 estrellas.

ABSTRACT

Thirteen-color photometry for O stars (spectral types B2 and earlier) are presented. Partial data (8C or 6RC) for 27 stars and complete 13-C data for 33 stars are included.

Key words: PHOTOMETRY – STARS-O TYPE

The seven-color intermediate-band photometric system of Borgman (1960) was designed specifically to classify O and B stars with filters chosen to measure the Balmer jump, the covering hydrogen lines around 3750 Å and the gradients of the spectral-energy distribution in the ultraviolet and blue, while avoiding most strong spectral lines of the early-type stars. The seven bluest filters of the 13-color system (Johnson and Mitchell 1975; Mitchell and Johnson 1969; Johnson, Mitchell and Latham 1967) match very closely those of Borgman, and the six red and near infrared filters were selected similarly with respect to the Paschen jump (Mitchell 1975).

Borgman (1960, 1963) and Borgman and Blaauw (1964) studied early-type (O, B and A) stars, their intrinsic colors, absolute magnitudes, distance moduli, and photometric effects caused by late-type companions. Johnson (1977) and Borgman (1961) used these photometric systems and early-type stars to study the wavelength dependence of interstellar extinction. More recently Underhill (1979) and Underhill *et al.* (1979) used published 13-C photometry, its absolute energy calibration from Johnson and Mitchell (1975) plus published ultraviolet observations and model atmosphere fluxes to determine effective temperatures, and diameters for a number of O and B stars. Finally, at the Observatorio Astronómico Nacional at San Pedro Mártir in Baja California we have found great usefulness in the 13-C system for the study of Be stars, being able to separate the effects of interstellar reddening from the stars' intrinsic ultraviolet and infrared excesses (Alvarez and Schuster 1978) and to correlate the ultraviolet and infrared variability of some Be stars (Alvarez and Schuster 1981).

We feel that 13-C photometry contains great potential for the study of O stars. Photometry of bright (and

faint) O stars can be used to derive mean intrinsic 13-C colors as a first step in a study of the physical parameters of O stars of differing spectral types and as a basis for more detailed studies of the law of interstellar extinction near the galactic plane. Also, 13-C photometry covers well a portion of an O star's continuum spectral-energy distribution, and, when combined with satellite ultraviolet observations and model atmosphere fluxes (using the absolute energy calibration of Johnson and Mitchell 1975), allows the derivation of angular diameters (Underhill *et al.* 1979), bolometric magnitudes, and effective temperatures. Finally, further work can be done to understand the classification parameters of the 13-C system for hot stars, to set up two-dimensional photometric classification schemes, and to calibrate the indices for temperature and absolute magnitude.

In 1974 a 13-C photometric program of bright stars from the *Catalogue of Bright Stars* (Hoffleit 1964) was begun at the observatory at San Pedro Mártir. This bright-star program was initiated mainly for cataloguing purposes, but the sample was broken into several classes, such as solar-type stars, Be stars, supergiants and O stars, to produce more scientifically useful results. In Tables 1 and 2 we give 8C and 6RC data respectively, from the O-star program, in which we are observing stars of spectral-types B2 and earlier. In these tables two lines are used for each night's observation; Column 1 gives the star's number from Hoffleit (1964), Columns 2 through 6 the reduced photometric data; Columns 7 through 11 weights of the data ("1" for good data and "0" for no or poor data), followed by the hour angle (in radians), average air mass and Julian Day (minus 2 430 000) of each observation. Columns 15 through 19 give codes which indicate the type of reduction procedure: (a) a "4" means a full least-squares solution for the zero-point, color-term and atmospheric

extinction coefficients, (b) a "3" indicates that a mean color-term was used, (c) a "2" a mean extinction coefficient, and (d) a "1" both a mean color-term and mean extinction coefficient. Column 20 gives an index which distinguishes the lines of data and shows the type of photometry (8C or 6RC).

Except for the 6RC observations of BS6788 and BS6929, and a few observations of BS1855 and BS8622, all observations of Tables 1 and 2 were made with the 1.5 m photometric telescope of the observatory at San Pedro Mártir, using 25" to 35" diaphragms due to the large image size of this instrument. Many of these stars lie in the Milky Way within fairly crowded regions. In Table 3 we list stars whose photometry is probably contaminated; other stars or nebulae may contribute 1% or more of the light. The notes of Table 3 were made while observing or were taken from Hoffleit (1964).

All observations were made employing the procedures and DC equipment described by Schuster (1981) and using exclusively the DC amplifier No. 1 (Johnson 1962), which has a very constant gain table (Schuster 1981). Except for a few observations of BS1855, BS2284, BS6118 and BS8622, the observations of Tables 1 and 2 were made from May 1975 to June 1976, during which time this amplifier was calibrated twice. BS1855 and BS8622 are primary 13-C standard stars used in the photometric reductions and for this reason have many observations, including ones at large air masses. Except for six very southern program stars (declinations $\lesssim -30^\circ$), we have always observed during each night standard stars at air masses greater than those of the program stars. In Schuster (1982) we showed that at the San Pedro Mártir Observatory it is not unusual to obtain good photometric values of the six very southern program stars (BS3878, BS5948, BS5987, BS6347, BS6397 and BS6535); they show good repeatability for independent photometric nights.

In Table 4 we indicate the quality of our data by giving probable errors corrected to unit air mass for various O and B stars observed at San Pedro Mártir. The lines for BS1855 and BS8622 use exclusively the data and air masses of Tables 1 and 2. The line labelled "O, B Stars" is from Table 10 of Schuster (1981), calculated using observations of the 13-C primary standard stars.

We see that, except perhaps for the 58–110 color, the quality of this data is very good. The larger 58–110 errors are due to the low sensitivity of the RCA7102 photomultiplier at 1.1μ .

Tables 1 and 2 contain 8C observations for 49 stars and 6RC data for 44 stars, respectively, combining to give complete 13-C data for 33 O stars. When these observations are combined with those of Johnson and Mitchell (1975), Mitchell and Johnson (1969) and Johnson, Mitchell and Latham (1967) we have a complete set of 13-C data for 153 stars of spectral-types B2 and earlier.

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REFERENCES

- Alvarez, M. and Schuster, W.J. 1978, *Bull. AAS*, 10, 683.
 Alvarez, M. and Schuster, W.J. 1981, *Rev. Mexicana Astron. Astrof.*, 6, 163.
 Borgman, J. 1960, *Bull. Astr. Inst. Netherlands*, 15, 255.
 Borgman, J. 1961, *Bull. Astr. Inst. Netherlands*, 16, 99.
 Borgman, J. 1963, *Bull. Astr. Inst. Netherlands*, 17, 58.
 Borgman, J. and Blaauw, A. 1964, *Bull. Astr. Inst. Netherlands*, 17, 358.
 Hoffleit, D. 1964, *Catalogue of Bright Stars* (New Haven, Conn.: Yale University Obs.).
 Johnson, H.L. 1962, in *Stars and Stellar Systems*, Vol. 2, *Astronomical Techniques*, ed. W.A. Hiltner (Chicago: The University of Chicago Press), p. 157.
 Johnson, H.L. 1977, *Rev. Mexicana Astron. Astrof.*, 2, 175.
 Johnson, H.L. and Mitchell, R.I. 1975, *Rev. Mexicana Astron. Astrof.*, 1, 299.
 Johnson, H.L., Mitchell, R.I., and Latham, A.S. 1967, *Comm. Lunar and Planet. Lab.*, 6, 85.
 Mitchell, R.I. 1975, private communication.
 Mitchell, R.I. and Johnson, H.L. 1969, *Comm. Lunar and Planet. Lab.*, 8, 1.
 Schuster, W.J. 1982, *Rev. Mexicana Astron. Astrof.*, 5, XXX.
 Underhill, A.B. 1979, *Ap. J.*, 234, 528.
 Underhill, A.B., Divan, L., and Prévot-Burnichon, M.L. 1979, *M.N.R.A.S.*, 189, 601.

TABLE 1
8C PHOTOMETRY OF O STARS

NAME	52 58	33-52 52-58	35-52 52-63	37-52 45-52	40-52 33-35	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP = 1,2,3,4,5	CD	
01855	4.578	-1.720	-1.594	-1.004	-0.330	1	1	1	1	1	0.159	1.814	14216	9559	4 4 4 4 4	08
01855	4.673	-0.091	-0.146	-0.076	-0.134	1	1	1	1	1	0.159	1.814	14216	9559	4 4 4 4 4	18
01855	4.574	-1.734	-1.594	-1.030	-0.342	1	1	1	1	1	0.161	1.942	14216	9683	4 4 4 4 4	08
01855	4.662	-0.086	-0.146	-0.077	-0.146	1	1	1	1	1	0.161	1.942	14216	9683	4 4 4 4 4	18
01855	4.571	-1.737	-1.605	-1.026	-0.337	1	1	1	1	1	1.048	2.771	14216	0044	4 4 4 4 4	08
01855	4.656	-0.083	-0.151	-0.082	-0.138	1	1	1	1	1	1.048	2.771	14216	0044	4 4 4 4 4	18
01855	4.571	-1.728	-1.589	-1.045	-0.344	1	1	1	1	1	0.279	1.331	12464	6769	4 4 4 4 4	08
01855	4.670	-0.103	-0.159	-0.077	-0.150	1	1	1	1	1	0.279	1.331	12464	6769	4 4 4 4 4	18
01855	4.544	-1.710	-1.581	-1.020	-0.326	1	1	1	1	1	0.577	1.545	12463	7268	4 4 4 4 4	08
01855	4.646	-0.104	-0.148	-0.069	-0.135	1	1	1	1	1	0.577	1.545	12463	7268	4 4 4 4 4	18
01855	4.589	-1.745	-1.612	-1.035	-0.349	1	1	1	1	1	0.146	1.290	12462	6611	4 4 4 4 4	08
01855	4.687	-0.096	-0.156	-0.088	-0.137	1	1	1	1	1	0.146	1.290	12462	6611	4 4 4 4 4	18
01855	4.581	-1.730	-1.596	-1.025	-0.331	1	1	1	1	1	0.846	2.005	13474	0037	4 4 4 4 4	08
01855	4.670	-0.088	-0.138	-0.076	-0.145	1	1	1	1	1	0.846	2.005	13474	0037	4 4 4 4 4	18
01855	4.569	-1.712	-1.583	-1.011	-0.333	1	1	1	1	1	0.749	1.793	13471	8937	4 4 4 4 4	08
01855	4.652	-0.079	-0.146	-0.071	-0.135	1	1	1	1	1	0.749	1.793	13471	8937	4 4 4 4 4	18
01855	4.573	-1.729	-1.595	-1.034	-0.338	1	1	1	1	1	-0.156	1.292	13108	8440	4 4 4 4 4	08
01855	4.658	-0.081	-0.137	-0.078	-0.137	1	1	1	1	1	-0.156	1.292	13108	8440	4 4 4 4 4	18
01855	4.578	-1.761	-1.607	-1.019	-0.344	1	1	1	1	1	0.196	1.302	13556	6739	4 4 4 4 4	08
01855	4.671	-0.092	-0.146	-0.075	-0.157	1	1	1	1	1	0.196	1.302	13556	6739	4 4 4 4 4	18
01855	4.576	-1.753	-1.602	-1.025	-0.344	1	1	1	1	1	0.216	1.308	13555	6799	4 4 4 4 4	08
01855	4.683	-0.107	-0.162	-0.076	-0.154	1	1	1	1	1	0.216	1.308	13555	6799	4 4 4 4 4	18
01855	4.570	-1.733	-1.604	-1.021	-0.347	1	1	1	1	1	0.768	1.829	12850	6978	4 4 4 4 4	08
01855	4.683	-0.105	-0.174	-0.073	-0.175	1	1	1	1	1	0.768	1.829	12850	6978	4 4 4 4 4	18
01855	4.578	-1.720	-1.576	-1.047	-0.344	1	1	1	1	1	1.162	3.640	12850	7604	4 4 4 4 4	08
01855	4.662	-0.085	-0.147	-0.079	-0.157	1	1	1	1	1	1.162	3.640	12850	7604	4 4 4 4 4	18
01855	4.572	-1.727	-1.588	-1.045	-0.347	1	1	1	1	1	0.635	1.615	12845	6904	2 1 1 1 1	08
01855	4.674	-0.091	-0.156	-0.089	-0.139	1	1	1	1	1	0.635	1.615	12845	6904	2 1 1 1 1	18
01855	4.534	-1.725	-1.607	-1.041	-0.365	1	1	1	1	1	0.029	1.275	13052	0289	4 4 4 4 4	08
01855	4.630	-0.089	-0.149	-0.095	-0.154	1	1	1	1	1	0.029	1.275	13052	0289	4 4 4 4 4	18
01855	4.565	-1.703	-1.574	-0.999	-0.324	1	1	1	1	1	0.419	1.406	13071	0390	4 4 4 4 4	08
01855	4.644	-0.075	-0.120	-0.070	-0.153	1	1	1	1	1	0.419	1.406	13071	0390	4 4 4 4 4	18
01855	4.575	-1.738	-1.611	-1.038	-0.342	1	1	1	1	1	-0.041	1.276	13076	9496	4 4 4 4 4	08
01855	4.661	-0.080	-0.144	-0.074	-0.149	1	1	1	1	1	-0.041	1.276	13076	9496	4 4 4 4 4	18
01855	4.564	-1.718	-1.587	-1.027	-0.329	1	1	1	1	1	0.588	1.558	13077	0495	4 4 4 4 4	08
01855	4.649	-0.079	-0.148	-0.061	-0.154	1	1	1	1	1	0.588	1.558	13077	0495	4 4 4 4 4	18
01855	4.572	-1.737	-1.616	-1.047	-0.357	1	1	1	1	1	-0.274	1.329	13107	8279	4 4 4 4 4	08
01855	4.654	-0.078	-0.144	-0.084	-0.125	1	1	1	1	1	-0.274	1.329	13107	8279	4 4 4 4 4	18
01855	4.557	-1.730	-1.629	-1.005	-0.337	1	1	1	1	1	0.662	1.652	13174	7936	4 4 4 4 4	08
01855	4.659	-0.101	-0.157	-0.077	-0.147	1	1	1	1	1	0.662	1.652	13174	7936	4 4 4 4 4	18
01855	4.597	-1.728	-1.606	-1.018	-0.346	1	1	1	1	1	0.753	1.801	12851	6927	4 4 4 4 4	08
01855	4.691	-0.091	-0.155	-0.079	-0.134	1	1	1	1	1	0.753	1.801	12851	6927	4 4 4 4 4	18
01855	4.579	-1.738	-1.617	-1.039	-0.352	1	1	1	1	1	1.062	2.850	12851	7417	4 4 4 4 4	08
01855	4.667	-0.087	-0.147	-0.083	-0.121	1	1	1	1	1	1.062	2.850	12851	7417	4 4 4 4 4	18
01855	4.572	-1.735	-1.611	-1.030	-0.337	1	1	1	1	1	1.059	2.834	12852	7385	4 4 4 4 4	08
01855	4.681	-0.101	-0.155	-0.072	-0.142	1	1	1	1	1	1.059	2.834	12852	7385	4 4 4 4 4	18
02222	5.938	-1.617	-1.481	-0.938	-0.318	1	1	1	1	1	0.309	1.092	12851	6520	4 4 4 4 4	08
02222	6.026	-0.084	-0.136	-0.077	-0.151	1	1	1	1	1	0.309	1.092	12851	6520	4 4 4 4 4	18
02222	5.902	-1.612	-1.529	-0.941	-0.325	1	1	1	1	1	0.397	1.122	12852	6632	4 4 4 4 4	08
02222	6.000	-0.090	-0.146	-0.089	-0.110	1	1	1	1	1	0.397	1.122	12852	6632	4 4 4 4 4	18
02266	5.522	-1.224	-1.117	-0.727	-0.228	1	1	1	1	1	0.341	1.712	12851	6594	4 4 4 4 4	08
02266	5.583	-0.059	-0.095	-0.056	-0.112	1	1	1	1	1	0.341	1.712	12851	6594	4 4 4 4 4	18
02266	5.504	-1.230	-1.144	-0.736	-0.239	1	1	1	1	1	0.430	1.794	12852	6708	4 4 4 4 4	08
02266	5.571	-0.061	-0.098	-0.058	-0.099	1	1	1	1	1	0.430	1.794	12852	6708	4 4 4 4 4	18
02273	5.289	-1.312	-1.177	-0.763	-0.263	1	1	1	1	1	0.380	1.391	12851	6666	4 4 4 4 4	08
02273	5.338	-0.046	-0.093	-0.073	-0.142	1	1	1	1	1	0.380	1.391	12851	6666	4 4 4 4 4	18
02273	5.251	-1.293	-1.202	-0.764	-0.258	1	1	1	1	1	0.468	1.453	12852	6778	4 4 4 4 4	08
02273	5.331	-0.074	-0.108	-0.062	-0.105	1	1	1	1	1	0.468	1.453	12852	6778	4 4 4 4 4	18
02284	5.571	-1.255	-1.204	-0.655	-0.046	1	1	1	1	1	0.421	1.513	12851	6743	4 4 4 4 4	08
02284	5.526	0.047	0.170	0.072	-0.065	1	1	1	1	1	0.421	1.513	12851	6743	4 4 4 4 4	18
02284	5.524	-1.245	-1.229	-0.659	-0.048	1	1	1	1	1	0.514	1.596	12852	6862	4 4 4 4 4	08
02284	5.505	0.027	0.159	0.071	-0.047	1	1	1	1	1	0.514	1.596	12852	6862	4 4 4 4 4	18
02370	6.148	-1.297	-1.208	-0.733	-0.150	1	1	1	1	1	0.446	1.164	12851	6849	4 4 4 4 4	08
02370	6.155	-0.004	0.067	0.006	-0.104	1	1	1	1	1	0.446	1.164	12851	6849	4 4 4 4 4	18
02370	6.091	-1.285	-1.242	-0.722	-0.155	1	1	1	1	1	0.514	1.201	12852	6929	4 4 4 4 4	08
02370	6.111	-0.012	0.039	0.010	-0.069	1	1	1	1	1	0.514	1.201	12852	6929	4 4 4 4 4	18
02373	6.170	-1.281	-1.172	-0.735	-0.207	1	1	1	1	1	0.558	1.691	12851	7025	4 4 4 4 4	08
02373	6.210	-0.039	-0.083	-0.028	-0.116	1	1	1	1	1	0.558	1.691	12851	7025	4 4 4 4 4	18
02373	6.153	-1.284	-1.206	-0.753	-0.214	1	1	1	1	1	0.559	1.692	12852	6999	4 4 4 4 4	08
02373	6.200	-0.040	-0.062	-0.036	-0.095	1	1	1	1	1	0.559	1.692	12852	6999	4 4 4 4 4	18
02422	6.136	-1.261	-1.185	-0.682	-0.023	1	1	1	1	1	0.586	1.306	12851	7113	4 4 4 4 4	08
02422	6.067	0.071	0.126	0.074	-0.089	1	1	1	1	1	0.586	1.306	12851	7113	4 4 4 4 4	18
02422	6.077	-1.263	-1.230	-0.684	-0.040	1	1	1	1	1	0.582	1.303	12852	7080	4 4 4 4 4	08
02422	6.017	0.069	0.109	0.074	-0.062	1	1	1	1	1	0.582	1.303	12852	7080	4 4 4 4 4	18
02432	6.256	-0.986	-0.925	-0.527	0.073	1	1	1	1	1	0.632	1.362	12851	7190	4 4 4 4 4	08
02432	6.159	0.098	0.182	0.130	-0.071	1	1	1	1	1	0.632	1.362	12851	7190	4 4 4 4 4	18
02432	6.222	-0.981	-0.954	-0.527	0.069	1	1	1	1	1	0.622	1.353	12852	7148	4 4 4 4 4	08
02432	6.139	0.090	0.173	0.128												

TABLE 1 (CONTINUED)

NAME	52 58	33-52 52-58	35-52 52-63	37-52 45-52	40-52 33-35	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP= 1,2,3,4,5	CD
02467	6.383	-1.430	-1.361	-0.792	-0.137	1	1	1	1	1	0.653	1.362	12852.7225	4 4 4 4 4	08
02467	6.376	0.017	0.029	0.025	-0.093	1	1	1	1	1	0.653	1.362	12852.7225	4 4 4 4 4	18
02623	6.633	-0.957	-0.891	-0.555	-0.067	1	1	1	1	1	0.723	1.449	12851.7501	4 4 4 4 4	08
02623	6.622	0.013	0.026	0.035	-0.073	1	1	1	1	1	0.723	1.449	12851.7501	4 4 4 4 4	18
02623	6.612	-0.956	-0.917	-0.563	-0.069	1	1	1	1	1	0.620	1.343	12852.7310	4 4 4 4 4	08
02623	6.615	0.003	0.029	0.033	-0.057	1	1	1	1	1	0.620	1.343	12852.7310	4 4 4 4 4	18
02670	6.535	-1.344	-1.233	-0.762	-0.141	1	1	1	1	1	0.759	1.932	12851.7586	4 4 4 4 4	08
02670	6.528	0.008	0.020	0.016	-0.116	1	1	1	1	1	0.759	1.932	12851.7586	4 4 4 4 4	18
02670	6.502	-1.334	-1.260	-0.762	-0.148	1	1	1	1	1	0.751	1.917	12852.7547	4 4 4 4 4	08
02670	6.518	-0.009	0.013	0.031	-0.093	1	1	1	1	1	0.751	1.917	12852.7547	4 4 4 4 4	18
02678	5.426	-1.198	-1.118	-0.657	-0.025	1	1	1	1	1	0.802	2.061	12851.7660	4 4 4 4 4	08
02678	5.370	0.057	0.098	0.086	-0.084	1	1	1	1	1	0.802	2.061	12851.7660	4 4 4 4 4	18
02678	5.445	-1.210	-1.147	-0.668	-0.042	1	1	1	1	1	0.789	2.029	12852.7613	4 4 4 4 4	08
02678	5.398	0.055	0.105	0.075	-0.080	1	1	1	1	1	0.789	2.029	12852.7613	4 4 4 4 4	18
02679	6.459	-1.505	-1.390	-0.854	-0.170	1	1	1	1	1	0.849	2.250	12851.7735	4 4 4 4 4	08
02679	6.476	-0.015	-0.020	0.013	-0.118	1	1	1	1	1	0.849	2.250	12851.7735	4 4 4 4 4	18
02679	6.499	-1.515	-1.424	-0.866	-0.184	1	1	1	1	1	0.842	2.226	12852.7696	4 4 4 4 4	08
02679	6.532	-0.024	-0.022	-0.004	-0.111	1	1	1	1	1	0.842	2.226	12852.7696	4 4 4 4 4	18
02694	6.233	-1.287	-1.212	-0.701	-0.046	1	1	1	1	1	0.891	2.275	12851.7820	4 4 4 4 4	08
02694	6.184	0.050	0.083	0.076	-0.079	1	1	1	1	1	0.891	2.275	12851.7820	4 4 4 4 4	18
02694	6.239	-1.314	-1.264	-0.715	-0.057	1	1	1	1	1	0.886	2.258	12852.7785	4 4 4 4 4	08
02694	6.218	0.050	0.026	0.068	-0.073	1	1	1	1	1	0.886	2.258	12852.7785	4 4 4 4 4	18
02806	6.374	-1.632	-1.503	-0.945	-0.259	1	1	1	1	1	0.882	2.173	12851.7894	4 4 4 4 4	08
02806	6.433	-0.058	-0.084	-0.029	-0.134	1	1	1	1	1	0.882	2.173	12851.7894	4 4 4 4 4	18
02806	6.391	-1.624	-1.524	-0.937	-0.266	1	1	1	1	1	0.877	2.161	12852.7860	4 4 4 4 4	08
02806	6.468	-0.068	-0.087	-0.038	-0.121	1	1	1	1	1	0.877	2.161	12852.7860	4 4 4 4 4	18
03858	4.793	-0.916	-0.867	-0.583	-0.184	1	1	1	1	1	0.458	1.997	12912.6520	4 4 4 4 4	08
03858	4.847	-0.055	-0.061	-0.043	-0.054	1	1	1	1	1	0.458	1.997	12912.6520	4 4 4 4 4	18
03858	4.780	-0.911	-0.833	-0.592	-0.183	1	1	1	1	1	0.445	1.980	12911.6528	4 4 4 4 4	08
03858	4.832	-0.052	-0.064	-0.035	-0.077	1	1	1	1	1	0.445	1.980	12911.6528	4 4 4 4 4	18
03878	6.474	-1.478	-1.408	-0.861	-0.192	1	1	1	1	1	0.497	2.529	12912.6610	4 4 4 4 4	08
03878	6.527	-0.052	-0.058	0.006	-0.080	1	1	1	1	1	0.497	2.529	12912.6610	4 4 4 4 4	18
03878	6.465	-1.490	-1.406	-0.870	-0.178	1	1	1	1	1	0.525	2.598	12911.6682	4 4 4 4 4	08
03878	6.502	-0.034	-0.053	0.009	-0.089	1	1	1	1	1	0.525	2.598	12911.6682	4 4 4 4 4	18
04590	5.225	-1.423	-1.328	-0.854	-0.259	1	1	1	1	1	0.483	1.837	12556.7273	4 4 4 4 4	08
04590	5.297	-0.068	-0.096	-0.055	-0.110	1	1	1	1	1	0.483	1.837	12556.7273	4 4 4 4 4	18
04590	5.242	-1.441	-1.338	-0.849	-0.255	1	1	1	1	1	0.331	1.688	12554.7087	4 4 4 4 4	08
04590	5.345	-0.093	-0.118	-0.056	-0.152	1	1	1	1	1	0.331	1.688	12554.7087	4 4 4 4 3	18
05056	0.923	-1.551	-1.440	-0.926	-0.315	1	1	1	1	1	0.165	1.367	12556.7352	4 4 4 4 4	08
05056	1.019	-0.091	-0.126	-0.070	-0.129	1	1	1	1	1	0.165	1.367	12556.7352	4 4 4 4 4	18
05056	0.918	-1.570	-1.475	-0.939	-0.315	1	1	1	1	1	0.038	1.347	12554.7204	4 4 4 4 4	08
05056	1.030	-0.101	-0.138	-0.077	-0.147	1	1	1	1	1	0.038	1.347	12554.7204	4 4 4 4 3	18
06084	2.930	-0.986	-0.915	-0.483	0.068	1	1	1	1	1	0.052	1.815	12559.8309	4 4 4 4 4	08
06084	2.845	0.091	0.212	0.119	-0.078	1	1	1	1	1	0.052	1.815	12559.8309	4 4 4 4 4	18
06084	2.934	-0.991	-0.942	-0.501	0.059	1	1	1	1	1	0.042	1.813	12557.8347	4 4 4 4 4	08
06084	2.826	0.112	0.228	0.111	-0.061	1	1	1	1	1	0.042	1.813	12557.8347	4 4 4 4 4	18
06112	4.639	-0.763	-0.706	-0.306	0.179	1	1	1	1	1	0.062	1.721	12558.8382	4 4 4 4 4	08
06112	4.472	0.175	0.344	0.159	-0.063	1	1	1	1	1	0.062	1.721	12558.8382	4 4 4 4 4	18
06112	4.642	-0.761	-0.728	-0.312	0.181	1	1	1	1	1	0.078	1.723	12557.8435	4 4 4 4 4	08
06112	4.472	0.174	0.351	0.160	-0.043	1	1	1	1	1	0.078	1.723	12557.8435	4 4 4 4 4	18
06118	4.418	-0.906	-0.913	-0.352	0.215	1	1	1	1	1	0.144	1.556	13304.8099	4 4 4 4 4	08
06118	4.247	0.178	0.389	0.205	-0.047	1	1	1	1	1	0.144	1.556	13304.8099	4 4 4 4 3	18
06118	4.381	-0.889	-0.900	-0.334	0.221	1	1	1	1	1	0.263	1.605	13303.8316	4 4 4 4 4	08
06118	4.225	0.161	0.392	0.214	-0.038	1	1	1	1	1	0.263	1.605	13303.8316	4 4 4 4 3	18
06347	6.206	-0.423	-0.455	-0.066	0.483	1	1	1	1	1	0.022	2.491	12559.8574	4 4 4 4 4	08
06347	5.950	0.263	0.491	0.348	0.024	1	1	1	1	1	0.022	2.491	12559.8574	4 4 4 4 4	18
06347	6.221	-0.400	-0.462	-0.075	0.484	1	1	1	1	1	0.030	2.492	12558.8613	4 4 4 4 4	08
06347	5.936	0.292	0.522	0.353	0.051	1	1	1	1	1	0.030	2.492	12558.8613	4 4 4 4 4	18
06353	5.645	-0.895	-0.858	-0.434	0.079	1	1	1	1	1	0.086	1.161	12558.8698	4 4 4 4 4	08
06353	5.560	0.091	0.201	0.128	-0.055	1	1	1	1	1	0.086	1.161	12558.8698	4 4 4 4 4	18
06353	5.658	-0.908	-0.856	-0.433	0.081	1	1	1	1	1	0.139	1.168	12557.8810	4 4 4 4 4	08
06353	5.550	0.112	0.202	0.137	-0.066	1	1	1	1	1	0.139	1.168	12557.8810	4 4 4 4 4	18
06397	5.498	-1.391	-1.333	-0.738	-0.068	1	1	1	1	1	0.033	2.319	12559.8653	4 4 4 4 4	08
06397	5.456	0.050	0.163	0.075	-0.073	1	1	1	1	1	0.033	2.319	12559.8653	4 4 4 4 4	18
06397	5.506	-1.375	-1.328	-0.739	-0.066	1	1	1	1	1	0.145	2.358	12558.8858	4 4 4 4 4	08
06397	5.438	0.075	0.190	0.071	-0.063	1	1	1	1	1	0.145	2.358	12558.8858	4 4 4 4 4	18
06535	5.705	-1.288	-1.222	-0.679	-0.040	1	1	1	1	1	0.003	2.240	12559.8739	4 4 4 4 4	08
06535	5.647	0.065	0.137	0.065	-0.077	1	1	1	1	1	0.003	2.240	12559.8739	4 4 4 4 4	18
06535	5.699	-1.251	-1.205	-0.671	-0.024	1	1	1	1	1	0.107	2.261	12558.8931	4 4 4 4 4	08
06535	5.635	0.071	0.161	0.071	-0.060	1	1	1	1	1	0.107	2.261	12558.8931	4 4 4 4 4	18
06672	6.190	-1.291	-1.233	-0.687	-0.040	1	1	1	1	1	-0.033	1.782	12559.8823	4 4 4 4 4	08
06672	6.131	0.066	0.140	0.067	-0.075	1	1	1	1	1	-0.033	1.782	12559.8823	4 4 4 4 4	18
06672	6.209	-1.297	-1.235	-0.700	-0.049	1	1	1	1	1	0.019	1.781	12557.8959	4 4 4 4 4	08
06672	6.108	0.106	0.167	0.058	-0.078	1	1	1	1	1	0.019	1.781	12557.8959	4 4 4 4 4	18
06684	5.806	-0.932	-0.876	-0.471	0.018	1	1	1	1	1	0.053	1.160	12559.8970	4 4 4 4 4	08
06684	5.744	0.067	0.139	0.086	-0.071	1	1	1	1	1	0.053	1.160	12559.8970	4 4 4 4 4	18
06684	5.846	-0.917	-0.866	-0.479	0.041	1	1	1	1	1	0.069	1.162	12557.9050	4 4 4 4 4	08
06684	5.756	0.095	0.138	0.100	-0.066	1	1	1	1	1	0.069	1.162	12557.9050	4 4 4 4 4	18

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TABLE 1 (CONTINUED)

NAME	52	33-52	35-52	37-52	40-52	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP=1,2,3,4,5	CD
	58	52-58	52-63	45-52	33-35										
06716	5.756	-1.341	-1.266	-0.749	-0.107	1	1	1	1	1	0.097	1.702	12557.9132	4 4 4 4 4	08
06716	5.701	0.060	0.079	0.039	-0.091	1	1	1	1	1	0.097	1.702	12557.9132	4 4 4 4 4	18
06716	5.731	-1.339	-1.269	-0.761	-0.089	1	1	1	1	1	0.180	1.728	12556.9290	4 4 4 4 4	08
06716	5.681	0.057	0.070	0.053	-0.088	1	1	1	1	1	0.180	1.728	12556.9290	4 4 4 4 4	18
06727	6.733	-1.358	-1.274	-0.753	-0.116	1	1	1	1	1	0.138	1.710	12557.9205	4 4 4 4 4	08
06727	6.680	0.057	0.056	0.042	-0.099	1	1	1	1	1	0.138	1.710	12557.9205	4 4 4 4 4	18
06727	6.715	-1.358	-1.278	-0.752	-0.106	1	1	1	1	1	0.229	1.749	12556.9376	4 4 4 4 4	08
06727	6.657	0.065	0.060	0.038	-0.096	1	1	1	1	1	0.229	1.749	12556.9376	4 4 4 4 4	18
06736	5.970	-1.325	-1.269	-0.729	-0.059	1	1	1	1	1	0.118	1.775	12556.9207	4 4 4 4 4	08
06736	5.879	0.098	0.157	0.065	-0.076	1	1	1	1	1	0.118	1.775	12556.9207	4 4 4 4 4	18
06736	5.965	-1.368	-1.302	-0.739	-0.071	1	1	1	1	1	0.151	1.786	12554.9314	4 4 4 4 4	08
06736	5.892	0.088	0.121	0.048	-0.114	1	1	1	1	1	0.151	1.786	12554.9314	4 4 4 4 3	18
06747	6.120	-1.345	-1.285	-0.752	-0.100	1	1	1	1	1	0.195	1.166	12558.9280	4 4 4 4 4	08
06747	6.106	0.021	0.054	0.051	-0.084	1	1	1	1	1	0.195	1.166	12558.9280	4 4 4 4 4	18
06747	6.135	-1.375	-1.292	-0.757	-0.092	1	1	1	1	1	0.232	1.175	12557.9366	4 4 4 4 4	08
06747	6.096	0.044	0.060	0.071	-0.092	1	1	1	1	1	0.232	1.175	12557.9366	4 4 4 4 4	18
06762	6.258	-1.079	-1.033	-0.568	0.037	1	1	1	1	1	0.107	1.651	12558.9157	4 4 4 4 4	08
06762	6.173	0.092	0.175	0.108	-0.062	1	1	1	1	1	0.107	1.651	12558.9157	4 4 4 4 4	18
06762	6.275	-1.096	-1.034	-0.574	0.046	1	1	1	1	1	0.165	1.669	12557.9276	4 4 4 4 4	08
06762	6.172	0.108	0.171	0.117	-0.075	1	1	1	1	1	0.165	1.669	12557.9276	4 4 4 4 4	18
06822	5.384	-1.261	-1.164	-0.678	-0.030	1	1	1	1	1	-0.109	1.625	12912.9178	4 4 4 4 4	08
06822	5.223	0.064	0.114	0.091	-0.103	1	1	1	1	1	-0.109	1.625	12912.9178	4 4 4 4 4	18
06822	5.353	-1.266	-1.197	-0.687	-0.039	1	1	1	1	1	0.030	1.614	12911.9425	4 4 4 4 4	08
06822	5.295	0.063	0.119	0.069	-0.081	1	1	1	1	1	0.030	1.614	12911.9425	4 4 4 4 4	18
06823	5.981	-1.289	-1.198	-0.699	-0.057	1	1	1	1	1	-0.064	1.605	12912.9249	4 4 4 4 4	08
06823	5.935	0.049	0.090	0.087	-0.099	1	1	1	1	1	-0.064	1.605	12912.9249	4 4 4 4 4	18
06823	5.968	-1.297	-1.234	-0.705	-0.053	1	1	1	1	1	0.083	1.609	12911.9510	4 4 4 4 4	08
06823	5.935	0.037	0.097	0.073	-0.077	1	1	1	1	1	0.083	1.609	12911.9510	4 4 4 4 4	18
06841	6.551	-1.188	-1.143	-0.624	0.008	1	1	1	1	1	0.151	1.560	12911.9633	4 4 4 4 4	08
06841	6.465	0.092	0.178	0.096	-0.059	1	1	1	1	1	0.151	1.560	12911.9633	4 4 4 4 4	18
06841	6.527	-1.190	-1.132	-0.626	0.012	1	1	1	1	1	0.181	1.570	12910.9707	4 4 4 4 4	08
06841	6.447	0.085	0.167	0.111	-0.092	1	1	1	1	1	0.181	1.570	12910.9707	4 4 4 4 3	18
06848	6.850	-0.843	-0.810	-0.366	0.216	1	1	1	1	1	0.215	1.589	12911.9744	4 4 4 4 4	08
06848	6.679	0.177	0.324	0.210	-0.043	1	1	1	1	1	0.215	1.589	12911.9744	4 4 4 4 4	18
06848	6.800	-0.839	-0.785	-0.358	0.222	1	1	1	1	1	0.232	1.596	12910.9798	4 4 4 4 4	08
06848	6.633	0.171	0.307	0.230	-0.076	1	1	1	1	1	0.232	1.596	12910.9798	4 4 4 4 3	18
06941	6.707	-0.692	-0.615	-0.345	0.071	1	1	1	1	1	-0.324	1.181	12912.8940	4 4 4 4 4	08
06941	6.650	0.057	0.126	0.104	-0.079	1	1	1	1	1	-0.324	1.181	12912.8940	4 4 4 4 4	18
06941	6.702	-0.698	-0.637	-0.348	0.061	1	1	1	1	1	0.069	1.125	12910.9619	4 4 4 4 4	08
06941	6.653	0.051	0.114	0.093	-0.087	1	1	1	1	1	0.069	1.125	12910.9619	4 4 4 4 3	18
07100	5.889	-1.180	-1.064	-0.698	-0.227	1	1	1	1	1	-0.367	1.051	12911.9038	4 4 4 4 4	08
07100	5.942	-0.053	-0.072	-0.039	-0.124	1	1	1	1	1	-0.367	1.051	12911.9038	4 4 4 4 4	18
07100	5.896	-1.182	-1.075	-0.706	-0.224	1	1	1	1	1	-0.326	1.040	12910.9131	4 4 4 4 4	08
07100	5.944	-0.045	-0.077	-0.048	-0.147	1	1	1	1	1	-0.326	1.040	12910.9131	4 4 4 4 3	18
07173	6.799	-0.425	-0.399	-0.215	0.212	1	1	1	1	1	-0.360	1.136	12911.9113	4 4 4 4 4	08
07173	6.669	0.132	0.240	0.199	0.032	1	1	1	1	1	-0.360	1.136	12911.9113	4 4 4 4 4	18
07173	6.802	-0.434	-0.411	-0.232	0.205	1	1	1	1	1	-0.310	1.119	12910.9219	4 4 4 4 4	08
07173	6.656	0.149	0.236	0.183	-0.042	1	1	1	1	1	-0.310	1.119	12910.9219	4 4 4 4 3	18
07200	6.779	-0.994	-0.919	-0.518	-0.038	1	1	1	1	1	-0.302	1.055	12911.9221	4 4 4 4 4	08
07200	6.752	0.029	0.053	0.070	-0.086	1	1	1	1	1	-0.302	1.055	12911.9221	4 4 4 4 4	18
07200	6.795	-1.008	-0.933	-0.536	-0.040	1	1	1	1	1	-0.263	1.045	12910.9310	4 4 4 4 4	08
07200	6.755	0.043	0.055	0.054	-0.111	1	1	1	1	1	-0.263	1.045	12910.9310	4 4 4 4 3	18
07318	5.458	-1.138	-1.044	-0.627	-0.052	1	1	1	1	1	-0.316	1.051	12911.9312	4 4 4 4 4	08
07318	5.421	0.040	0.073	0.080	-0.105	1	1	1	1	1	-0.316	1.051	12911.9312	4 4 4 4 4	18
07318	5.440	-1.133	-1.056	-0.637	-0.034	1	1	1	1	1	-0.270	1.040	12910.9412	4 4 4 4 4	08
07318	5.409	0.034	0.062	0.068	-0.117	1	1	1	1	1	-0.270	1.040	12910.9412	4 4 4 4 3	18
07482	6.600	-0.655	-0.605	-0.237	0.337	1	1	1	1	1	-0.383	1.081	12912.9235	4 4 4 4 4	08
07482	6.405	0.199	0.345	0.301	-0.056	1	1	1	1	1	-0.383	1.081	12912.9235	4 4 4 4 4	18
07482	6.605	-0.656	-0.627	-0.241	0.339	1	1	1	1	1	-0.312	1.059	12910.9502	4 4 4 4 4	08
07482	6.416	0.192	0.332	0.280	-0.055	1	1	1	1	1	-0.312	1.059	12910.9502	4 4 4 4 3	18
07554	6.420	-1.202	-1.132	-0.644	-0.104	1	1	1	1	1	-0.356	1.155	12912.9445	4 4 4 4 4	08
07554	6.413	0.008	0.106	0.048	-0.083	1	1	1	1	1	-0.356	1.155	12912.9445	4 4 4 4 4	18
07591	5.865	-1.420	-1.281	-0.857	-0.258	1	1	1	1	1	-0.295	1.072	12912.9557	4 4 4 4 4	08
07591	5.925	-0.060	-0.087	-0.030	-0.146	1	1	1	1	1	-0.295	1.072	12912.9557	4 4 4 4 4	18
07600	6.268	-1.421	-1.302	-0.835	-0.200	1	1	1	1	1	-0.237	1.062	12912.9656	4 4 4 4 4	08
07600	6.288	-0.019	-0.027	0.016	-0.129	1	1	1	1	1	-0.237	1.062	12912.9656	4 4 4 4 4	18
08622	4.842	-1.671	-1.563	-0.978	-0.294	1	1	1	1	1	0.132	1.015	14171.6933	4 4 4 4 4	08
08622	4.924	-0.089	-0.125	-0.050	-0.120	1	1	1	1	1	0.132	1.015	14171.6933	4 4 4 4 4	18
08622	4.850	-1.666	-1.556	-0.974	-0.289	1	1	1	1	1	-5.687	1.142	14171.7670	4 4 4 4 4	08
08622	4.922	-0.070	-0.110	-0.047	-0.122	1	1	1	1	1	-5.687	1.142	14171.7670	4 4 4 4 4	18
08622	4.860	-1.677	-1.536	-0.978	-0.288	1	1	1	1	1	-4.948	2.077	14171.8843	4 4 4 4 4	08
08622	4.913	-0.050	-0.094	-0.046	-0.155	1	1	1	1	1	-4.948	2.077	14171.8843	4 4 4 4 4	18
08622	4.849	-1.680	-1.561	-0.963	-0.288	1	1	1	1	1	-5.750	1.113	14170.7598	4 4 4 4 4	08
08622	4.933	-0.080	-0.121	-0.043	-0.137	1	1	1	1	1	-5.750	1.113	14170.7598	4 4 4 4 4	18
08622	4.853	-1.706	-1.569	-0.977	-0.293	1	1	1	1	1	-5.521	1.240	14168.8015	4 4 4 4 4	08
08622	4.929	-0.067	-0.102	-0.048	-0.149	1	1	1	1	1	-5.521	1.240	14168.8015	4 4 4 4 4	18
08622	4.838	-1.669	-1.542	-0.991	-0.284	1	1	1	1	1	-4.930	2.129	14168.8954	4 4 4 4 4	08
08622	4.905	-0.063	-0.101	-0.048	-0.133	1	1	1	1	1	-4.930	2.129	14168.8954	4 4 4 4 4	18
08622	4.853	-1.678	-1.548	-0.977	-0.294	1	1	1	1	1	-5.883	1.066	14216.6131	4 4 4 4 4	08
08622															

TABLE 1 (CONTINUED)

NAME	52 58	33-52 52-58	35-52 52-63	37-52 45-52	40-52 33-35	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP= 1,2,3,4,5	CD
08622	4. 878	-1. 660	-1. 536	-0. 983	-0. 294	1	1	1	1	1	-5. 842	1. 079	14215 6223	4 4 4 4 4	08
08622	4. 949	-0. 068	-0. 110	-0. 048	-0. 129	1	1	1	1	1	-5. 842	1. 079	14215 6223	4 4 4 4 4	18
08622	4. 838	-1. 674	-1. 535	-0. 973	-0. 292	1	1	1	1	1	-0. 911	1. 363	12912 9736	4 4 4 4 4	08
08622	4. 896	-0. 057	-0. 092	-0. 033	-0. 148	1	1	1	1	1	-0. 911	1. 363	12912 9736	4 4 4 4 4	18
08622	4. 826	-1. 667	-1. 543	-0. 968	-0. 294	1	1	1	1	1	-0. 856	1. 313	12911 9850	4 4 4 4 4	08
08622	4. 897	-0. 068	-0. 100	-0. 061	-0. 139	1	1	1	1	1	-0. 856	1. 313	12911 9850	4 4 4 4 4	18
08622	4. 813	-1. 680	-1. 556	-0. 987	-0. 301	1	1	1	1	1	-0. 843	1. 302	12910 9898	4 4 4 4 4	08
08622	4. 882	-0. 065	-0. 095	-0. 049	-0. 174	1	1	1	1	1	-0. 843	1. 302	12910 9898	4 4 4 4 3	18
08622	4. 858	-1. 663	-1. 549	-0. 973	-0. 288	1	1	1	1	1	-0. 646	1. 168	13745 7357	4 4 4 4 4	08
08622	4. 937	-0. 075	-0. 109	-0. 053	-0. 140	1	1	1	1	1	-0. 646	1. 168	13745 7357	4 4 4 4 3	18
08622	4. 837	-1. 664	-1. 562	-0. 972	-0. 294	1	1	1	1	1	0. 126	1. 015	13745 8583	4 4 4 4 4	08
08622	4. 904	-0. 062	-0. 095	-0. 055	-0. 149	1	1	1	1	1	0. 126	1. 015	13745 8583	4 4 4 4 3	18
08622	4. 848	-1. 664	-1. 560	-0. 981	-0. 288	1	1	1	1	1	-5. 696	1. 137	13745 9315	4 4 4 4 4	08
08622	4. 909	-0. 055	-0. 092	-0. 050	-0. 151	1	1	1	1	1	-5. 696	1. 137	13745 9315	4 4 4 4 3	18
08622	4. 883	-1. 652	-1. 542	-0. 991	-0. 291	1	1	1	1	1	-0. 600	1. 144	13744 7458	4 4 4 4 4	08
08622	4. 952	-0. 068	-0. 110	-0. 051	-0. 115	1	1	1	1	1	-0. 600	1. 144	13744 7458	4 4 4 4 4	18
08622	4. 831	-1. 659	-1. 529	-0. 989	-0. 285	1	1	1	1	1	0. 048	1. 010	13744 8486	4 4 4 4 4	08
08622	4. 887	-0. 055	-0. 104	-0. 039	-0. 133	1	1	1	1	1	0. 048	1. 010	13744 8486	4 4 4 4 4	18
08622	4. 837	-1. 664	-1. 545	-0. 991	-0. 295	1	1	1	1	1	0. 106	1. 013	13744 8579	4 4 4 4 4	08
08622	4. 902	-0. 063	-0. 098	-0. 043	-0. 123	1	1	1	1	1	0. 106	1. 013	13744 8579	4 4 4 4 4	18
08622	4. 845	-1. 658	-1. 541	-0. 980	-0. 287	1	1	1	1	1	-5. 908	1. 059	13744 9006	4 4 4 4 4	08
08622	4. 915	-0. 068	-0. 105	-0. 050	-0. 121	1	1	1	1	1	-5. 908	1. 059	13744 9006	4 4 4 4 4	18
08622	4. 828	-1. 653	-1. 540	-0. 967	-0. 287	1	1	1	1	1	-1. 747	1. 052	13473 6388	4 4 4 4 4	08
08622	4. 909	-0. 081	-0. 110	-0. 044	-0. 122	1	1	1	1	1	-1. 747	1. 052	13473 6388	4 4 4 4 4	18
08622	4. 853	-1. 667	-1. 552	-0. 981	-0. 289	1	1	1	1	1	-5. 742	1. 117	13471 6750	4 4 4 4 4	08
08622	4. 922	-0. 064	-0. 120	-0. 039	-0. 120	1	1	1	1	1	-5. 742	1. 117	13471 6750	4 4 4 4 4	18
08622	4. 831	-1. 667	-1. 550	-1. 006	-0. 295	1	1	1	1	1	-0. 076	1. 012	13416 7273	4 4 4 4 4	08
08622	4. 899	-0. 067	-0. 110	-0. 049	-0. 138	1	1	1	1	1	-0. 076	1. 012	13416 7273	4 4 4 4 3	18
08622	4. 842	-1. 663	-1. 545	-0. 997	-0. 295	1	1	1	1	1	-5. 695	1. 138	13416 8327	4 4 4 4 4	08
08622	4. 917	-0. 073	-0. 106	-0. 051	-0. 141	1	1	1	1	1	-5. 695	1. 138	13416 8327	4 4 4 4 3	18
08622	4. 867	-1. 653	-1. 533	-0. 970	-0. 281	1	1	1	1	1	-5. 140	1. 663	13416 9207	4 4 4 4 4	08
08622	4. 932	-0. 063	-0. 100	-0. 035	-0. 146	1	1	1	1	1	-5. 140	1. 663	13416 9207	4 4 4 4 3	18
08622	4. 844	-1. 666	-1. 554	-1. 003	-0. 295	1	1	1	1	1	-0. 048	1. 010	13415 7344	4 4 4 4 4	08
08622	4. 916	-0. 070	-0. 105	-0. 050	-0. 138	1	1	1	1	1	-0. 048	1. 010	13415 7344	4 4 4 4 3	18
08622	4. 845	-1. 658	-1. 540	-0. 986	-0. 284	1	1	1	1	1	-5. 622	1. 176	13415 8469	4 4 4 4 4	08
08622	4. 914	-0. 066	-0. 099	-0. 043	-0. 145	1	1	1	1	1	-5. 622	1. 176	13415 8469	4 4 4 4 3	18
08622	4. 855	-1. 656	-1. 545	-0. 975	-0. 290	1	1	1	1	1	-4. 973	2. 010	13415 9499	4 4 4 4 4	08
08622	4. 916	-0. 060	-0. 108	-0. 052	-0. 149	1	1	1	1	1	-4. 973	2. 010	13415 9499	4 4 4 4 3	18
08622	4. 837	-1. 658	-1. 553	-0. 997	-0. 283	1	1	1	1	1	-5. 618	1. 178	13414 8504	4 4 4 4 4	08
08622	4. 901	-0. 067	-0. 096	-0. 047	-0. 162	1	1	1	1	1	-5. 618	1. 178	13414 8504	4 4 4 4 3	18
08622	4. 841	-1. 657	-1. 549	-0. 961	-0. 279	1	1	1	1	1	-5. 014	1. 911	13414 9462	4 4 4 4 4	08
08622	4. 906	-0. 066	-0. 097	-0. 040	-0. 158	1	1	1	1	1	-5. 014	1. 911	13414 9462	4 4 4 4 3	18
08622	4. 838	-1. 666	-1. 564	-0. 980	-0. 286	1	1	1	1	1	-2. 126	1. 056	13384 8845	4 4 4 4 4	08
08622	4. 917	-0. 073	-0. 106	-0. 050	-0. 158	1	1	1	1	1	-2. 126	1. 056	13384 8845	4 4 4 4 3	18
08622	4. 863	-1. 664	-1. 554	-0. 964	-0. 293	1	1	1	1	1	-5. 224	1. 535	13384 9947	4 4 4 4 4	08
08622	4. 918	-0. 048	-0. 086	-0. 049	-0. 170	1	1	1	1	1	-5. 224	1. 535	13384 9947	4 4 4 4 3	18
08622	4. 857	-1. 675	-1. 575	-1. 004	-0. 283	1	1	1	1	1	0. 118	1. 014	13383 8481	4 4 4 4 4	08
08622	4. 930	-0. 069	-0. 107	-0. 058	-0. 141	1	1	1	1	1	0. 118	1. 014	13383 8481	4 4 4 4 3	18
08622	4. 858	-1. 674	-1. 549	-0. 983	-0. 293	1	1	1	1	1	-5. 651	1. 160	13383 9298	4 4 4 4 4	08
08622	4. 923	-0. 060	-0. 095	-0. 054	-0. 166	1	1	1	1	1	-5. 651	1. 160	13383 9298	4 4 4 4 3	18
08622	4. 846	-1. 655	-1. 536	-0. 971	-0. 288	1	1	1	1	1	-5. 197	1. 574	13384 0018	4 4 4 4 4	08
08622	4. 909	-0. 060	-0. 086	-0. 037	-0. 165	1	1	1	1	1	-5. 197	1. 574	13384 0018	4 4 4 4 3	18
08622	4. 851	-1. 664	-1. 553	-0. 962	-0. 279	1	1	1	1	1	0. 207	1. 024	13382 8649	4 4 4 4 4	08
08622	4. 926	-0. 070	-0. 107	-0. 050	-0. 136	1	1	1	1	1	0. 207	1. 024	13382 8649	4 4 4 4 4	18
08622	4. 852	-1. 678	-1. 554	-0. 976	-0. 294	1	1	1	1	1	0. 087	1. 012	13447 6685	4 4 4 4 4	08
08622	4. 933	-0. 076	-0. 110	-0. 048	-0. 132	1	1	1	1	1	0. 087	1. 012	13447 6685	4 4 4 4 4	18
08622	4. 857	-1. 675	-1. 549	-0. 976	-0. 299	1	1	1	1	1	-5. 755	1. 111	13447 7384	4 4 4 4 4	08
08622	4. 930	-0. 068	-0. 106	-0. 050	-0. 134	1	1	1	1	1	-5. 755	1. 111	13447 7384	4 4 4 4 4	18
08622	4. 850	-1. 672	-1. 544	-0. 974	-0. 299	1	1	1	1	1	0. 321	1. 045	13446 7083	4 4 4 4 4	08
08622	4. 932	-0. 075	-0. 101	-0. 046	-0. 140	1	1	1	1	1	0. 321	1. 045	13446 7083	4 4 4 4 4	18
08622	4. 857	-1. 667	-1. 544	-0. 976	-0. 295	1	1	1	1	1	-5. 596	1. 191	13446 7664	4 4 4 4 4	08
08622	4. 937	-0. 074	-0. 102	-0. 049	-0. 135	1	1	1	1	1	-5. 596	1. 191	13446 7664	4 4 4 4 4	18
08622	4. 853	-1. 658	-1. 544	-0. 965	-0. 284	1	1	1	1	1	-5. 563	1. 212	13470 7062	2 2 2 2 2	08
08622	4. 923	-0. 057	-0. 106	-0. 045	-0. 121	1	1	1	1	1	-5. 563	1. 212	13470 7062	2 2 2 2 2	18
08622	4. 850	-1. 662	-1. 545	-0. 976	-0. 288	1	1	1	1	1	0. 096	1. 013	13469 6099	4 4 4 4 4	08
08622	4. 928	-0. 075	-0. 117	-0. 047	-0. 122	1	1	1	1	1	0. 096	1. 013	13469 6099	4 4 4 4 4	18
08622	4. 844	-1. 658	-1. 539	-0. 971	-0. 286	1	1	1	1	1	-5. 770	1. 105	13469 6760	4 4 4 4 4	08
08622	4. 917	-0. 069	-0. 103	-0. 043	-0. 124	1	1	1	1	1	-5. 770	1. 105	13469 6760	4 4 4 4 4	18
08622	4. 870	-1. 667	-1. 553	-0. 972	-0. 284	1	1	1	1	1	-5. 525	1. 237	13467 7204	4 4 4 4 4	08
08622	4. 942	-0. 067	-0. 101	-0. 040	-0. 117	1	1	1	1	1	-5. 525	1. 237	13467 7204	4 4 4 4 4	18
08622	4. 845	-1. 626	-1. 511	-0. 959	-0. 271	1	1	1	1	1	-4. 769	2. 747	13467 8404	4 4 4 4 4	08
08622	4. 914	-0. 062	-0. 111	-0. 046	-0. 120	1	1	1	1	1	-4. 769	2. 747	13467 8404	4 4 4 4 4	18
08622	4. 849	-1. 659	-1. 538	-0. 981	-0. 293	1	1	1	1	1	-0. 154	1. 018	13403 7503	4 4 4 4 4	08
08622	4. 926	-0. 066	-0. 119	-0. 043	-0. 125	1	1	1	1	1	-0. 154	1. 018	13403 7503	4 4 4 4 4	18
08622	4. 851	-1. 653	-1. 540	-0. 983	-0. 281	1	1	1	1	1	-5. 532	1. 232	13403 8940	4 4 4 4 4	08
08622	4. 923	-0. 057	-0. 087	-0. 044	-0. 111	1	1	1	1	1	-5. 532	1. 232	13403 8940	4 4 4 4 4	18</

TABLE 1 (CONTINUED)

NAME	52 58	33-52 52-58	35-52 52-63	37-52 45-52	40-52 33-35	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP= 1, 2, 3, 4, 5	CD
08622	4. 909	-0. 054	-0. 086	-0. 059	-0. 140	1	1	1	1	1	-1. 017	1. 480	12899. 9923	4 4 4 4 4	18
08622	4. 856	-1. 664	-1. 545	-0. 973	-0. 294	1	1	1	1	1	-1. 005	1. 466	12898. 9969	4 4 4 4 4	08
08622	4. 922	-0. 061	-0. 095	-0. 048	-0. 156	1	1	1	1	1	-1. 005	1. 466	12898. 9969	4 4 4 4 3	18
08622	4. 844	-1. 669	-1. 548	-0. 960	-0. 292	1	1	1	1	1	-1. 018	1. 482	12895. 0057	4 4 4 4 4	08
08622	4. 913	-0. 064	-0. 105	-0. 049	-0. 139	1	1	1	1	1	-1. 018	1. 482	12895. 0057	4 4 4 4 4	18
08622	4. 859	-1. 674	-1. 554	-0. 972	-0. 297	1	1	1	1	1	-1. 023	1. 488	13665. 8944	4 4 4 4 4	08
08622	4. 926	-0. 058	-0. 095	-0. 056	-0. 183	1	1	1	1	1	-1. 023	1. 488	13665. 8944	4 4 4 4 3	18
08622	4. 840	-1. 682	-1. 573	-0. 996	-0. 312	1	1	1	1	1	-0. 417	1. 071	13665. 9906	4 4 4 4 4	08
08622	4. 899	-0. 051	-0. 088	-0. 058	-0. 178	1	1	1	1	1	-0. 417	1. 071	13665. 9906	4 4 4 4 3	18
08622	4. 885	-1. 667	-1. 575	-0. 969	-0. 292	1	1	1	1	1	-0. 379	1. 060	13664. 9993	4 4 4 4 4	08
08622	4. 934	-0. 046	-0. 071	-0. 050	-0. 158	1	1	1	1	1	-0. 379	1. 060	13664. 9993	4 4 4 4 3	18
08622	4. 838	-1. 668	-1. 573	-0. 969	-0. 295	1	1	1	1	1	-0. 398	1. 065	13663. 9991	4 4 4 4 4	08
08622	4. 886	-0. 048	-0. 074	-0. 050	-0. 161	1	1	1	1	1	-0. 398	1. 065	13663. 9991	4 4 4 4 3	18
08622	4. 839	-1. 659	-1. 564	-0. 969	-0. 291	1	1	1	1	1	-0. 421	1. 072	13662. 9981	4 4 4 4 4	08
08622	4. 887	-0. 048	-0. 081	-0. 044	-0. 157	1	1	1	1	1	-0. 421	1. 072	13662. 9981	4 4 4 4 3	18
08622	4. 868	-1. 673	-1. 583	-0. 973	-0. 297	1	1	1	1	1	-0. 434	1. 077	13661. 9988	4 4 4 4 4	08
08622	4. 928	-0. 052	-0. 095	-0. 054	-0. 157	1	1	1	1	1	-0. 434	1. 077	13661. 9988	4 4 4 4 3	18
08622	4. 843	-1. 671	-1. 572	-0. 963	-0. 293	1	1	1	1	1	-0. 100	1. 013	12952. 9931	4 4 4 4 4	08
08622	4. 907	-0. 060	-0. 087	-0. 045	-0. 166	1	1	1	1	1	-0. 100	1. 013	12952. 9931	4 4 4 4 3	18
08622	4. 839	-1. 676	-1. 558	-0. 967	-0. 292	1	1	1	1	1	-0. 107	1. 013	12953. 9892	4 4 4 4 4	08
08622	4. 909	-0. 067	-0. 096	-0. 048	-0. 170	1	1	1	1	1	-0. 107	1. 013	12953. 9892	4 4 4 4 3	18
08622	4. 820	-1. 691	-1. 584	-0. 984	-0. 306	1	1	1	1	1	-0. 079	1. 012	12954. 9909	4 4 4 4 4	08
08622	4. 884	-0. 062	-0. 092	-0. 043	-0. 164	1	1	1	1	1	-0. 079	1. 012	12954. 9909	4 4 4 4 3	18
08622	4. 884	-1. 654	-1. 519	-0. 979	-0. 276	1	1	1	1	1	-0. 490	1. 096	13051. 6608	4 4 4 4 4	08
08622	4. 964	-0. 074	-0. 119	-0. 036	-0. 167	1	1	1	1	1	-0. 490	1. 096	13051. 6608	4 4 4 4 3	18
08622	4. 856	-1. 667	-1. 557	-0. 985	-0. 275	1	1	1	1	1	0. 152	1. 017	13051. 7628	4 4 4 4 4	08
08622	4. 925	-0. 063	-0. 101	-0. 041	-0. 144	1	1	1	1	1	0. 152	1. 017	13051. 7628	4 4 4 4 3	18
08622	4. 840	-1. 656	-1. 555	-0. 983	-0. 300	1	1	1	1	1	-5. 290	1. 452	13051. 8962	4 4 4 4 4	08
08622	4. 908	-0. 059	-0. 096	-0. 054	-0. 138	1	1	1	1	1	-5. 290	1. 452	13051. 8962	4 4 4 4 3	18
08622	4. 853	-1. 675	-1. 548	-0. 984	-0. 293	1	1	1	1	1	-0. 055	1. 011	13070. 6780	4 4 4 4 4	08
08622	4. 934	-0. 077	-0. 126	-0. 047	-0. 146	1	1	1	1	1	-0. 055	1. 011	13070. 6780	4 4 4 4 3	18
08622	4. 842	-1. 681	-1. 572	-0. 992	-0. 302	1	1	1	1	1	-0. 271	1. 035	13072. 6383	4 4 4 4 4	08
08622	4. 932	-0. 083	-0. 123	-0. 054	-0. 115	1	1	1	1	1	-0. 271	1. 035	13072. 6383	4 4 4 4 3	18
08622	4. 825	-1. 659	-1. 540	-0. 981	-0. 285	1	1	1	1	1	-5. 570	1. 207	13072. 7945	4 4 4 4 4	08
08622	4. 878	-0. 044	-0. 079	-0. 048	-0. 125	1	1	1	1	1	-5. 570	1. 207	13072. 7945	4 4 4 4 3	18
08622	4. 869	-1. 662	-1. 528	-0. 973	-0. 296	1	1	1	1	1	-0. 160	1. 018	13076. 6450	4 4 4 4 4	08
08622	4. 961	-0. 086	-0. 108	-0. 057	-0. 154	1	1	1	1	1	-0. 160	1. 018	13076. 6450	4 4 4 4 3	18
08622	4. 842	-1. 656	-1. 545	-0. 971	-0. 284	1	1	1	1	1	-5. 350	1. 386	13076. 8184	4 4 4 4 4	08
08622	4. 900	-0. 051	-0. 092	-0. 046	-0. 133	1	1	1	1	1	-5. 350	1. 386	13076. 8184	4 4 4 4 3	18
08622	4. 839	-1. 658	-1. 551	-0. 984	-0. 284	1	1	1	1	1	-4. 804	2. 583	13106. 8233	4 4 4 4 4	08
08622	4. 910	-0. 071	-0. 103	-0. 045	-0. 114	1	1	1	1	1	-4. 804	2. 583	13106. 8233	4 4 4 4 3	18
08622	4. 854	-1. 658	-1. 532	-0. 970	-0. 287	1	1	1	1	1	-5. 800	1. 093	13107. 6623	4 4 4 4 4	08
08622	4. 930	-0. 073	-0. 119	-0. 039	-0. 127	1	1	1	1	1	-5. 800	1. 093	13107. 6623	4 4 4 4 3	18
08622	4. 858	-1. 667	-1. 537	-0. 970	-0. 284	1	1	1	1	1	-5. 212	1. 552	13107. 7557	4 4 4 4 4	08
08622	4. 922	-0. 060	-0. 107	-0. 039	-0. 133	1	1	1	1	1	-5. 212	1. 552	13107. 7557	4 4 4 4 3	18
08622	4. 840	-1. 665	-1. 550	-0. 989	-0. 296	1	1	1	1	1	-0. 143	1. 017	13002. 8496	4 4 4 4 4	08
08622	4. 903	-0. 064	-0. 100	-0. 050	-0. 177	1	1	1	1	1	-0. 143	1. 017	13002. 8496	4 4 4 4 3	18
08622	4. 836	-1. 670	-1. 553	-0. 987	-0. 296	1	1	1	1	1	-5. 681	1. 145	13002. 9680	4 4 4 4 4	08
08622	4. 896	-0. 057	-0. 088	-0. 045	-0. 178	1	1	1	1	1	-5. 681	1. 145	13002. 9680	4 4 4 4 3	18
08622	4. 839	-1. 660	-1. 559	-0. 988	-0. 293	1	1	1	1	1	-0. 038	1. 010	13003. 8637	4 4 4 4 4	08
08622	4. 910	-0. 068	-0. 102	-0. 050	-0. 157	1	1	1	1	1	-0. 038	1. 010	13003. 8637	4 4 4 4 3	18
08622	4. 852	-1. 667	-1. 555	-0. 988	-0. 290	1	1	1	1	1	-5. 709	1. 131	13003. 9608	4 4 4 4 4	08
08622	4. 912	-0. 056	-0. 089	-0. 045	-0. 167	1	1	1	1	1	-5. 709	1. 131	13003. 9608	4 4 4 4 3	18
08622	4. 859	-1. 677	-1. 557	-0. 987	-0. 299	1	1	1	1	1	-0. 763	1. 241	13210. 9075	4 4 4 4 4	08
08622	4. 937	-0. 065	-0. 094	-0. 044	-0. 141	1	1	1	1	1	-0. 763	1. 241	13210. 9075	4 4 4 4 3	18
08622	4. 881	-1. 664	-1. 555	-0. 987	-0. 298	1	1	1	1	1	-0. 244	1. 030	13210. 9899	4 4 4 4 4	08
08622	4. 956	-0. 062	-0. 085	-0. 042	-0. 151	1	1	1	1	1	-0. 244	1. 030	13210. 9899	4 4 4 4 3	18
08622	4. 828	-1. 671	-1. 547	-0. 988	-0. 291	1	1	1	1	1	-0. 826	1. 288	13209. 9003	4 4 4 4 4	08
08622	4. 897	-0. 068	-0. 096	-0. 051	-0. 133	1	1	1	1	1	-0. 282	1. 037	13209. 9867	4 4 4 4 4	08
08622	4. 838	-1. 657	-1. 528	-0. 978	-0. 275	1	1	1	1	1	-0. 282	1. 037	13209. 9867	4 4 4 4 3	18
08622	4. 898	-0. 059	-0. 095	-0. 045	-0. 138	1	1	1	1	1	-0. 282	1. 037	13209. 9867	4 4 4 4 4	08
08622	4. 815	-1. 664	-1. 556	-0. 984	-0. 297	1	1	1	1	1	-0. 822	1. 285	13208. 9037	4 4 4 4 4	08
08622	4. 883	-0. 062	-0. 106	-0. 051	-0. 152	1	1	1	1	1	-0. 822	1. 285	13208. 9037	4 4 4 4 3	18
08622	4. 839	-1. 659	-1. 550	-0. 986	-0. 304	1	1	1	1	1	-0. 283	1. 037	13208. 9892	4 4 4 4 4	08
08622	4. 902	-0. 058	-0. 098	-0. 047	-0. 149	1	1	1	1	1	-0. 283	1. 037	13208. 9892	4 4 4 4 3	18
08622	4. 835	-1. 669	-1. 543	-0. 985	-0. 284	1	1	1	1	1	-0. 789	1. 259	13207. 9117	4 4 4 4 4	08
08622	4. 905	-0. 067	-0. 108	-0. 048	-0. 158	1	1	1	1	1	-0. 789	1. 259	13207. 9117	4 4 4 4 3	18
08622	4. 863	-1. 663	-1. 553	-0. 993	-0. 289	1	1	1	1	1	-0. 283	1. 037	13207. 9920	4 4 4 4 4	08
08622	4. 924	-0. 058	-0. 098	-0. 049	-0. 142	1	1	1	1	1	-0. 283	1. 037	13207. 9920	4 4 4 4 3	18
08622	4. 832	-1. 664	-1. 556	-0. 987	-0. 294	1	1	1	1	1	-0. 889	1. 343	13202. 9094	4 4 4 4 4	08
08622	4. 900	-0. 073	-0. 120	-0. 047	-0. 163	1	1	1	1	1	-0. 889	1. 343	13202. 9094	4 4 4 4 3	18
08622	4. 825	-1. 664	-1. 558	-0. 989	-0. 290	1	1	1	1	1	-0. 343	1. 051	13202. 9961	4 4 4 4 4	08
08622	4. 885	-0. 064	-0. 094	-0. 054	-0. 159	1	1	1	1	1	-0. 343	1. 051	13202. 9961	4 4 4 4 3	18
08622	4. 842	-1. 671	-1. 551	-0. 973	-0. 293	1	1	1	1	1	-0. 707	1. 203	13280. 0012	4 4 4 4 4	08
08622	4. 885	-0. 035	-0. 080	-0. 049	-0. 125	1	1	1	1	1	-0. 707	1. 203	13280. 0012	4 4 4 4 3	18
08622	4. 867	-1. 676	-1. 547	-0. 974	-0. 275	1									

TABLE 2
6RC PHOTOMETRY OF O STARS

NAME	58 58	58-80 58-72	58-86 90-110	58-99	58-110	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP=1,2,3,4,5	CD	
01855	4.647	-0.203	-0.277	-0.456	-0.502	1	1	1	1	1	0	256	1.321	14214	8814	4 4 4 4 4 06
01855	4.647	-0.144	-0.042	0.000	0.000	1	1	1	0	0	0	256	1.321	14214	8814	4 4 3 0 0 16
01855	4.648	-0.211	-0.276	-0.452	-0.490	1	1	1	1	1	0	423	1.409	14213	9107	4 4 4 4 4 06
01855	4.648	-0.146	-0.030	0.000	0.000	1	1	1	0	0	0	423	1.409	14213	9107	4 4 3 0 0 16
01855	4.655	-0.201	-0.272	-0.445	-0.485	1	1	1	1	1	0	525	1.492	14211	9223	4 4 4 4 4 06
01855	4.655	-0.144	-0.035	0.000	0.000	1	1	1	0	0	0	525	1.492	14211	9223	4 4 3 0 0 16
01855	4.630	-0.207	-0.277	-0.449	-0.507	1	1	1	1	1	0	913	2.196	14209	0021	4 4 4 4 4 06
01855	4.630	-0.144	-0.053	0.000	0.000	1	1	1	0	0	0	913	2.196	14209	0021	4 4 3 0 0 16
01855	4.569	-0.204	-0.277	-0.448	-0.498	1	1	1	1	1	0	368	1.374	12467	6828	4 4 4 4 4 06
01855	4.668	-0.146	-0.052	0.000	0.000	1	1	1	0	0	0	368	1.374	12467	6828	4 4 3 0 0 16
01855	4.671	-0.189	-0.259	-0.439	-0.477	1	1	1	1	1	0	1152	3.534	12467	8072	4 4 4 4 4 06
01855	4.671	-0.123	-0.037	0.000	0.000	1	1	1	0	0	0	1152	3.534	12467	8072	4 4 3 0 0 16
01855	4.648	-0.226	-0.287	-0.461	-0.501	1	1	1	1	1	0	1185	3.879	12467	8124	4 4 4 4 4 06
01855	4.648	-0.151	-0.040	0.000	0.000	1	1	1	0	0	0	1185	3.879	12467	8124	4 4 3 0 0 16
01855	4.673	-0.214	-0.290	-0.451	-0.493	1	1	1	1	1	0	450	1.428	12466	6984	4 4 4 4 4 06
01855	4.672	-0.161	-0.046	0.000	0.000	1	1	1	0	0	0	450	1.428	12466	6984	4 4 3 0 0 16
01855	4.665	-0.199	-0.267	-0.441	-0.473	1	1	1	1	1	0	428	1.420	13181	7289	4 4 4 4 4 06
01855	4.665	-0.132	-0.036	0.000	0.000	1	1	1	0	0	0	428	1.420	13181	7289	4 4 3 0 0 16
01855	4.657	-0.210	-0.274	-0.451	-0.486	1	1	1	1	1	0	642	1.624	13181	7713	4 4 4 4 4 06
01855	4.657	-0.148	-0.040	0.000	0.000	1	1	1	0	0	0	642	1.624	13181	7713	4 4 3 0 0 16
01855	4.659	-0.205	-0.277	-0.444	-0.483	1	1	1	1	1	0	366	1.373	13180	7302	4 4 4 4 4 06
01855	4.659	-0.143	-0.039	0.000	0.000	1	1	1	0	0	0	366	1.373	13180	7302	4 4 3 0 0 16
01855	4.678	-0.193	-0.260	-0.436	-0.440	1	1	1	1	1	-0.298	1.339	13111	8133	4 4 4 4 4 06	
01855	4.678	-0.134	-0.014	0.000	0.000	1	1	1	0	0	-0.298	1.339	13111	8133	4 4 3 0 0 16	
01855	4.667	-0.194	-0.263	-0.451	-0.516	1	1	1	1	1	-0.313	1.346	13109	8164	4 4 4 4 4 06	
01855	4.667	-0.129	-0.062	0.000	0.000	1	1	1	0	0	-0.313	1.346	13109	8164	4 4 3 0 0 16	
01855	4.664	-0.213	-0.268	-0.459	-0.481	1	1	1	1	1	1.082	2.974	13558	8091	4 4 4 4 4 06	
01855	4.664	-0.149	-0.017	0.000	0.000	1	1	1	0	0	1.082	2.974	13558	8091	4 4 3 0 0 16	
01855	4.664	-0.220	-0.279	-0.457	-0.485	1	1	1	1	1	1.115	3.213	13558	8144	4 4 4 4 4 06	
01855	4.664	-0.140	-0.025	0.000	0.000	1	1	1	0	0	1.115	3.213	13558	8144	4 4 3 0 0 16	
01855	4.667	-0.204	-0.270	-0.454	-0.478	1	1	1	1	1	1.147	3.487	13558	8195	4 4 4 4 4 06	
01855	4.667	-0.134	-0.023	0.000	0.000	1	1	1	0	0	1.147	3.487	13558	8195	4 4 3 0 0 16	
01855	4.656	-0.218	-0.279	-0.452	-0.490	1	1	1	1	1	0.922	2.260	13526	8727	4 4 4 4 4 06	
01855	4.656	-0.142	-0.036	0.000	0.000	1	1	1	0	0	0.922	2.260	13526	8727	4 4 3 0 0 16	
01855	4.656	-0.197	-0.262	-0.446	-0.464	1	1	1	1	1	0.996	2.513	13526	8829	4 4 4 4 4 06	
01855	4.655	-0.134	-0.020	0.000	0.000	1	1	1	0	0	0.996	2.513	13526	8829	4 4 3 0 0 16	
01855	4.672	-0.202	-0.267	-0.444	-0.466	1	1	1	1	1	0.923	2.230	13554	7948	4 4 4 4 4 06	
01855	4.672	-0.135	-0.028	0.000	0.000	1	1	1	0	0	0.923	2.230	13554	7948	4 4 3 0 0 16	
01855	4.664	-0.208	-0.268	-0.456	-0.482	1	1	1	1	1	0.974	2.416	13554	8029	4 4 4 4 4 06	
01855	4.664	-0.135	-0.025	0.000	0.000	1	1	1	0	0	0.974	2.416	13554	8029	4 4 3 0 0 16	
01855	4.644	-0.204	-0.275	-0.442	-0.499	1	1	1	1	1	-0.015	1.275	13796	9825	4 4 4 4 4 06	
01855	4.644	-0.140	-0.047	0.000	0.000	1	1	1	0	0	-0.015	1.275	13796	9825	4 4 3 0 0 16	
01855	4.651	-0.210	-0.279	-0.438	-0.487	1	1	1	1	1	0.170	1.295	13794	0199	4 4 4 4 4 06	
01855	4.650	-0.153	-0.044	0.000	0.000	1	1	1	0	0	0.170	1.295	13794	0199	4 4 3 0 0 16	
01855	4.672	-0.214	-0.275	-0.459	-0.504	1	1	1	1	1	0.504	1.472	13560	7118	4 4 4 4 4 06	
01855	4.672	-0.151	-0.029	0.000	0.000	1	1	1	0	0	0.504	1.472	13560	7118	4 4 3 0 0 16	
01855	4.662	-0.215	-0.277	-0.456	-0.503	1	1	1	1	1	0.768	1.830	13559	7566	4 4 4 4 4 06	
01855	4.662	-0.153	-0.035	0.000	0.000	1	1	1	0	0	0.768	1.830	13559	7566	4 4 3 0 0 16	
01855	4.661	-0.215	-0.275	-0.458	-0.491	1	1	1	1	1	-0.104	1.282	13474	8501	4 4 4 4 4 06	
01855	4.661	-0.142	-0.037	0.000	0.000	1	1	1	0	0	-0.104	1.282	13474	8501	4 4 3 0 0 16	
02284	5.521	0.236	0.179	0.101	0.181	1	1	1	1	1	0.237	1.407	13560	7038	4 4 4 4 4 06	
02284	5.520	0.151	0.085	0.000	0.000	1	1	1	0	0	0.237	1.407	13560	7038	4 4 3 0 0 16	
02284	5.542	0.248	0.188	0.111	0.197	1	1	1	1	1	0.503	1.585	13559	7487	4 4 4 4 4 06	
02284	5.541	0.161	0.091	0.000	0.000	1	1	1	0	0	0.503	1.585	13559	7487	4 4 3 0 0 16	
03858	4.797	-0.096	-0.113	-0.209	-0.221	1	1	1	1	1	0.436	1.968	12909	6568	4 4 4 4 4 06	
03858	4.796	-0.076	-0.007	0.000	0.000	1	1	1	0	0	0.436	1.968	12909	6568	4 4 3 0 0 16	
03858	4.810	-0.093	-0.112	-0.200	-0.214	1	1	1	1	1	0.401	1.925	12908	6539	4 4 4 4 4 06	
03858	4.810	-0.074	-0.009	0.000	0.000	1	1	1	0	0	0.401	1.925	12908	6539	4 4 3 0 0 16	
03878	6.478	-0.072	-0.099	-0.244	-0.260	1	1	1	1	1	0.466	2.465	12909	6643	4 4 4 4 4 06	
03878	6.478	-0.047	-0.008	0.000	0.000	1	1	1	0	0	0.466	2.465	12909	6643	4 4 3 0 0 16	
03878	6.486	-0.065	-0.096	-0.237	-0.212	1	1	1	1	1	0.429	2.396	12908	6613	4 4 4 4 4 06	
03878	6.485	-0.049	0.030	0.000	0.000	1	1	1	0	0	0.429	2.396	12908	6613	4 4 3 0 0 16	
04590	5.337	-0.148	-0.194	-0.328	-0.393	1	1	1	1	1	0.090	1.580	12908	7011	4 4 4 4 4 06	
04590	5.337	-0.110	-0.059	0.000	0.000	1	1	1	0	0	0.090	1.580	12908	7011	4 4 3 0 0 16	
04590	5.332	-0.142	-0.200	-0.343	-0.348	1	1	1	1	1	0.260	1.641	12562	6755	4 4 4 4 4 06	
04590	5.332	-0.099	0.006	0.000	0.000	1	1	1	0	0	0.260	1.641	12562	6755	4 4 3 0 0 16	
04590	5.332	-0.144	-0.208	-0.329	-0.348	1	1	1	1	1	0.303	1.668	12561	6850	4 4 4 4 4 06	
04590	5.332	-0.096	-0.008	0.000	0.000	1	1	1	0	0	0.303	1.668	12561	6850	4 4 3 0 0 16	
05056	1.014	-0.157	-0.227	-0.356	-0.404	1	1	1	1	1	0.241	1.391	12563	7281	4 4 4 4 4 06	
05056	1.014	-0.117	-0.044	0.000	0.000	1	1	1	0	0	0.241	1.391	12563	7281	4 4 3 0 0 16	
05056	1.036	-0.152	-0.215	-0.362	-0.434	1	1	1	1	1	0.021	1.346	12562	6959	4 4 4 4 4 06	
05056	1.036	-0.116	-0.061	0.000	0.000	1	1	1	0	0	0.021	1.346	12562	6959	4 4 3 0 0 16	
05056	1.008	-0.162	-0.222	-0.356	-0.394	1	1	1	1	1	0.345	1.442	12561	7501	4 4 4 4 4 06	
05056	1.009	-0.102	-0.027	0.000	0.000	1	1	1	0	0	0.345	1.442	12561	7501	4 4 3 0 0 16	
05907	5.426	0.011	0.009	-0.042	-0.021	1	1	1	1	1	-0.006	1.737	12563	7918	4 4 4 4 4 06	
05907	5.427	0.012	0.024	0.000	0.000	1	1	1	0	0	-0.006	1.737	12563	7918	4 4 3 0 0 16	
05907	5.412	0.030	0.009	-0.024	0.029	1	1	1	1	1	-0.027	1.738	12562	7912	4 4 4 4 4 06	
05907	5.412	0.020	0.059	0.000	0.000	1	1	1	0	0	-0.027	1.738	12562	7912	4 4 3 0 0 16	
05928	3.927	-0.155	-0.205	-0.326	-0.345	1	1	1	1	1	0.031	2.006	12563	7997		

PHOTOMETRY OF O STARS

TABLE 2 (CONTINUED)

NAME	58 58	58-80 58-72	58-86 99-110	58-99	58-110	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP = 1, 2, 3, 4, 5	CO
05948	3.466	-0.156	-0.202	-0.357	-0.388	1	1	1	1	1	0.033	2.820	12564.7995	4 4 4 4 4	06
05948	3.466	-0.108	-0.019	0.000	0.000	1	1	1	0	0	0.033	2.820	12564.7995	4 4 3 0 0	16
05948	3.402	-0.149	-0.217	-0.328	-0.378	1	1	1	1	1	0.104	2.847	12562.8162	4 4 4 4 4	06
05948	3.402	-0.104	-0.027	0.000	0.000	1	1	1	0	0	0.104	2.847	12562.8162	4 4 3 0 0	16
05987	4.260	-0.122	-0.161	-0.276	-0.318	1	1	1	1	1	0.091	2.647	12564.8131	4 4 4 4 4	06
05987	4.259	-0.085	-0.029	0.000	0.000	1	1	1	0	0	0.091	2.647	12564.8131	4 4 3 0 0	16
05987	4.266	-0.134	-0.167	-0.276	-0.292	1	1	1	1	1	0.070	2.639	12563.8125	4 4 4 4 4	06
05987	4.266	-0.089	-0.008	0.000	0.000	1	1	1	0	0	0.070	2.639	12563.8125	4 4 3 0 0	16
06112	4.503	0.425	0.485	0.574	0.669	1	1	1	1	1	0.052	1.719	12564.8202	4 4 4 4 4	06
06112	4.504	0.308	0.093	0.000	0.000	1	1	1	0	0	0.052	1.719	12564.8202	4 4 3 0 0	16
06112	4.510	0.438	0.505	0.585	0.685	1	1	1	1	1	0.035	1.718	12563.8203	4 4 4 4 4	06
06112	4.510	0.311	0.098	0.000	0.000	1	1	1	0	0	0.035	1.718	12563.8203	4 4 3 0 0	16
06118	4.383	0.537	0.530	0.518	0.655	1	1	1	1	1	0.085	1.543	12564.8266	4 4 4 4 4	06
06118	4.382	0.368	0.134	0.000	0.000	1	1	1	0	0	0.085	1.543	12564.8266	4 4 3 0 0	16
06118	4.164	0.507	0.512	0.517	0.622	1	1	1	1	1	0.202	1.576	13688.7680	4 4 4 4 4	06
06118	4.163	0.331	0.108	0.000	0.000	1	1	1	0	0	0.202	1.576	13688.7680	4 4 3 0 0	16
06118	4.166	0.497	0.504	0.498	0.620	1	1	1	1	1	0.251	1.599	13687.7785	4 4 4 4 4	06
06118	4.165	0.323	0.122	0.000	0.000	1	1	1	0	0	0.251	1.599	13687.7785	4 4 3 0 0	16
06118	4.159	0.486	0.502	0.491	0.612	1	1	1	1	1	0.636	2.030	13686.8423	4 4 4 4 4	06
06118	4.158	0.330	0.125	0.000	0.000	1	1	1	0	0	0.636	2.030	13686.8423	4 4 3 0 0	16
06118	4.244	0.551	0.549	0.528	0.606	1	1	1	1	1	0.568	1.910	13304.8773	4 4 4 4 4	06
06118	4.242	0.357	0.082	0.000	0.000	1	1	1	0	0	0.568	1.910	13304.8773	4 4 3 0 0	16
06118	4.275	0.533	0.525	0.489	0.637	1	1	1	1	1	0.058	1.540	13270.8892	4 4 4 4 4	06
06118	4.273	0.341	0.150	0.000	0.000	1	1	1	0	0	0.058	1.540	13270.8892	4 4 3 0 0	16
06118	4.277	0.534	0.532	0.517	0.640	1	1	1	1	1	0.160	1.561	13269.9081	4 4 4 4 4	06
06118	4.276	0.348	0.121	0.000	0.000	1	1	1	0	0	0.160	1.561	13269.9081	4 4 3 0 0	16
06118	4.294	0.551	0.543	0.534	0.655	1	1	1	1	1	0.150	1.559	13268.9093	4 4 4 4 4	06
06118	4.293	0.362	0.119	0.000	0.000	1	1	1	0	0	0.150	1.559	13268.9093	4 4 3 0 0	16
06141	4.811	-0.082	-0.115	-0.207	-0.184	1	1	1	1	1	0.112	1.805	12564.8329	4 4 4 4 4	06
06141	4.811	-0.060	0.031	0.000	0.000	1	1	1	0	0	0.112	1.805	12564.8329	4 4 3 0 0	16
06141	4.820	-0.082	-0.106	-0.194	-0.205	1	1	1	1	1	0.057	1.793	12563.8269	4 4 4 4 4	06
06141	4.821	-0.051	-0.008	0.000	0.000	1	1	1	0	0	0.057	1.793	12563.8269	4 4 3 0 0	16
06347	5.979	0.629	0.708	0.796	0.905	1	1	1	1	1	0.043	2.494	12564.8471	4 4 4 4 4	06
06347	5.979	0.436	0.107	0.000	0.000	1	1	1	0	0	0.043	2.494	12564.8471	4 4 3 0 0	16
06347	5.999	0.615	0.715	0.792	0.931	1	1	1	1	1	0.030	2.492	12563.8477	4 4 4 4 4	06
06347	5.999	0.440	0.138	0.000	0.000	1	1	1	0	0	0.030	2.492	12563.8477	4 4 3 0 0	16
06347	5.921	0.629	0.700	0.813	0.959	1	1	1	1	1	-0.008	2.490	12562.8444	4 4 4 4 4	06
06347	5.922	0.458	0.142	0.000	0.000	1	1	1	0	0	-0.008	2.490	12562.8444	4 4 3 0 0	16
06353	5.558	0.210	0.214	0.203	0.246	1	1	1	1	1	-0.001	1.157	12561.8479	4 4 4 4 4	06
06353	5.559	0.154	0.043	0.000	0.000	1	1	1	0	0	-0.001	1.157	12561.8479	4 4 3 0 0	16
06353	5.569	0.207	0.218	0.193	0.224	1	1	1	1	1	-0.029	1.157	12560.8462	4 4 4 4 4	06
06353	5.570	0.155	0.031	0.000	0.000	1	1	1	0	0	-0.029	1.157	12560.8462	4 4 3 0 0	16
06397	5.493	0.215	0.173	0.096	0.190	1	1	1	1	1	0.069	2.326	12564.8573	4 4 4 4 4	06
06397	5.492	0.131	0.098	0.000	0.000	1	1	1	0	0	0.069	2.326	12564.8573	4 4 3 0 0	16
06397	5.485	0.176	0.150	0.073	0.223	1	1	1	1	1	0.050	2.322	12563.8569	4 4 4 4 4	06
06397	5.485	0.125	0.153	0.000	0.000	1	1	1	0	0	0.050	2.322	12563.8569	4 4 3 0 0	16
06397	5.427	0.197	0.151	0.103	0.192	1	1	1	1	1	-0.002	2.317	12562.8515	4 4 4 4 4	06
06397	5.427	0.137	0.097	0.000	0.000	1	1	1	0	0	-0.002	2.317	12562.8515	4 4 3 0 0	16
06535	5.673	0.146	0.155	0.095	0.145	1	1	1	1	1	0.035	2.242	12564.8654	4 4 4 4 4	06
06535	5.673	0.103	0.056	0.000	0.000	1	1	1	0	0	0.035	2.242	12564.8654	4 4 3 0 0	16
06535	5.618	0.152	0.139	0.111	0.175	1	1	1	1	1	0.007	2.240	12562.8664	4 4 4 4 4	06
06535	5.618	0.101	0.072	0.000	0.000	1	1	1	0	0	0.007	2.240	12562.8664	4 4 3 0 0	16
06535	5.665	0.159	0.162	0.101	0.133	1	1	1	1	1	0.016	2.241	12560.8732	4 4 4 4 4	06
06535	5.664	0.109	0.036	0.000	0.000	1	1	1	0	0	0.016	2.241	12560.8732	4 4 3 0 0	16
06672	6.138	0.129	0.134	0.072	0.100	1	1	1	1	1	0.047	1.784	12564.8813	4 4 4 4 4	06
06672	6.139	0.101	0.032	0.000	0.000	1	1	1	0	0	0.047	1.784	12564.8813	4 4 3 0 0	16
06672	6.174	0.155	0.153	0.094	0.127	1	1	1	1	1	0.016	1.781	12563.8791	4 4 4 4 4	06
06672	6.175	0.123	0.035	0.000	0.000	1	1	1	0	0	0.016	1.781	12563.8791	4 4 3 0 0	16
06684	5.812	0.142	0.141	0.104	0.105	1	1	1	1	1	-0.011	1.159	12564.8732	4 4 4 4 4	06
06684	5.811	0.089	0.005	0.000	0.000	1	1	1	0	0	-0.011	1.159	12564.8732	4 4 3 0 0	16
06684	5.816	0.140	0.144	0.113	0.147	1	1	1	1	1	0.062	1.161	12563.8875	4 4 4 4 4	06
06684	5.816	0.102	0.033	0.000	0.000	1	1	1	0	0	0.062	1.161	12563.8875	4 4 3 0 0	16
06716	5.741	0.040	0.036	-0.041	-0.044	1	1	1	1	1	0.086	1.699	12563.8951	4 4 4 4 4	06
06716	5.742	0.039	0.000	0.000	0.000	1	1	1	0	0	0.086	1.699	12563.8951	4 4 3 0 0	16
06716	5.739	0.049	0.026	-0.052	0.001	1	1	1	1	1	0.158	1.720	12560.9147	4 4 4 4 4	06
06716	5.739	0.039	0.057	0.000	0.000	1	1	1	0	0	0.158	1.720	12560.9147	4 4 3 0 0	16
06727	6.730	0.025	0.009	-0.070	-0.085	1	1	1	1	1	0.128	1.707	12563.9025	4 4 4 4 4	06
06727	6.730	0.026	-0.011	0.000	0.000	1	1	1	0	0	0.128	1.707	12563.9025	4 4 3 0 0	16
06727	6.721	0.034	0.003	-0.079	-0.054	1	1	1	1	1	0.205	1.737	12560.9229	4 4 4 4 4	06
06727	6.721	0.027	0.030	0.000	0.000	1	1	1	0	0	0.205	1.737	12560.9229	4 4 3 0 0	16
06736	5.893	0.129	0.121	0.091	0.143	1	1	1	1	1	0.075	1.765	12561.9001	4 4 4 4 4	06
06736	5.894	0.095	0.057	0.000	0.000	1	1	1	0	0	0.075	1.765	12561.9001	4 4 3 0 0	16
06736	5.936	0.148	0.144	0.085	0.160	1	1	1	1	1	0.097	1.769	12560.9063	4 4 4 4 4	06
06736	5.936	0.110	0.079	0.000	0.000	1	1	1	0	0	0.097	1.769	12560.9063	4 4 3 0 0	16
06747	6.155	0.033	0.018	-0.078	-0.050	1	1	1	1	1	0.225	1.173	12563.9191	4 4 4 4 4	06
06747	6.156	0.032	0.029	0.000	0.000	1	1	1	0	0	0.225	1.173	12563.9191	4 4 3 0 0	16
06747	6.116	0.034	0.007	-0.065	-0.051	1	1	1	1	1	0.128	1.154	12562.9064	4 4 4 4 4	06
06747	6.116	0.032	0.016	0.000	0.000	1	1	1	0	0	0.128	1.154	12562.9064	4 4 3 0 0	16
06762	6.231	0.167	0.177	0.149	0.183	1	1	1	1	1	0.158	1.666	12563.9101	4 4 4 4 4	06
06762	6.232	0.126	0.036	0.000	0.000	1	1	1							

TABLE 2 (CONTINUED)

NAME	58 58	58-80 58-72	58-86 99-110	58-99	58-110	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP=1,2,3,4,5	CD
06787	4.386	-0.131	-0.175	-0.290	-0.347	1	1	1	1	1	-0.230	1.038	12908.9052	4 4 4 4 4	06
06787	4.386	-0.094	-0.052	0.000	0.000	1	1	1	0	0	-0.230	1.038	12908.9052	4 4 3 0 0	16
06788	6.181	-0.106	-0.170	-0.303	0.000	1	1	1	1	0	0.234	2.456	12946.8762	4 4 4 4 4	06
06788	6.181	-0.071	0.000	0.000	0.000	1	1	0	0	0	0.234	2.456	12946.8762	4 4 3 0 0	16
06822	5.333	0.104	0.096	0.032	0.054	1	1	1	1	1	0.082	1.620	12909.9562	4 4 4 4 4	06
06822	5.332	0.062	0.025	0.000	0.000	1	1	1	0	0	0.082	1.620	12909.9562	4 4 3 0 0	16
06822	5.300	0.106	0.105	0.041	0.049	1	1	1	1	1	-0.197	1.654	12908.9146	4 4 4 4 4	06
06822	5.300	0.077	0.011	0.000	0.000	1	1	1	0	0	-0.197	1.654	12908.9146	4 4 3 0 0	16
06823	5.957	0.089	0.069	0.009	0.039	1	1	1	1	1	0.152	1.626	12909.9674	4 4 4 4 4	06
06823	5.957	0.065	0.033	0.000	0.000	1	1	1	0	0	0.152	1.626	12909.9674	4 4 3 0 0	16
06823	5.950	0.084	0.079	0.013	0.030	1	1	1	1	1	-0.155	1.626	12908.9214	4 4 4 4 4	06
06823	5.950	0.059	0.017	0.000	0.000	1	1	1	0	0	-0.155	1.626	12908.9214	4 4 3 0 0	16
06841	6.494	0.184	0.213	0.186	0.193	1	1	1	1	1	-0.090	1.546	12909.9305	4 4 4 4 4	06
06841	6.494	0.128	0.008	0.000	0.000	1	1	1	0	0	-0.090	1.546	12909.9305	4 4 3 0 0	16
06841	6.490	0.199	0.209	0.177	0.216	1	1	1	1	1	-0.101	1.548	12908.9315	4 4 4 4 4	06
06841	6.490	0.131	0.040	0.000	0.000	1	1	1	0	0	-0.101	1.548	12908.9315	4 4 3 0 0	16
06848	6.698	0.396	0.443	0.488	0.570	1	1	1	1	1	-0.011	1.543	12909.9439	4 4 4 4 4	06
06848	6.698	0.284	0.081	0.000	0.000	1	1	1	0	0	-0.011	1.543	12909.9439	4 4 3 0 0	16
06848	6.710	0.394	0.436	0.498	0.599	1	1	1	1	1	-0.050	1.545	12908.9405	4 4 4 4 4	06
06848	6.710	0.268	0.099	0.000	0.000	1	1	1	0	0	-0.050	1.545	12908.9405	4 4 3 0 0	16
06929	6.500	0.446	0.376	0.309	0.000	1	1	1	1	0	-0.003	1.800	12946.8515	4 4 4 4 4	06
06929	6.500	0.315	0.000	0.000	0.000	1	1	0	0	0	-0.003	1.800	12946.8515	4 4 3 0 0	16
06941	6.670	0.142	0.151	0.123	0.145	1	1	1	1	1	-0.521	1.285	12909.8710	4 4 4 4 4	06
06941	6.672	0.117	0.022	0.000	0.000	1	1	1	0	0	-0.521	1.285	12909.8710	4 4 3 0 0	16
06941	6.664	0.141	0.131	0.129	0.120	1	1	1	1	1	-0.050	1.123	12908.9485	4 4 4 4 4	06
06941	6.664	0.100	-0.008	0.000	0.000	1	1	1	0	0	-0.050	1.123	12908.9485	4 4 3 0 0	16
07100	5.929	-0.127	-0.167	-0.272	-0.283	1	1	1	1	1	-0.538	1.114	12909.8821	4 4 4 4 4	06
07100	5.920	-0.090	-0.008	0.000	0.000	1	1	1	0	0	-0.538	1.114	12909.8821	4 4 3 0 0	16
07100	5.944	-0.120	-0.161	-0.253	-0.270	1	1	1	1	1	-0.082	1.003	12908.9573	4 4 4 4 4	06
07100	5.945	-0.082	-0.014	0.000	0.000	1	1	1	0	0	-0.082	1.003	12908.9573	4 4 3 0 0	16
07173	6.668	0.276	0.314	0.319	0.371	1	1	1	1	1	-0.506	1.207	12909.8935	4 4 4 4 4	06
07173	6.667	0.187	0.050	0.000	0.000	1	1	1	0	0	-0.506	1.207	12909.8935	4 4 3 0 0	16
07173	6.687	0.292	0.330	0.352	0.353	1	1	1	1	1	-0.074	1.073	12908.9648	4 4 4 4 4	06
07173	6.687	0.208	0.000	0.000	0.000	1	1	1	0	0	-0.074	1.073	12908.9648	4 4 3 0 0	16
07200	6.735	0.037	0.029	-0.044	0.030	1	1	1	1	1	-0.445	1.104	12909.9048	4 4 4 4 4	06
07200	6.735	0.021	0.074	0.000	0.000	1	1	1	0	0	-0.445	1.104	12909.9048	4 4 3 0 0	16
07200	6.762	0.047	0.043	-0.021	-0.057	1	1	1	1	1	-0.036	1.017	12908.9725	4 4 4 4 4	06
07200	6.762	0.040	-0.034	0.000	0.000	1	1	1	0	0	-0.036	1.017	12908.9725	4 4 3 0 0	16
07318	5.426	0.071	0.064	-0.008	-0.016	1	1	1	1	1	-0.434	1.090	12909.9179	4 4 4 4 4	06
07318	5.427	0.058	-0.007	0.000	0.000	1	1	1	0	0	-0.434	1.090	12909.9179	4 4 3 0 0	16
07318	5.446	0.078	0.064	0.001	-0.022	1	1	1	1	1	-0.058	1.011	12908.9802	4 4 4 4 4	06
07318	5.446	0.056	-0.022	0.000	0.000	1	1	1	0	0	-0.058	1.011	12908.9802	4 4 3 0 0	16
07482	6.432	0.441	0.479	0.496	0.577	1	1	1	1	1	-0.114	1.023	12564.9292	4 4 4 4 4	06
07482	6.433	0.313	0.079	0.000	0.000	1	1	1	0	0	-0.114	1.023	12564.9292	4 4 3 0 0	16
07482	6.422	0.431	0.479	0.485	0.575	1	1	1	1	1	0.011	1.017	12563.9518	4 4 4 4 4	06
07482	6.423	0.313	0.086	0.000	0.000	1	1	1	0	0	0.011	1.017	12563.9518	4 4 3 0 0	16
07554	6.274	0.182	0.115	0.036	0.075	1	1	1	1	1	-0.111	1.094	12564.9364	4 4 4 4 4	06
07554	6.273	0.104	0.043	0.000	0.000	1	1	1	0	0	-0.111	1.094	12564.9364	4 4 3 0 0	16
07554	6.273	0.191	0.123	0.037	0.096	1	1	1	1	1	0.036	1.089	12563.9625	4 4 4 4 4	06
07554	6.273	0.123	0.058	0.000	0.000	1	1	1	0	0	0.036	1.089	12563.9625	4 4 3 0 0	16
07591	5.936	-0.145	-0.190	-0.330	-0.407	1	1	1	1	1	0.021	1.045	12564.9589	4 4 4 4 4	06
07591	5.937	-0.082	-0.067	0.000	0.000	1	1	1	0	0	0.021	1.045	12564.9589	4 4 3 0 0	16
07591	5.948	-0.131	-0.174	-0.316	-0.342	1	1	1	1	1	0.088	1.047	12563.9722	4 4 4 4 4	06
07591	5.948	-0.087	-0.025	0.000	0.000	1	1	1	0	0	0.088	1.047	12563.9722	4 4 3 0 0	16
07600	6.295	-0.071	-0.103	-0.237	-0.249	1	1	1	1	1	0.058	1.045	12564.9654	4 4 4 4 4	06
07600	6.295	-0.049	-0.004	0.000	0.000	1	1	1	0	0	0.058	1.045	12564.9654	4 4 3 0 0	16
07600	6.310	-0.077	-0.105	-0.232	-0.256	1	1	1	1	1	0.125	1.049	12563.9787	4 4 4 4 4	06
07600	6.310	-0.042	-0.022	0.000	0.000	1	1	1	0	0	0.125	1.049	12563.9787	4 4 3 0 0	16
07709	6.503	-0.095	-0.154	-0.279	-0.330	1	1	1	1	1	0.031	1.305	12564.9732	4 4 4 4 4	06
07709	6.502	-0.084	-0.042	0.000	0.000	1	1	1	0	0	0.031	1.305	12564.9732	4 4 3 0 0	16
07709	6.495	-0.105	-0.146	-0.261	-0.345	1	1	1	1	1	0.036	1.305	12562.9795	4 4 4 4 4	06
07709	6.495	-0.072	-0.074	0.000	0.000	1	1	1	0	0	0.036	1.305	12562.9795	4 4 3 0 0	16
07716	6.252	0.026	-0.004	-0.079	-0.111	1	1	1	1	1	0.096	1.017	12563.9866	4 4 4 4 4	06
07716	6.252	0.016	-0.031	0.000	0.000	1	1	1	0	0	0.096	1.017	12563.9866	4 4 3 0 0	16
07716	6.278	0.038	0.015	-0.108	-0.145	1	1	1	1	1	0.079	1.016	12562.9867	4 4 4 4 4	06
07716	6.279	0.034	-0.034	0.000	0.000	1	1	1	0	0	0.079	1.016	12562.9867	4 4 3 0 0	16
08622	4.951	-0.152	-0.206	-0.366	-0.400	1	1	1	1	1	-5.751	1.113	14214.6395	4 4 4 4 4	06
08622	4.951	-0.105	-0.031	0.000	0.000	1	1	1	0	0	-5.751	1.113	14214.6395	4 4 3 0 0	16
08622	4.918	-0.136	-0.196	-0.348	-0.379	1	1	1	1	1	-5.077	1.775	14214.7464	4 4 4 4 4	06
08622	4.918	-0.094	-0.027	0.000	0.000	1	1	1	0	0	-5.077	1.775	14214.7464	4 4 3 0 0	16
08622	4.933	-0.150	-0.211	-0.366	-0.399	1	1	1	1	1	-5.817	1.088	14213.6318	4 4 4 4 4	06
08622	4.933	-0.107	-0.026	0.000	0.000	1	1	1	0	0	-5.817	1.088	14213.6318	4 4 3 0 0	16
08622	4.934	-0.136	-0.199	-0.352	-0.369	1	1	1	1	1	-5.131	1.678	14213.7406	4 4 4 4 4	06
08622	4.934	-0.094	-0.009	0.000	0.000	1	1	1	0	0	-5.131	1.678	14213.7406	4 4 3 0 0	16
08622	4.941	-0.157	-0.212	-0.377	-0.396	1	1	1	1	1	-1.449	1.051	14211.6181	4 4 4 4 4	06
08622	4.941	-0.118	-0.015	0.000	0.000	1	1	1	0	0	-1.449	1.051	14211.6181	4 4 3 0 0	16
08622	4.920	-0.142	-0.205	-0.364	-0.392	1	1	1	1	1	-5.194	1.578	14211.7361	4 4 4 4 4	06
08622	4.920	-0.101	-0.024	0.000	0.000	1	1	1	0	0	-5.194	1.578	14211.7361	4 4 3 0 0	16
08622	4.901	-0.149	-0.211	-0.360	-0.394	1	1	1	1	1	0.202	1.024	14209.6008	4 4 4 4 4	06
08622	4.901	-0.119	-0.032	0.000	0.000	1	1	1	0						

PHOTOMETRY OF O STARS

TABLE 2 (CONTINUED)

NAME	58 58	58-80 58-72	58-86 90-110	58-99	58-110	W1	W2	W3	W4	W5	H.A.	AIR MASS	J.D.	IP = 1,2,3,4,5	CD
08622	4.884	-0.141	-0.201	-0.349	-0.391	1	1	1	1	1	-5.744	1.116	14209.6542	4 4 4 4 4	06
08622	4.884	-0.102	-0.038	0.000	0.000	1	1	1	0	0	-5.744	1.116	14209.6542	4 4 3 0 0	16
08622	4.942	-0.156	-0.212	-0.373	-0.438	1	1	1	1	1	0.292	1.039	14208.6177	4 4 4 4 4	06
08622	4.942	-0.119	-0.060	0.000	0.000	1	1	1	0	0	0.292	1.039	14208.6177	4 4 3 0 0	16
08622	4.935	-0.150	-0.204	-0.372	-0.411	1	1	1	1	1	-5.572	1.206	14208.6842	4 4 4 4 4	06
08622	4.935	-0.108	-0.036	0.000	0.000	1	1	1	0	0	-5.572	1.206	14208.6842	4 4 3 0 0	16
08622	4.922	-0.151	-0.209	-0.380	-0.436	1	1	1	1	1	-0.826	1.288	12909.9953	4 4 4 4 4	06
08622	4.922	-0.108	-0.050	0.000	0.000	1	1	1	0	0	-0.826	1.288	12909.9953	4 4 3 0 0	16
08622	4.907	-0.151	-0.209	-0.370	-0.411	1	1	1	1	1	-0.823	1.286	12908.9984	4 4 4 4 4	06
08622	4.908	-0.098	-0.036	0.000	0.000	1	1	1	0	0	-0.823	1.286	12908.9984	4 4 3 0 0	16
08622	4.913	-0.150	-0.217	-0.385	-0.398	1	1	1	1	1	-0.565	1.127	12564.9813	4 4 4 4 4	06
08622	4.913	-0.111	-0.004	0.000	0.000	1	1	1	0	0	-0.565	1.127	12564.9813	4 4 3 0 0	16
08622	4.915	-0.157	-0.216	-0.378	-0.442	1	1	1	1	1	-0.502	1.101	12563.9940	4 4 4 4 4	06
08622	4.916	-0.102	-0.060	0.000	0.000	1	1	1	0	0	-0.502	1.101	12563.9940	4 4 3 0 0	16
08622	4.926	-0.167	-0.223	-0.392	-0.430	1	1	1	1	1	-0.521	1.108	12562.9937	4 4 4 4 4	06
08622	4.926	-0.119	-0.029	0.000	0.000	1	1	1	0	0	-0.521	1.108	12562.9937	4 4 3 0 0	16
08622	4.932	-0.151	-0.212	-0.377	-0.444	1	1	1	1	1	-0.020	1.010	13444.6597	4 4 4 4 4	06
08622	4.932	-0.112	-0.054	0.000	0.000	1	1	1	0	0	-0.020	1.010	13444.6597	4 4 3 0 0	16
08622	4.929	-0.141	-0.199	-0.357	-0.431	1	1	1	1	1	-5.824	1.085	13111.6476	4 4 4 4 4	06
08622	4.929	-0.097	-0.083	0.000	0.000	1	1	1	0	0	-5.824	1.085	13111.6476	4 4 3 0 0	16
08622	4.916	-0.154	-0.210	-0.358	-0.348	1	1	1	1	1	-5.667	1.152	13109.6780	4 4 4 4 4	06
08622	4.916	-0.106	0.012	0.000	0.000	1	1	1	0	0	-5.667	1.152	13109.6780	4 4 3 0 0	16
08622	4.907	-0.149	-0.200	-0.365	-0.381	1	1	1	1	1	-5.342	1.394	13796.8484	4 4 4 4 4	06
08622	4.906	-0.110	-0.007	0.000	0.000	1	1	1	0	0	-5.342	1.394	13796.8484	4 4 3 0 0	16
08622	4.940	-0.144	-0.201	-0.372	-0.399	1	1	1	1	1	-5.889	1.064	13793.7698	4 4 4 4 4	06
08622	4.940	-0.103	-0.023	0.000	0.000	1	1	1	0	0	-5.889	1.064	13793.7698	4 4 3 0 0	16
08622	4.898	-0.137	-0.193	-0.352	-0.384	1	1	1	1	1	-5.239	1.516	13793.8730	4 4 4 4 4	06
08622	4.898	-0.096	-0.028	0.000	0.000	1	1	1	0	0	-5.239	1.516	13793.8730	4 4 3 0 0	16
08622	4.901	-0.137	-0.213	-0.360	-0.398	1	1	1	1	1	-1.448	1.052	13791.7678	4 4 4 4 4	06
08622	4.901	-0.110	-0.036	0.000	0.000	1	1	1	0	0	-1.448	1.052	13791.7678	4 4 3 0 0	16
08622	4.913	-0.141	-0.190	-0.342	-0.382	1	1	1	1	1	-5.209	1.557	13791.8833	4 4 4 4 4	06
08622	4.913	-0.100	-0.038	0.000	0.000	1	1	1	0	0	-5.209	1.557	13791.8833	4 4 3 0 0	16
08622	4.949	-0.138	-0.200	-0.370	-0.400	1	1	1	1	1	-0.048	1.010	13690.9808	4 4 4 4 4	06
08622	4.950	-0.091	-0.044	0.000	0.000	1	1	1	0	0	-0.048	1.010	13690.9808	4 4 3 0 0	16
08622	4.944	-0.138	-0.199	-0.369	-0.430	1	1	1	1	1	-0.044	1.010	13689.9842	4 4 4 4 4	06
08622	4.944	-0.094	-0.071	0.000	0.000	1	1	1	0	0	-0.044	1.010	13689.9842	4 4 3 0 0	16
08622	4.946	-0.144	-0.204	-0.368	-0.410	1	1	1	1	1	-0.047	1.010	13688.9864	4 4 4 4 4	06
08622	4.947	-0.102	-0.062	0.000	0.000	1	1	1	0	0	-0.047	1.010	13688.9864	4 4 3 0 0	16
08622	4.939	-0.144	-0.205	-0.381	-0.422	1	1	1	1	1	-0.067	1.011	13686.9887	4 4 4 4 4	06
08622	4.939	-0.106	-0.059	0.000	0.000	1	1	1	0	0	-0.067	1.011	13686.9887	4 4 3 0 0	16
08622	4.921	-0.140	-0.201	-0.360	-0.405	1	1	1	1	1	-5.662	1.154	13476.6741	2 2 2 2 2	06
08622	4.922	-0.101	-0.041	0.000	0.000	1	1	1	0	0	-5.662	1.154	13476.6741	2 2 1 0 0	16
08622	4.918	-0.141	-0.197	-0.360	-0.376	1	1	1	1	1	-5.302	1.438	13474.7367	4 4 4 4 4	06
08622	4.918	-0.102	-0.020	0.000	0.000	1	1	1	0	0	-5.302	1.438	13474.7367	4 4 3 0 0	16
08622	4.903	-0.146	-0.213	-0.357	-0.403	1	1	1	1	1	-4.928	2.134	13474.7960	4 4 4 4 4	06
08622	4.903	-0.115	-0.047	0.000	0.000	1	1	1	0	0	-4.928	2.134	13474.7960	4 4 3 0 0	16
08622	4.887	-0.145	-0.209	-0.357	-0.429	1	1	1	1	1	-5.615	1.180	13387.9245	4 4 4 4 4	06
08622	4.887	-0.106	-0.053	0.000	0.000	1	1	1	0	0	-5.615	1.180	13387.9245	4 4 3 0 0	16
08622	4.925	-0.141	-0.194	-0.356	-0.398	1	1	1	1	1	-5.085	1.760	13388.0086	4 4 4 4 4	06
08622	4.925	-0.101	-0.027	0.000	0.000	1	1	1	0	0	-5.085	1.760	13388.0086	4 4 3 0 0	16
08622	4.918	-0.145	-0.204	-0.361	-0.394	1	1	1	1	1	0.299	1.041	13386.8686	4 4 4 4 4	06
08622	4.918	-0.108	-0.019	0.000	0.000	1	1	1	0	0	0.299	1.041	13386.8686	4 4 3 0 0	16
08622	4.895	-0.156	-0.207	-0.365	-0.437	1	1	1	1	1	-5.181	1.597	13386.9962	4 4 4 4 4	06
08622	4.895	-0.111	-0.058	0.000	0.000	1	1	1	0	0	-5.181	1.597	13386.9962	4 4 3 0 0	16
08622	4.907	-0.152	-0.213	-0.365	-0.409	1	1	1	1	1	-0.583	1.136	13004.7744	4 4 4 4 4	06
08622	4.907	-0.109	-0.055	0.000	0.000	1	1	1	0	0	-0.583	1.136	13004.7744	4 4 3 0 0	16
08622	4.928	-0.129	-0.187	-0.351	-0.325	1	1	1	1	1	-5.043	1.847	13111.7717	4 4 4 4 4	06
08622	4.928	-0.087	0.017	0.000	0.000	1	1	1	0	0	-5.043	1.847	13111.7717	4 4 3 0 0	16
08622	4.916	-0.162	-0.221	-0.375	-0.478	1	1	1	1	1	-5.028	1.878	13109.7795	4 4 4 4 4	06
08622	4.916	-0.117	-0.099	0.000	0.000	1	1	1	0	0	-5.028	1.878	13109.7795	4 4 3 0 0	16
08622	4.971	-0.149	-0.207	-0.366	-0.406	1	1	1	1	1	0.247	1.030	13796.7382	4 4 4 4 4	06
08622	4.971	-0.102	-0.031	0.000	0.000	1	1	1	0	0	0.247	1.030	13796.7382	4 4 3 0 0	16
08622	4.977	-0.122	-0.186	-0.343	-0.406	1	1	1	1	1	-0.076	1.012	13687.9847	4 4 4 4 4	06
08622	4.978	-0.079	-0.068	0.000	0.000	1	1	1	0	0	-0.076	1.012	13687.9847	4 4 3 0 0	16
08622	4.925	-0.161	-0.219	-0.378	-0.449	1	1	1	1	1	-0.509	1.103	13667.9705	4 4 4 4 4	06
08622	4.926	-0.103	-0.078	0.000	0.000	1	1	1	0	0	-0.509	1.103	13667.9705	4 4 3 0 0	16
08622	4.957	-0.153	-0.212	-0.385	-0.451	1	1	1	1	1	-0.598	1.143	13666.9591	4 4 4 4 4	06
08622	4.958	-0.109	-0.066	0.000	0.000	1	1	1	0	0	-0.598	1.143	13666.9591	4 4 3 0 0	16
08622	4.944	-0.079	-0.158	-0.296	-0.338	1	1	1	1	1	0.213	1.025	13387.8523	4 4 4 4 4	06
08622	4.944	-0.046	-0.025	0.000	0.000	1	1	1	0	0	0.213	1.025	13387.8523	4 4 3 0 0	16
08622	4.960	-0.144	-0.210	-0.346	-0.527	1	1	1	1	1	-0.147	1.017	13006.8382	4 4 4 4 4	06
08622	4.960	-0.087	-0.140	0.000	0.000	1	1	1	0	0	-0.147	1.017	13006.8382	4 4 3 0 0	16
08622	4.921	-0.130	-0.197	-0.350	-0.521	1	1	1	1	1	-0.193	1.022	12948.9892	4 4 4 4 4	06
08622	4.922	-0.082	-0.192	0.000	0.000	1	1	1	0	0	-0.193	1.022	12948.9892	4 4 3 0 0	16
08622	4.958	-0.153	-0.200	-0.386	-0.611	1	1	1	1	1	-0.189	1.022	12947.9926	4 4 4 4 4	06
08622	4.959	-0.098	-0.221	0.000	0.000	1	1	1	0	0	-0.189	1.022	12947.9926	4 4 3 0 0	16
08622	4.916	-0.193	-0.236	-0.406	-0.564	1	1	1	1	1	-0.166	1.019	12946.9989	4 4 4 4 4	06
08622	4.916	-0.150	-0.158	0.000	0.000	1	1	1	0	0	-0.166	1.019	12946.9989	4 4 3 0 0	16
08622	4.975	-0.151	-0.202	-0.382	-0.431	1	1	1	1	1	-0.797	1.266	13274.0032	4 4 4 4 4	06
08622	4.976	-0.102	-0.050	0.000	0.000	1	1	1	0</						

TABLE 3

O STARS WITH CONTAMINATED PHOTOMETRY

Star	Notes
BS2370	Double star, $m = 2.2$, $sep = 16''.4$, Companion $Sp = A5$.
BS2678	Double star, $m = 1.2$, $sep = 0''.7$.
BS5948	Double star, $m = 3.8$, $sep = 15''.5$.
BS6535	In cluster NGC 6383, double star, $m = 4.8$, $sep = 6''.1$.
BS6736	In nebula NGC 6523, cluster NGC 6530; I Sgr association.
BS6841	Very crowded field, III Sgr association; double star, $m = 7.1$, $sep = 8''.4$.
BS6848	Double star, $m = 0.5$, $sep = 0''.6$. Component C, $V = 8.0$, $Sp = B2$, $Sep = 18''$.

TABLE 4

PROBABLE ERRORS AT UNIT AIR MASS

Star	52	33-52	35-52	37-52	40-52	45-52	52-58	52-63	58	NB
BS1855	.0080	.0080	.0081	.0084	.0062	.0045	.0060	.0063	.0094	23
BS6822	.0095	.0064	.0084	.0071	.0051	.0040	.0069	.0089	.0133	95
O, B Stars	.0096	.0073	.0086	.0078	.0068	.0041	.0072	.0084	.0112	360
Star	58	58-72	58-80	58-86	58-99	58-110	NR			
BS1855	.0074	.0048	.0046	.0042	.0041	.0097	25			
BS8622	.0159	.0105	.0109	.0084	.0123	.0375	47			
O, B Stars	.0100	.0060	.0061	.0060	.0081	.0195	276			

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