

# Spectrophotometry of speckle binary stars

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Received February 26, 2002; accepted April 17, 2002.

**Abstract.** Spectrophotometric observations of 20 speckle interferometric binary stars in the wavelength range 3640–8340 Å with a resolution of 18 Å are presented in the form of the measured flux corrected for atmospheric extinction in the units of  $\text{erg}/\text{cm}^2 \cdot \text{s} \cdot \text{Å}$ , with no corrections for interstellar reddening.  $B, V$ , and  $R$  magnitudes,  $B - V$  colour indices and entire spectral types are also presented and compared with those of Hipparcos and Tycho catalogues and SIMBAD.

**Key words:** stars: spectrophotometry: spectral energy distribution - stars: binaries: speckle binary stars

## 1. Introduction

The study of binary and multiple systems by means of speckle interferometry made a valuable contribution to the understanding of formation and evolution of stellar systems, especially in the recent years with the aid of large telescopes and utilization of diffraction limited techniques. The direct results of speckle interferometric observations are separation angle, orientation angle, and magnitude difference for the sub-components of each binary or multiple system (Balega et al., 2002). In its turn this leads to the determination of orbit and orbital period. Using other kinds of observations, like high resolution spectroscopy (Tokovinin, 1995) or wide range spectrophotometry (Al-Wardat et al., 2002; Al-Wardat, 2002), the number of deduced parameters can be raised, and wide understanding of such systems can be achieved.

In this paper, a wide range (3640–8340 Å), low resolution (18 Å, 6 Å/px) spectrophotometry of 20 speckle interferometric binary stars is presented. The objects of the study were taken from the speckle interferometric programme, which has been carried out at the 6 m telescope of the Special Astrophysical Observatory since the early 90s. The programme mainly includes late type dwarfs in the vicinity of the Sun, and their fundamental parameters are badly known. The presented data can be used as a reference for building theoretical spectral energy distribution curves on the basis of Kurucz blanketed models. This, along with the magnitude difference from speckle interferometric observations, can be used to build a spectral energy distribution for each of the components from which we can get their  $T_{\text{eff}}$ ,  $\lg g$ , and spectral types.

The stars are listed in Table 1 with different identifications: Hipparcos (Col. 1), HD (Col. 2), other

identifications (Col. 3). The coordinates of the stars (Table 1, Col. 4, 5) were taken from SIMBAD astronomical database.

## 2. Observations and data analysis

Spectra were obtained using a low resolution grating (325/4° grooves/mm, 5.97 Å/px reciprocal dispersion) within the UAGS spectrograph at the Cassegrain focus of the Carl Zeiss Jena (Zeiss-1000) 1 m telescope of SAO during the photometrical nights, January 28 and February 4, 2002. The seeing was around 1.5". The times of observations in terms of Julian Dates are listed in Table 1, Col.6. The stars AD Leo, Wolf424, and Hip78864, which exhibit variability, were observed at a specific time.

The spectrograph has an ISD015 A 530×580 px CCD detector. A 0.5 mm slit width was used to encompass all light from the star, and it was rotated (by changing the angle of the instrument's table) to a suitable direction to prevent the effect of nearby stars.

Two positional angles for the grating were used to cover the spectral range between 3640Å and 8340Å, 29° for the blue part and 30°40' for the red part. This was done for two reasons: first, because of small dimensions of the detector which does not cover this spectral range, and, second, in order to overcome the falling sensitivity of the detector in the blue part of the spectrum by applying longer integration times in this part, and there were at least 500Å of overlap between the two regions (see Fig. 1), allowing us further checks on our internal agreement.

Standards from Massey et al. (1988), Oke (1990) and Hamuy et al. (1992, 1994) were used for the cal-

ibration of the system. The spectra were sky subtracted and wavelength calibrated. Then the spectral sensitivity curve of the CCD derived from the standard stars' spectra for each angle, was used for flux calibration of the object spectra. All steps were made using ESO-MIDAS<sup>1</sup> routines. The wavelength calibration was performed by means of He-Ne-Ar lamp emission spectra.

For each star, the spectra were averaged separately for angles of the grating. Then by averaging the resulting individual spectra in the overlap region, we obtained a single 4700 Å band spectrum.

As an example, four individual spectra of Hip12552 obtained on February 4th, 2002 are plotted together in Fig. 1. No adjustment has been made in their flux level. The coincidence reflects a good internal agreement of our results.

The standard deviation of  $B$  and  $V$  magnitudes, obtained for each star from the sample of the spectra, is typically better than 0<sup>m</sup>06, and for the  $R$  band it is better than 0<sup>m</sup>07. The error bars are the lowest in the central part of the spectrum where the blue and red spectra overlap.

To investigate the external agreement of our results, we used some of the standard stars. We observed these standards as objects, then we compared the results with the published spectral energy distributions of these standards. We observed the stars HR718 (4<sup>m</sup>28, B9III), HR5501 (5<sup>m</sup>68, B9.5V), and HR1544 (4<sup>m</sup>36, AIV), where Hilt600 (10<sup>m</sup>44, B1) from Massey et al. (1988), Feige66 (10<sup>m</sup>50, sdO) from Massey et al. (1988), and HD93521 (7<sup>m</sup>04, O9Vp) from Oke (1990) were used as standards in obtaining the spectra, respectively. Then we compared our results with those published by Hamuy et al. (1992, 1994) (Figs. 2, 3, and 4). The comparisons show a good agreement within the estimated error values from the internal agreement.

### 3. Results and discussion

Table 2 lists the measured flux of the stars, corrected for the atmospheric extinction, in units of erg/cm<sup>2</sup>·s·Å, where Hipparcos identification, if exists, was used for the stars, else other identifications were used. The data are plotted in Fig. 5. The low sensitivity of the detector in the blue part is noteworthy here, which is clear in the spectra.

$BVR$  synthetic magnitudes were computed using the following integrals:

$$X = -2.5 \log \frac{\int S_x(\lambda) F_\lambda d\lambda}{\int S_x(\lambda) d\lambda} + ZP,$$

<sup>1</sup> Munich Image Data Analysis System, developed, maintained and distributed by the European Southern Observatory.

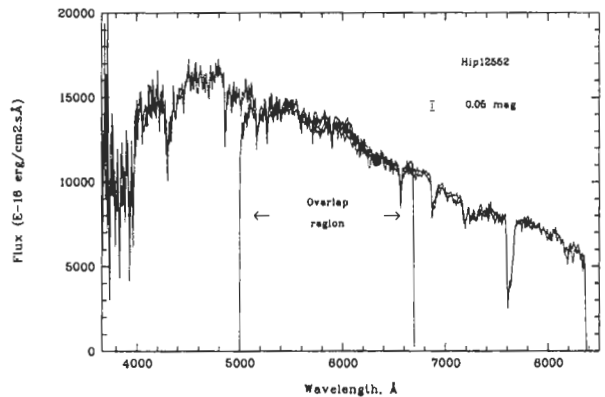


Figure 1: Superposition of 4 different spectra of Hip12552 is shown as an evidence for the final agreement of spectra. The overlap region between blue and red spectra is shown also.

where  $S_x(\lambda)$  is the transmission function for the pass-band  $X$ . We adopted the filter functions  $B_{90}$ ,  $V_{90}$  and  $R_{90}$  published by Bessel (1990).  $ZP$  is the zero point for the magnitude scale. For  $V$  band  $ZP$  was solved using the spectrophotometric calibration of Vega published by Hayes (1985) and the  $V$  magnitude of 0<sup>m</sup>03 measured by Johnson et al. (1966). While for  $B$  and  $R$  bands it was solved using the Vega magnitudes published by Hamuy et al. (2001) as  $B = 0<sup>m</sup>014$ , and  $R = 0<sup>m</sup>042$ , since they are more reliable than those obtained by Johnson et al. (1966) (see Appendix B in Hamuy et al., 2001). The integrals were computed after interpolating  $S_x(\lambda)$  to the wavelength spacing of  $F_\lambda^{Star}$  which is 6 Å. The results of these calculations are listed in Table 1, Col. 7, 8, 9, and 10.

Figs. 6, 7, and 8 show comparisons between the calculated  $B$  magnitudes,  $V$  magnitudes and  $B - V$  colour indices with Johnson  $B$ ,  $V$ , and  $B - V$  of Hipparcos catalogue (fields H5 and H37). The Hipparcos magnitudes were taken either from the ground based observations or calculated from  $B_T$  and  $V_T$  of Tycho using different relations for different kinds or luminosity classes of the stars (for more information see Hipparcos and Tycho catalogues sec. 1.3 (ESA, 1997)).

The entire spectral types of the binaries were estimated by comparing  $B - V$  with the intrinsic colours of FitzGerald (1970) neglecting interstellar reddening since all of the stars are nearby stars and their interstellar reddening lies within the error values of  $B - V$  (see Al-Wardat, 2002). Results are listed in Table 1, Col. 11, along with those from SIMBAD (Col. 12) for comparison sake, where they show a good agreement (within the error values of  $B - V$ ) for 15 stars, while the other 5 stars: (Hip1055, Hip51945, Hip64838, Hip70973, and Hip78864) show differences between the estimated spectral types in this work and those given by SIMBAD.

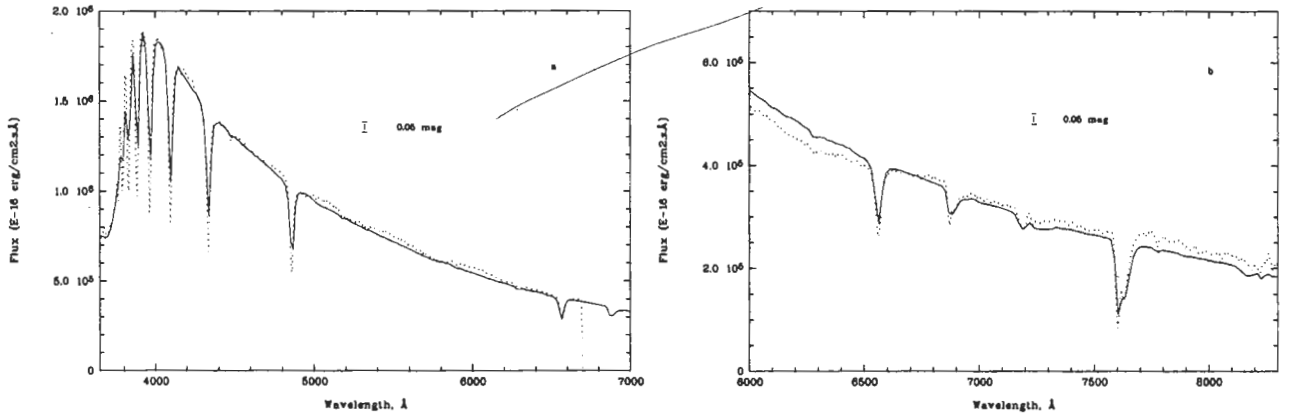


Figure 2: Blue part (a) and red part (b) comparisons between the obtained spectral energy distribution of HR718 ( $4^m28$ , B9III) (dotted line) and that published by Hamuy et al. (1992, 1994) (solid line). Hilt600 ( $10^m44$ , B1) from Massey et al. (1988) was used as a standard in obtaining the spectrum.

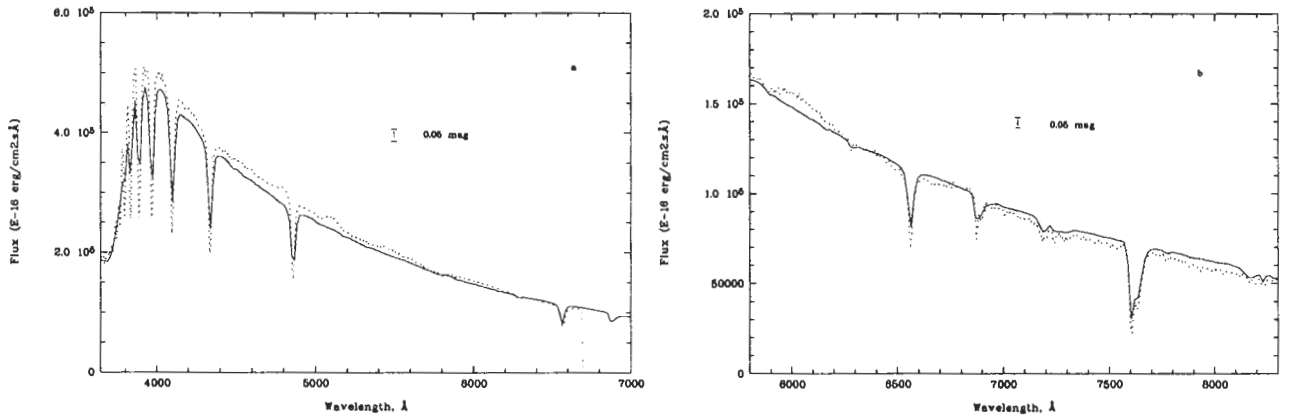


Figure 3: Blue part (a) and red part (b) comparisons between the obtained spectral energy distribution of HR5501 ( $5^m68$ , B9.5V) (dotted line) and that published by Hamuy et al. (1992, 1994) (solid line). Feige66 ( $10^m50$ , sdo) from Massey et al. (1988) was used as a standard in obtaining the spectrum.

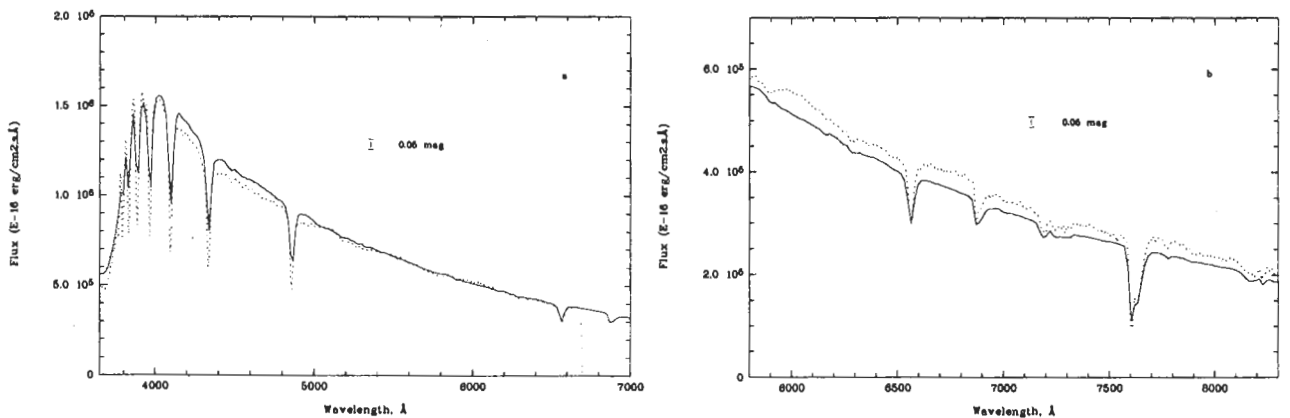


Figure 4: Blue part (a) and red part (b) comparisons between the obtained spectral energy distribution of HR1544 ( $4^m36$ , AIV) (dotted line) and that published by Hamuy et al. (1992, 1994) (solid line). HD93521 ( $7^m04$ , O9Vp) from Oke (1990) was used as a standard in obtaining the spectrum.

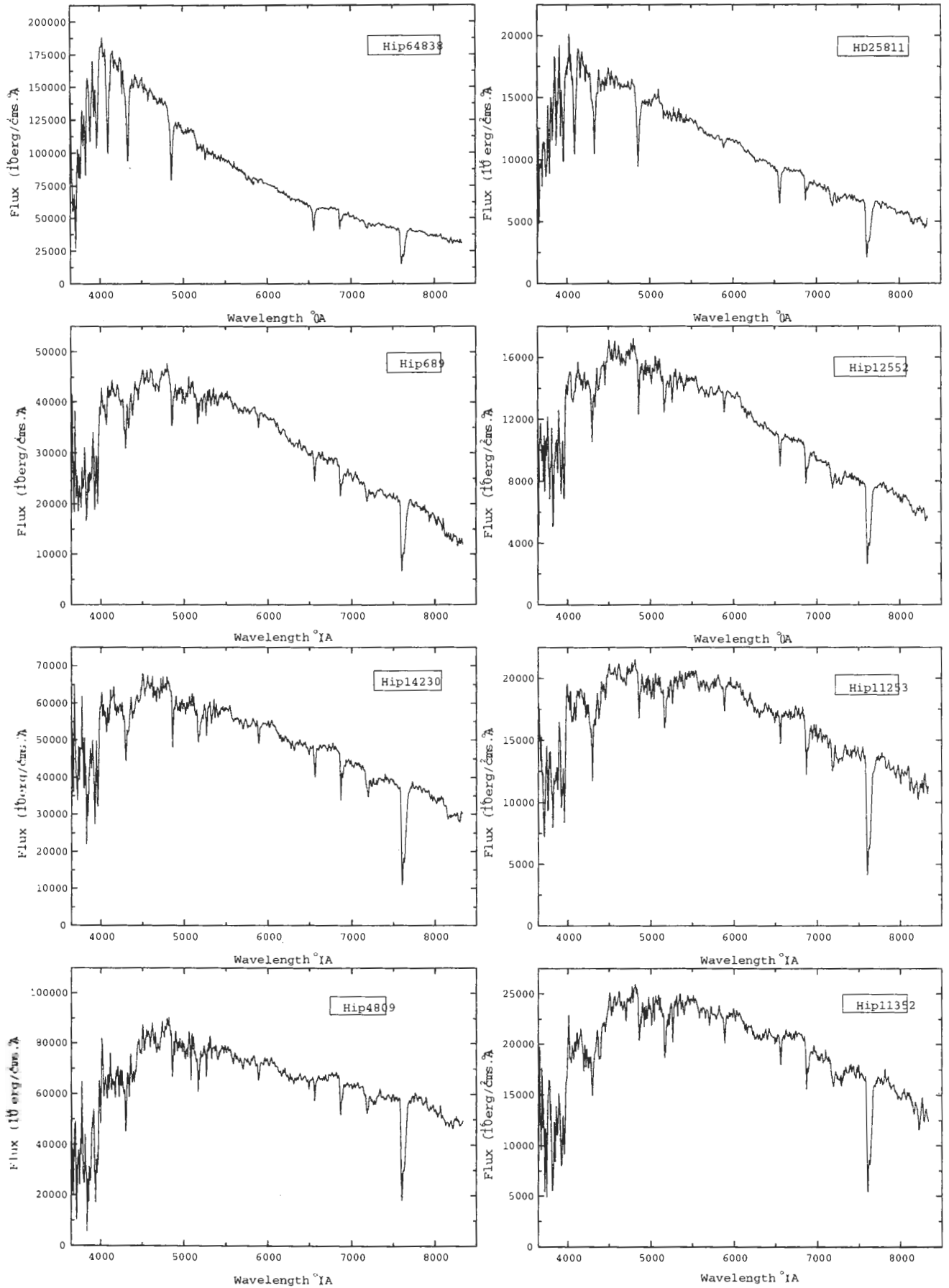


Figure 5: Spectral energy distributions of the stars labeled with the star names.

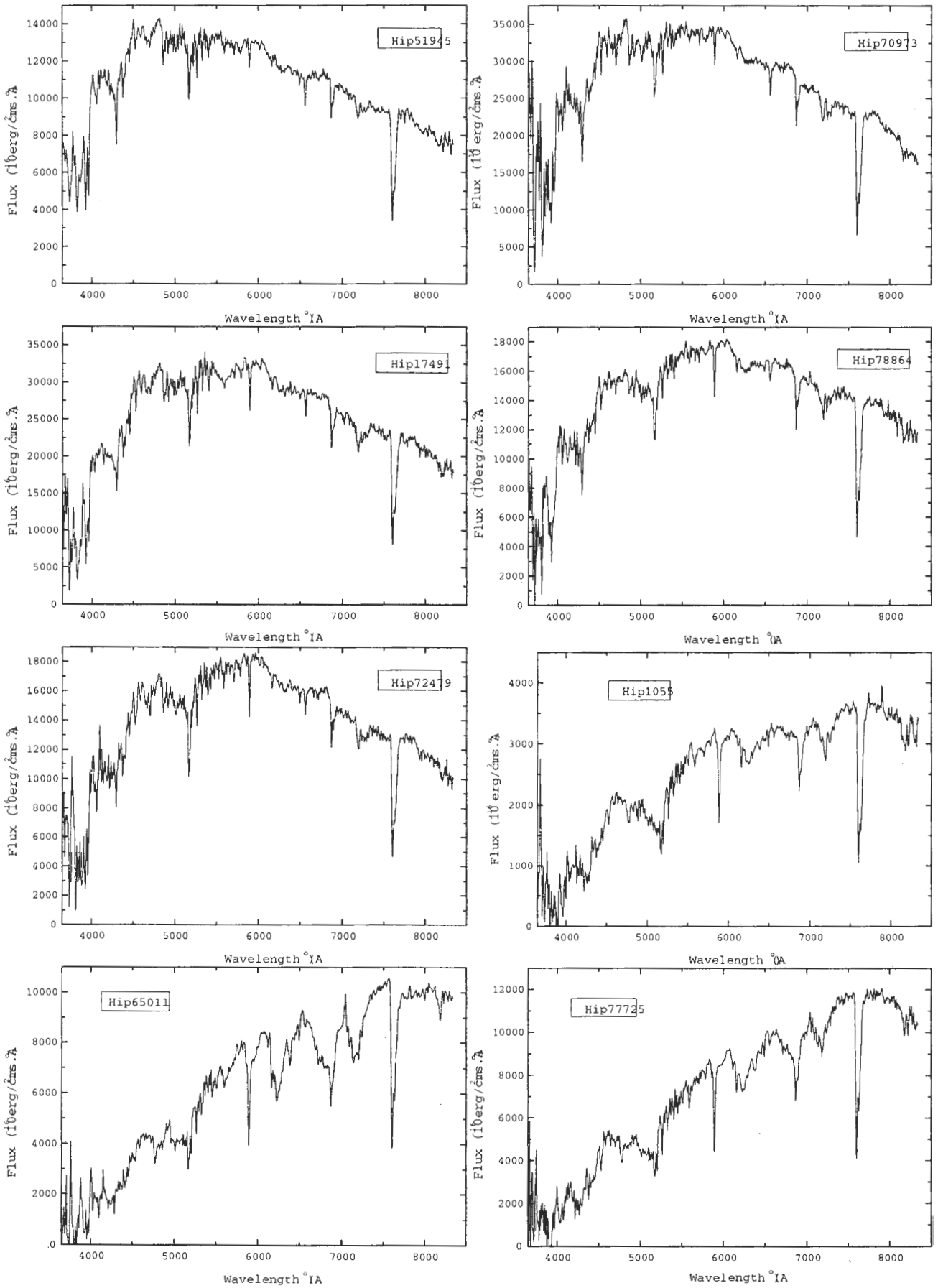


Figure 5: (Continued).

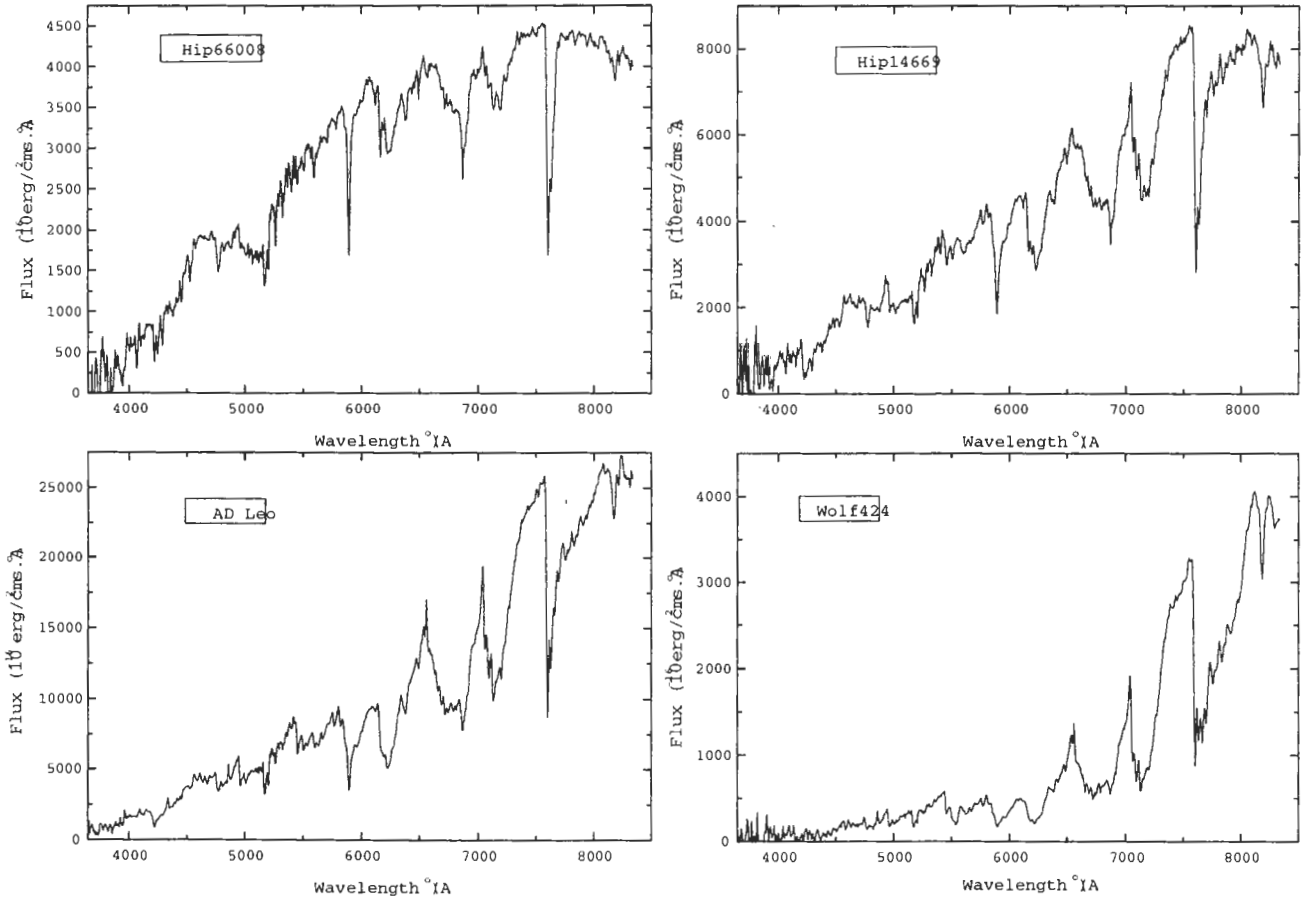


Figure 5: (Continued).

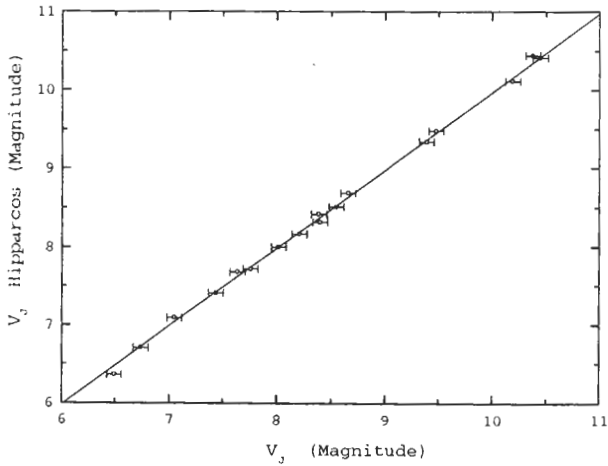


Figure 6: Comparison between the calculated  $V_J$  magnitudes and  $V_J$  magnitudes of Hipparcos and Tycho catalogues.

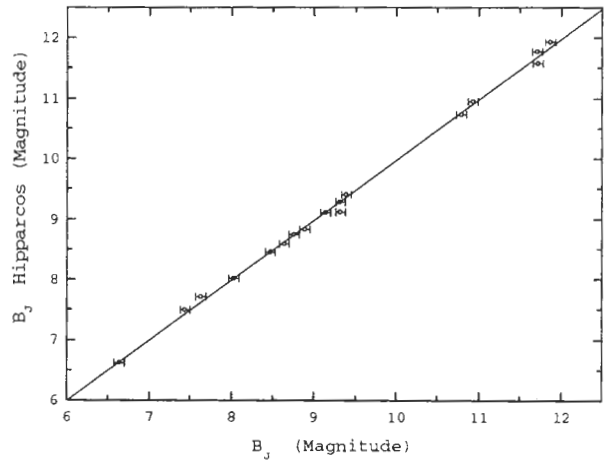


Figure 7: Comparison between the calculated  $B_J$  magnitudes and  $B_J$  magnitudes of Hipparcos and Tycho catalogues.

#### 4. Conclusions

Composite spectral energy distributions of 20 speckle binary stars were measured, from which 17 are G, K, and M dwarfs. The knowledge of the fundamental

parameters of these late-type binaries is important for the improvement of mass-luminosity relation at the bottom of the main sequence.

The  $BVR$  magnitudes and the  $B - V$  colour indices have been calculated, and the entire spectral

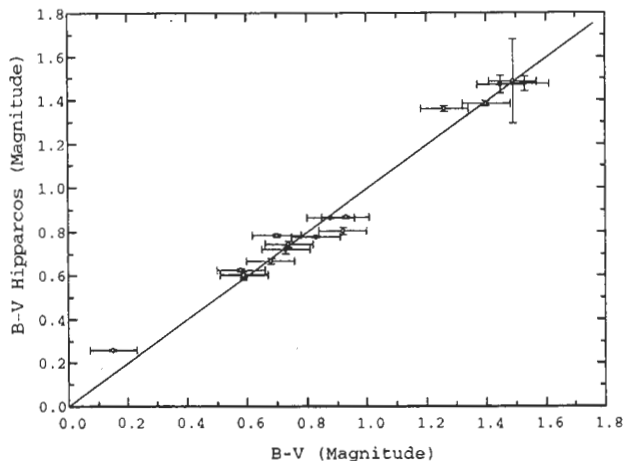


Figure 8: Comparison between the calculated  $(B-V)_J$  and  $(B-V)_J$  of Hipparcos and Tycho catalogues.

types of the pairs have been estimated.

A good agreement has been found between the calculated colour magnitudes and colour indices and those of Hipparcos and Tycho catalogues. Also a comparison of the estimated spectral types with those given by SIMBAD shows a good agreement for 15 stars within the error values of  $B - V$ . Here it is noteworthy that previous papers concerning the quadruple system ADS11061 (Tokovinin, 1995, Al-Wardat, 2002) showed a big difference between the estimated entire

spectral types and those given by SIMBAD.

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Table 1: List of the stars with  $B_J$ ,  $V_J$ ,  $R_C$ ,  $(B - V)_J$ , and spectral type results of this work.

Star Name		Other Identifications (3)	$\alpha_{2000}$ (h)(m)(s) (4)	$\delta_{2000}$ (°)(')(") (5)	Times of Obs. JD 2452300+ (6)	$B_J$ mag $\pm 0.06^*$ (7)	$V_J$ mag $\pm 0.06^*$ (8)	$R_C$ mag $\pm 0.07^*$ (9)	$(B - V)_J$ $\pm 0.08^*$ (10)	Sp. Type This Work (11)	Sp. Type SIMBAD (12)
Hip (1)	HD (2)										
689	375		00 08 28.47	+34 56 04.37	10.171, 10.201	8.02	7.42	7.17	0.6	G0	F8
1055	-		00 13 09.17	+20 22 56.75	10.181, 10.207	11.70	10.42	9.64	1.28	K7	M0
4809	6009		01 01 43.58	+25 17 31.98	3.195, 10.190, 10.212	7.43	6.73	6.32	0.70	G6	G8IV
11253	14874		02 24 51.15	+30 38 48.28	3.208, 10.275, 10.279	8.88	8.20	7.80	0.68	G5	G0V
11352	15013		02 26 09.59	+34 28 10.03	3.213, 10.279, 10.301	8.75	8.00	7.60	0.75	G8	G5
12552	16656	COU 1511	02 41 28.88	+40 52 50.83	3.250, 10.283, 10.305	9.13	8.54	8.26	0.59	G0	G0
14230	18490		03 03 28.66	+23 03 41.33	10.285, 10.309	7.62	7.04	6.68	0.58	F9	G0
14669	-	GJ 125	03 09 30.79	+45 43 57.87	10.313, 10.348	11.71	10.16	9.13	1.54	M4	M2
17491	23140	GJ 150.2	03 44 48.83	+46 02 09.04	10.319, 10.358	8.63	7.74	7.31	0.88	K1	K2
-	25811	CHA 13	04 06 16.41	+19 52 28.58	10.322, 10.366	9.03	8.63	8.44	0.4	F3	F0
-	-	AD Leo	10 19 36.27	+19 52 11.9	10.422	10.87	9.34	8.20	1.53	M4.5	M4.5V
51945	91877	BAG 3	10 36 43.07	+11 01 18.96	10.433, 10.430	9.38	8.64	8.24	0.74	G8	K0
-	-	Wolf424	12 33 17	+09 01 20	10.495	14.25	12.50	10.96	1.74	M7	M5Ve
64838	115488	FIN 350	13 17 29.85	- 00 40 33.83	10.524, 10.591	6.63	6.47	6.39	0.15	A5	F0V
65011	-	GL 507A	13 19 33.59	+35 06 36.56	10.508, 10.577	10.92	9.46	8.61	1.47	M0	M0
66008	-	WOR 24	13 31 58.25	+31 08 04.56	10.515, 10.583	11.86	10.36	9.47	1.51	M4	M0V
70973	-	RST 4529	14 31 00.62	- 05 48 08.47	10.597, 10.633	8.46	7.62	7.21	0.84	K0	G5
72479	-	ADS 9397	14 49 20	+10 14 00	10.607, 10.637	9.31	8.37	7.88	0.95	K3	K2V
77725	-	GL 600	15 52 08.24	+10 52 28.11	10.613, 10.644	10.78	9.37	8.46	1.41	M0.5	M2
78864	144515	NQ Ser	16 05 53.41	+10 41 06.01	10.618	9.31	8.38	7.86	0.92	K2	G8IV

\* The error values for most of the stars are better than these values.







Table 2: Flux (E-16 erg/cm<sup>2</sup>s.Å) (continued)

λ	Hip 689	Hip 1065	Hip 4809	Hip 11253	Hip 11352	Hip 12552	Hip 14230	Hip 14669	Hip 17491	HD 5811	AD Leo	Hip 51945	Wolf 424	64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77725	Hip 78864
4458	41474	1519	81631	18275	21228	14246	60380	14269	17491	15970	2966	11932	70	151886	2850	1157	28442	13169	3205	78864
4464	43082	1615	77610	18692	22139	14878	61065	1530	22960	15510	3322	12635	63	149856	3183	1349	30029	14084	3251	13332
4470	43411	1645	76095	19845	22650	15726	60831	1765	28459	16672	3559	13185	111	149462	3496	1379	31665	14357	3678	14193
4476	43682	1698	77254	20325	22784	15718	62140	1653	28357	16336	3612	13266	143	151170	3365	1467	32056	14597	3780	14558
4482	44157	1742	77058	20069	23214	15677	64176	1684	27714	15926	3653	13190	162	151730	3265	1497	30356	14408	3935	14827
4488	44434	1829	75502	20191	23393	16135	64884	1625	28334	16182	3703	13187	137	152533	3277	1449	31947	14455	4485	15476
4494	45186	1904	78556	20640	24220	16387	65295	1661	28376	16765	3744	13443	136	155402	3393	1685	33170	15216	4536	16408
4500	46088	1948	85817	21106	24427	17086	67863	1747	29463	17063	3762	14019	155	155971	3641	1685	34066	15900	4588	16548
4506	46421	1935	87304	21168	24525	17127	67670	1706	30652	17432	3743	14237	113	156477	3592	1661	33588	15674	4487	15575
4512	46014	1911	84930	20675	25060	16878	66278	1709	29968	17121	3779	13941	119	157690	3450	1661	33197	15215	4668	14887
4518	45060	1774	80884	20320	24162	16477	65447	1739	30242	16873	3781	13394	147	149483	3366	1532	30514	13913	3969	13705
4524	43543	1676	77084	20341	23000	16176	62427	1626	28056	16544	3656	12657	165	149547	3341	1359	28109	13698	3667	13372
4530	43910	1742	77503	20307	22836	15849	61881	1541	26008	16035	3597	12665	168	145908	3457	1338	31338	13913	3539	14110
4536	44906	1823	80852	20504	23736	16277	63869	1637	27013	16416	3736	13166	197	150882	3333	1557	33251	14417	4105	14581
4542	45242	1884	81934	20441	23531	16507	63963	1662	28475	17149	3743	13231	187	152516	3304	1596	33080	14562	4307	14622
4548	44260	2000	82501	20354	23220	16854	64152	1767	30048	16490	3781	13173	181	149327	3946	1890	32790	14981	4381	14653
4554	45408	2073	85466	20282	24259	16793	64901	1836	30274	16745	4105	13558	227	147621	3989	1890	32661	16101	4831	15174
4560	46338	2087	83110	20489	24655	16076	66266	1992	30370	16616	4058	13789	222	149021	3989	1890	33106	16592	5367	15189
4566	45572	2152	82604	20704	24763	16376	67529	2244	31509	16505	4602	13773	231	147427	4187	1883	33462	16231	5281	15477
4572	44197	2151	85065	20873	24686	16854	65359	2283	31450	16159	4537	13667	232	147139	4144	1809	33144	16305	5046	15040
4578	43893	2073	83388	20308	23828	16660	64437	2072	29464	15891	4231	134316	190	139452	3903	1764	32343	15332	4666	15317
4584	44135	2007	85881	20308	23948	15891	65475	2204	28878	16798	4226	13360	170	142625	3847	1842	31140	15318	5153	14776
4590	44812	2015	85853	19900	23444	16075	65922	2093	29071	16383	4312	13484	198	146524	4313	1911	32375	16154	5118	15161
4602	46066	2075	81105	20374	24320	15969	65475	2204	30012	16682	4542	13800	253	149557	4233	1907	33696	16518	5227	16007
4608	46425	2201	83752	20856	24525	16035	66123	2121	28878	16734	4312	13484	198	146524	4313	1911	32375	16154	5118	15161
4614	45974	2147	86037	21074	24754	16241	64430	2231	30652	16545	4724	13877	223	147907	4233	1928	34677	16518	5227	16007
4620	46123	2212	85236	21153	25219	16763	67260	2326	30951	15954	4296	13890	217	147456	4351	1934	33536	16250	5166	16542
4626	45744	2209	86139	20867	24899	16685	61420	2148	30996	16091	4159	13569	165	146117	4351	1919	31828	15572	4883	15036
4632	43608	2109	83149	20634	24148	16277	64665	2070	30384	16208	4089	13269	178	145355	4313	1893	32213	15683	5202	15693
4638	43123	2018	80903	20300	23746	15796	64465	2084	30911	16091	4159	13569	165	146117	4351	1919	31828	15572	4883	15036
4644	43422	2062	79772	19921	24199	15485	61938	2070	29093	15662	4095	13111	205	143432	4137	1893	32176	15014	4683	14825
4650	43193	2147	82559	20036	23846	15745	62942	2137	28480	15837	4296	13292	217	142665	4132	1829	32612	15206	4918	15164
4656	43024	2120	84436	20163	23846	16267	63848	2108	28840	16154	4545	13313	208	142665	4355	1893	32612	15206	4918	15164
4662	42249	2095	80401	19849	23364	15921	61628	2042	28941	15977	4322	12915	177	143577	4402	1898	30914	14771	5112	15101
4668	43783	2134	76546	19730	23527	15621	60400	2047	28408	15887	4122	12917	190	140654	4200	1896	31916	15494	4914	15292
4674	43624	2130	76440	19814	23723	15986	63651	2038	29249	15849	3985	13076	174	141945	4163	1899	31916	15494	4914	15292
4680	43390	2054	77993	20086	24251	15954	64224	1980	29234	15957	3959	13093	196	141183	4313	1877	33612	15297	5049	15261
4686	43418	2096	80007	19985	24136	15851	63839	1995	29215	15810	4112	13169	204	141183	4313	1877	33612	15297	5049	15261
4692	43224	2019	78527	19681	23685	15744	63610	2152	29233	15863	4361	13036	168	136896	4251	1866	29444	14288	4650	14430
4698	42153	2008	77954	19630	22547	15600	62610	2279	28721	15916	4536	12730	184	137556	4328	1880	29484	14315	4781	14740
4704	42103	2052	78768	19932	23444	15471	61187	2139	28312	16120	4536	12730	184	137556	4328	1880	29484	14315	4781	14740
4710	43438	2069	77250	19742	23444	15718	62676	2085	28837	15888	4386	13159	193	137793	4324	1974	30934	15417	4921	15456
4716	44680	2069	81810	19750	24500	16411	63676	2103	30610	15902	4371	13617	209	139462	4292	1979	32911	16387	4953	15546
4722	44364	2051	82219	20983	24588	16382	66723	2196	30733	15875	4436	13566	211	142266	4043	1937	33590	16057	5189	15652
4728	44862	2052	82370	20436	24294	16376	63595	2178	29534	15869	4467	13302	190	141660	4054	1883	32829	15745	5133	15516
4734	46851	2070	80720	20429	24861	16115	62956	2214	29596	15864	4506	13404	211	137321	4218	1881	32762	15894	4917	15628
4740	46200	1948	87792	20429	24861	16115	62956	2214	29596	15864	4506	13404	211	137321	4218	1881	32762	15894	4917	15628
4746	45651	1920	84930	20810	24515	16526	67450	2096	31286	16215	4782	13811	279	141620	4285	1895	33706	16429	5185	15659
4752	45473	1902	84526	20433	24674	16126	64948	2147	31008	15894	4602	13198	263	138150	3720	1697	32954	16046	4854	15272
4758	45272	1771	84221	20378	24022	15864	63906	1952	30452	15758	3994	13498	212	138150	3720	1697	32954	16046	4854	15272
4764	45360	1724	82460	20522	24222	16268	64544	1728	30370	15660	3568	13590	155	136301	3417	1589	32637	15991	4278	15401
4770	45799	1707	86882	21008	25143	16947	64270	1649	31257	15669	3419	13990	133	136581	3206	1484	33936	16518	4100	

Table 2: Flux ( $E-16 \text{ erg/cm}^2\text{-s-Å}$ ) (continued)

$\lambda$	Hip 689	Hip 1055	Hip 4809	Hip 11253	Hip 11352	Hip 12552	Hip 14230	Hip 14669	Hip 17491	HD 25811	AD Lec	Hip 51945	Wolf 424	64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77259	Hip 78864	Hip 84739
4866	36710	1810	171567	17743	21000	13282	52629	1934	27278	10300	4596	12753	293	85213	4042	1791	29860	14673	4760	14739	
4872	40273	1940	76755	18677	21720	14246	56904	1912	27630	11655	4267	12231	292	98217	4091	1790	30925	15308	4839	14828	
4878	41238	1830	80810	19168	22767	15225	58854	1907	28662	12812	4342	13116	211	112747	4066	1779	31546	15562	4867	15040	
4884	40878	1729	75354	18911	22036	15407	56963	2023	28652	13212	4352	12543	211	112747	4209	1769	31546	15187	4642	14683	
4890	42683	2075	77819	19596	22659	14984	58315	2116	28301	13553	4515	13002	221	115029	4391	1827	31605	15906	4666	14945	
4896	42164	2057	85015	20378	23816	15457	61086	2116	30137	14032	4670	13615	251	1200263	4416	1914	33523	16587	5048	15488	
4902	43544	2073	84337	20058	24179	15623	61927	2202	31427	14298	4927	13394	258	121275	4794	1979	32642	15233	5178	15198	
4908	41865	1937	80660	19918	23649	15260	60015	2324	30869	14494	5202	13324	296	1234000	4688	1893	30923	14808	4839	14280	
4914	40316	1814	79183	19174	22829	15109	59240	2305	28734	14766	5189	12410	316	121772	4492	1964	30617	15122	4767	14208	
4926	42491	2103	80716	19433	23692	15034	58837	2634	29157	14664	5650	12410	326	1183235	4668	2030	31305	15768	5104	14880	
4932	41609	1975	80248	19262	22668	15440	58573	2745	29375	14431	5583	12879	340	1183235	4668	2034	31315	15603	5147	15113	
4938	42809	2011	78201	19239	22417	14903	57941	2545	29566	14497	5705	13169	352	1200963	4799	2003	32369	15994	5032	15651	
4944	40944	1803	80877	19358	23804	15848	60281	2605	30305	14872	5970	13640	375	1232391	4946	2076	32911	16308	5086	16126	
4950	41621	1861	82083	19967	23254	15664	59784	2556	30442	14552	6092	12879	325	121057	4657	1973	32240	15658	5054	15516	
4956	42440	1901	78465	18665	23527	14831	57697	2186	29369	14436	6206	12879	314	121057	4011	1767	32982	15782	4668	15333	
4962	42702	1940	78074	20113	23287	15327	59740	1888	29299	14643	3823	13351	180	1196337	4115	1830	32595	15452	5048	15260	
4968	43135	1950	77522	19631	23822	15172	60828	1960	29922	14715	4272	13471	176	1203930	4240	1842	32785	15964	4736	15269	
4974	42368	1774	81060	20288	24717	15493	61098	2055	30368	14682	4351	13289	192	121611	4170	1773	32115	14963	4660	14925	
4980	39725	1810	76719	19008	24077	15005	58476	2022	28250	14295	4315	12492	208	118151	4170	1773	32115	14963	4660	14925	
4986	42514	1789	80340	19870	23449	15001	58517	2029	28205	14404	4464	12805	251	1157446	4095	1778	32184	15282	4484	14752	
4992	42492	1813	79331	19581	23852	15314	59944	2101	30063	14906	4740	13443	246	1171122	4103	1790	31873	15373	4509	15091	
4998	40545	1759	79902	19057	22457	14605	58887	1971	28908	14843	4061	12729	205	1167388	4035	1698	30318	14411	4396	14049	
5004	40746	1769	79109	18303	22872	14524	58887	1971	28908	14843	4061	12729	205	1167388	4035	1698	30318	14411	4396	14049	
5010	40243	1652	74197	18691	21881	14828	58047	1905	28237	14430	3988	12476	213	1141122	3706	1694	29898	14388	4187	13844	
5016	39610	1712	73764	18510	23033	14281	58437	1852	28430	14281	4286	12671	206	115354	3896	1704	30275	14586	4264	14184	
5022	41293	1802	77522	19537	23748	14857	58589	1970	28857	14317	4286	12671	206	115354	3896	1704	30275	14586	4264	14184	
5028	41923	1812	77585	20051	24712	15317	60297	2004	29138	14869	4577	13085	226	118103	4162	1658	30995	14786	4484	14433	
5034	41596	1768	74751	18314	23748	15257	60297	1988	30314	14682	4673	13535	242	116110	4210	1839	32157	15304	4566	14852	
5040	41048	1742	78901	19451	23748	15257	60297	1988	30314	14682	4673	13535	242	116110	4210	1839	32157	15304	4566	14852	
5046	41349	1848	79821	19451	23748	15257	60297	1988	30314	14682	4673	13535	242	116110	4210	1839	32157	15304	4566	14852	
5052	43427	1789	84752	20396	24144	16066	61204	2116	31315	15242	4925	14021	299	119188	4077	1749	33814	15701	4398	14936	
5058	42075	1654	82559	20055	24144	16066	61204	2116	31315	15242	4925	14021	299	119188	4077	1749	33814	15701	4398	14936	
5064	40755	1785	78795	19807	24308	15678	59997	2174	30554	15139	4862	13289	283	1153639	4113	1646	31947	14959	4260	14281	
5070	42784	1756	77182	19582	24004	15476	60297	2174	30554	15139	4862	13289	283	1153639	4113	1646	31947	14959	4260	14281	
5076	41748	1576	65496	19450	23915	14976	59398	2129	29351	14885	4888	13948	297	116314	4132	1659	32812	15108	4308	14859	
5082	42837	1728	65496	19450	23915	14976	59398	2129	29351	14885	4888	13948	297	116314	4132	1659	32812	15108	4308	14859	
5094	43024	1643	84030	20200	24900	15435	62299	2166	30593	14937	5066	13278	310	117977	4240	1742	34080	15534	4442	15220	
5098	43979	1684	84030	20200	24900	15435	62299	2166	30593	14937	5066	13278	310	117977	4240	1742	34080	15534	4442	15220	
5100	43108	1554	77808	19283	24849	15782	62590	2203	30472	14972	5066	13278	310	117977	4240	1742	34080	15534	4442	15220	
5106	43105	1574	81595	19347	23372	15196	59156	2102	29445	15501	4779	13256	320	117344	4180	1731	33501	15440	4616	14842	
5112	44280	1627	80704	19839	24053	15558	60654	2172	29943	15705	4787	13163	283	1186660	3909	1632	32862	14915	3987	14660	
5118	43816	1569	82638	20083	24583	15896	61909	2187	30696	15114	5158	13593	311	116424	4235	1704	33546	15670	4520	14841	
5124	41634	1495	82638	20083	24583	15896	61909	2187	30696	15114	5158	13593	311	116424	4235	1704	33546	15670	4520	14841	
5130	40930	1617	75779	18856	23641	15005	58064	2164	29779	14548	4947	12940	330	1174688	3900	1680	30904	14896	4207	14159	
5136	41668	1623	76947	18950	23489	14691	57226	2232	28932	14494	5195	12451	363	1153599	4217	1730	30900	14251	4448	13963	
5142	41572	1552	74866	18819	22733	14470	56622	2264	28567	14584	5021	12407	325	1138466	4088	1701	30539	14078	4199	14114	
5148	41050	1540	72858	17856	22013	14525	57693	2240	28049	14561	4798	12643	342	1118446	3888	1650	31203	14251	4060	13974	
5154	40512	1732	73974	19061	23069	14803	58244	2197	27764	14392	4912	12914	311	1110994	4135	1722	31384	14838	4275	14196	
5160	39717	1636	79957	18488	22569	14552	56523	2387	29060	14422	5517	12359	358	1093993	4470	1821	29076	12540	4433	12984	
5166	36579	1271	67140	16354	19575	13077	51097	2015	21542	13505	4091	10106	276	1060079	3514	1458	25200	10154	3635	11367	
5172	36896	1254	60964	15362	18719	12469	49505	1717	21278	13298	3223	9939	184	101743	3974	1307	26436	10144	3429	11520	
5178	39680	1484	65648	16841	19943	13256	51551	1621	24535	13992	3287	11414	165	106980	3357	1350	26025	10544	3278	11304	
5184	37099	1454	66648	16452	19230	13072	51232	1640	22552	13711	3983	10282	181	104761	3366	1460	27420	12172	3373	12438	
5190	38564	1617	73470	17816	22008	13952	54042	1880	25817	13591	4477	11801	227	103038	4103	1644	29064	13896	4058	13637	
5196	39706	1736	73470	17816	22008	13952	54042	1880	25817	13591	4477	11801	227	103038	4103	1644	29064	13896	4058	13637	
5202	40462	1359	74439	18487	22437	14362	55047	2048	26240	13509	4155	12295	250	105063	3617	1531	30622	13443	3844	14168	
5208	40496	1626	74349	18487	22437	14362	55047	2048	26240	13509	4155	12295	250	105063	3617	1531	30622	13443	3844	14168	
5214	40965	2002	76513	19338	22982	14493	56134	2204	29135	13966											

Table 2: Flux ( $E-16 \text{ erg/cm}^2 \cdot \text{s} \cdot \text{\AA}$ ) (continued)

$\lambda$	Hip 689	Hip 1055	Hip 1056	Hip 1057	Hip 1058	Hip 11253	Hip 11352	Hip 12552	Hip 14230	Hip 14669	Hip 17491	HD 15811	AD Leo	Hip 51945	Wolf 424	Hip 64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77725	Hip 78864
5274	38750	2123	69695	18661	21791	13461	2524	27410	53707	2829	30455	13259	6205	12954	355	100840	5173	2147	31148	15720	5157	15450
5280	40505	2225	77704	19387	23309	14101	56718	30455	56718	2829	30455	13259	6550	12954	342	96514	5451	2301	32232	16653	5718	15770
5286	42141	2470	76998	19925	24026	14634	58785	3018	58785	3018	30843	13549	6871	13549	412	100913	5661	2450	33683	17142	6120	16591
5292	42327	2380	80224	20173	24317	15035	59180	3032	59180	3032	32874	14248	6749	13520	423	105918	5631	2417	33793	16596	6234	16069
5304	40253	2268	77095	19828	23778	14736	58554	2824	58554	2824	30601	13533	6425	13520	405	102403	5273	2288	33051	16541	5774	16069
5308	41650	2477	77815	19858	24256	14808	59857	3013	59857	3013	31883	13539	6935	13460	411	108881	5854	2469	34332	17468	6179	16481
5310	42485	2567	82488	20080	24605	15250	60378	3061	60378	3061	32991	13821	6935	13800	436	100930	5961	2603	35326	17745	6479	16994
5316	41670	2447	83044	20112	24862	15016	60920	3117	60920	3117	32815	13412	6951	13332	408	101297	5995	2552	34674	16977	6600	16998
5322	40170	2178	79036	19421	23600	14287	56209	3073	56209	3073	31817	13312	6732	12560	396	99090	5639	2349	32602	15404	6211	15467
5328	39213	2152	75323	19131	22791	13922	54514	2720	54514	2720	28831	13077	6405	13045	403	98773	5161	2148	31964	15997	5437	15583
5334	40917	2352	79374	19776	23987	14282	56921	2909	56921	2909	30504	13293	6766	13045	403	100074	5596	2444	33077	16423	5970	16186
5340	40477	2296	76223	19715	24184	14580	56996	3012	56996	3012	31302	13839	6768	12822	412	99120	5603	2342	32800	16516	5948	15850
5346	41156	2364	78107	19883	24284	14523	57307	3014	57307	3014	31525	13423	6984	13164	446	98521	5605	2445	33827	16792	6060	16093
5352	42295	2666	76801	20536	24973	14676	59524	3188	59524	3188	32702	14122	7587	13619	473	100179	6243	2645	35082	17926	6517	16962
5358	42896	2690	78455	20576	24913	15043	61199	3416	61199	3416	34067	14025	7616	13731	483	101445	6197	2672	34721	17604	6937	17183
5364	41000	2480	78896	19974	24035	14926	59116	3351	59116	3351	32426	13494	7345	12846	456	100080	5907	2517	31768	16243	6164	16028
5370	39608	2359	76924	19648	23483	14320	56136	3304	56136	3304	30830	13084	7423	12648	472	98590	5669	2822	33696	17566	6703	17163
5376	41091	2661	77438	19975	23980	14449	59862	3619	59862	3619	32771	13461	7912	13470	494	98697	6695	2811	34336	16634	6943	17148
5382	41606	2562	78472	19989	24154	14492	59271	3629	59271	3629	32665	13625	8144	13325	521	99085	6650	2756	33720	16397	6937	17078
5388	40271	2429	75906	19301	23498	14388	57997	3390	57997	3390	31143	13287	7904	12608	507	95378	6245	2574	32052	16692	6397	16045
5400	39463	2416	74254	19167	22975	14156	57074	3268	57074	3268	29444	13196	7923	12408	507	95378	6247	2514	32059	16599	6344	15938
5406	39239	2351	73532	19176	22951	13824	56232	3237	56232	3237	28868	13016	7866	12488	530	96112	6018	2463	32213	16025	5964	15491
5412	39451	2577	73513	19393	23421	13982	56232	3519	56232	3519	29999	13007	8098	12800	519	95282	6344	2872	32583	16966	6645	16519
5418	40311	2710	76780	20051	24200	14298	57805	3792	57805	3792	31975	13365	8745	13222	548	98358	6747	2906	33899	17193	7364	17016
5424	40843	2639	75251	20468	24176	14310	57758	3734	57758	3734	31653	13163	8505	12947	556	98140	6669	2903	33729	16863	7238	16866
5430	41372	2502	77358	19971	23843	14174	56859	3619	56859	3619	31105	12960	8197	12809	556	97533	6323	2833	32852	16137	6501	16241
5436	41250	2616	76740	19901	24157	14549	58296	3675	58296	3675	30884	13149	8344	13089	553	95737	6732	2774	33902	17559	6823	16681
5442	41638	2672	77553	19992	24441	14867	58774	3529	58774	3529	32840	13654	8381	13395	581	95246	6923	2906	34469	17403	7063	16882
5448	40753	2506	76093	20404	24834	14722	58801	3258	58801	3258	31756	13150	7075	13111	505	93690	5962	2586	33923	17405	6216	16981
5454	42157	2514	79241	20308	24519	14436	58055	2987	58055	2987	32510	13298	8097	13439	355	97966	5846	2747	33649	17013	6288	16694
5460	41782	2694	77802	20043	24211	14448	58474	2978	58474	2978	32812	13296	8268	13329	354	98690	6040	2814	34489	17382	6691	16994
5466	41170	2801	78625	20560	24210	14468	59166	3114	59166	3114	31938	13139	8268	13271	338	96157	6202	2763	34821	17781	7033	17120
5472	40946	2690	78398	20213	23890	14716	57969	3261	57969	3261	31718	13241	7907	13273	363	96045	6469	2781	33743	16899	6950	16825
5478	40624	2682	76217	20048	24170	14452	57727	3293	57727	3293	31219	13064	7133	12926	384	94270	6291	2757	33199	16826	6638	17059
5484	40864	2804	77902	20343	24568	14584	58824	3389	58824	3389	31682	13304	7375	13296	392	95479	6523	2864	34742	17659	6919	17382
5490	41005	2828	79248	20544	24849	14592	58769	3427	58769	3427	31687	13356	7491	13399	396	96332	6636	2801	35043	17978	7255	17378
5496	41602	2799	78181	20600	24364	14675	58155	3371	58155	3371	31540	13318	7027	13499	377	94649	6486	2840	34384	17793	7094	17157
5502	41824	2738	76857	20259	24232	14502	58703	3147	58703	3147	30949	13309	6372	13353	305	93321	6225	2769	34682	17448	6896	17429
5508	41008	2690	76340	20206	24425	14502	58349	3107	58349	3107	30850	13274	6358	13150	265	94301	6195	2717	34682	17527	6757	17181
5514	41138	2651	76290	20549	24853	14530	58430	3189	58430	3189	30652	13171	6512	13312	248	94904	6261	2721	34126	17473	6691	17111
5520	42194	2901	77977	20652	24404	14685	58461	3371	58461	3371	31100	13180	6766	13513	237	93870	6735	2943	34047	17732	7470	17221
5526	41412	2984	78929	20668	24069	14519	57875	3444	57875	3444	31049	13069	6894	13301	231	93827	6679	2930	33536	16819	7391	16824
5532	40639	2864	77179	20325	24442	14461	57950	3461	57950	3461	30516	12928	6774	13197	230	92327	6812	3030	33781	18091	7387	17715
5538	40974	2990	77320	20422	24548	14536	58696	3537	58696	3537	30513	12994	6676	13411	195	93380	6862	2973	34237	18091	7387	17715
5544	41265	3035	77627	20632	24306	14719	59370	3574	59370	3574	30294	12984	6717	13525	203	94822	7069	3060	35442	18059	7467	18044
5550	41265	3023	77893	20502	24341	14800	59028	3621	59028	3621	30278	12984	6717	13525	203	94822	7031	3050	34737	18222	7726	17978
5556	41166	2912	77040	20203	23995	14713	57919	3568	57919	3568	30472	13163	6988	13649	232	93685	7082	3017	34769	17788	7766	17802
5562	40564	2829	76311	20017	23787	14495	57263	3577	57263	3577	30617	12904	7274	13237	295	93827	6849	2960	33702	17156	7462	16961
5568	40004	2807	74908	19742	23688	14240	56472	3462	56472	3462	29858	12723	7221	12840	338	90822	6717	2873	33275	17145	7235	16864
5574	40193	2769	74378	19632	23883	14084	56034	3424	56034	3424	29848	12635	7613	12933	386	91686	6852	3011	33516	17453	7409	17300
5580	39997	2728	73942	19177	23069	14010	55874	3311	55874	3311	29651	12498	7432	12786	394	90734	6957	3018	33760	17170	7503	17105
5586	39140	2636	72047	18907	22570	13686	55041	3311	55041	3311	29651	12498	7432	12786	394	90734	6957	3018	33760	17170	7503	17105
5592	38703	2654	71987	19019	23069	13737	55209	3323	55209	3323	29184	12368	6984	12933	392	88849	6286	2648	32504	16727		





Table 2: Flux (E-16 erg/cm<sup>2</sup>.s.Å) (continued)

$\lambda$	Hip 689	Hip 1055	Hip 4809	Hip 11253	Hip 11352	Hip 12552	Hip 14230	Hip 14669	Hip 17491	HD 25811	AD Lee	Hip 51945	Wolf 424	Hip 64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77725	Hip 78864
6090	36029	3105	70884	18790	11352	12552	14230	14669	17491	HD 25811	AD Lee	Hip 51945	Wolf 424	Hip 64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77725	Hip 78864
6096	35752	3127	71253	18622	22381	13004	52666	4575	31651	11172	9493	12460	492	74378	8406	3834	32730	17807	9029	17803
6102	35263	3152	71035	18668	22386	12743	52903	4497	31372	11109	9591	12312	497	73236	8339	3744	32460	17630	8631	17804
6108	35690	3101	70949	19084	22233	12720	52550	4504	31456	11100	9371	12402	483	72827	8298	3689	32680	17709	8769	17801
6114	36968	2999	70803	19074	22037	12830	51920	4366	31321	11053	9243	12450	467	73081	8147	3572	32338	17544	8560	17834
6120	36597	2965	69836	18603	22288	12836	52052	4303	31170	11012	9080	12340	470	73639	8012	3530	32075	17286	8295	16984
6126	35333	2984	69058	18227	22060	12789	51776	4469	30982	10941	9227	12158	478	72367	7852	3456	32176	17307	8389	17193
6132	34493	3015	68644	18238	21402	12540	50949	4610	30395	10883	9514	12102	460	70083	8209	3722	31808	17188	8654	17116
6138	34032	3081	68755	18352	21383	12414	50509	4674	30127	10779	9684	12161	460	70226	8419	3772	31546	17081	8645	17075
6144	34443	2888	69091	18379	21953	12638	51236	4644	30481	10674	9484	12255	431	69756	8369	3765	31884	17249	8460	17097
6150	34123	3089	69173	18333	22063	12732	51492	4316	30712	10736	9720	12134	403	69756	7859	3525	31732	17142	8536	16782
6156	33640	2644	69778	18060	21390	12540	50679	3745	30178	10693	7566	11871	357	69907	6928	3056	30858	16554	7232	16173
6162	33865	2623	67136	17790	21112	12140	49540	3303	29169	10564	6619	11688	310	69091	6528	2892	30354	16164	7321	13951
6168	34250	2804	67707	17769	21655	12088	49872	3322	29810	10597	6630	12013	281	69972	6335	3138	30650	16334	7776	16270
6174	34443	2943	68760	18245	21915	12413	50557	3548	30490	10688	6241	12162	254	69025	6799	3320	31448	16947	8084	16719
6180	34670	2945	69592	18295	21750	12534	50263	3548	30490	10741	6196	12164	254	69561	6916	3314	31735	17186	8064	16808
6186	34852	2901	68419	18297	21800	12395	49754	3351	30722	10812	5973	11921	235	69853	6599	3219	31708	17021	8031	16763
6192	34582	2887	68400	18631	21823	12283	50174	3221	30676	10684	6043	12104	244	69631	6467	3240	32162	17040	8081	16890
6198	34553	2824	70102	18894	21703	12378	50804	3221	30698	10604	5924	12056	256	71048	6766	3371	32054	17132	7994	16784
6204	34562	2884	70412	18430	21812	12498	51241	3425	30748	10524	6064	12264	243	69196	6677	3251	31783	17156	7983	16481
6210	33826	2766	68267	17975	21876	12528	50977	3306	30617	10389	5820	12050	254	67956	6528	3090	31269	16908	7598	16228
6216	33348	2707	67405	18189	21573	12411	50767	3077	29866	10252	5184	11789	209	68036	5946	2987	31052	16722	7428	16220
6222	33327	2707	67005	18267	21109	12236	50198	2927	29056	10464	5111	11669	211	67629	5694	2987	30804	16722	7339	16294
6228	33132	2725	67001	17833	20919	12126	49474	2865	29540	10314	5145	11789	218	69332	5713	2946	30427	16639	7259	16165
6234	32528	2729	67761	17635	21328	12106	50264	2912	29153	10368	5267	11725	245	67866	5791	2945	30648	16762	7296	16241
6240	32507	2712	67189	17494	21195	12043	50357	3030	28865	10244	5443	11618	245	67469	5984	2967	30531	16420	7403	16191
6246	32507	2680	68125	17282	20647	11872	49656	3161	28623	10264	5588	11528	268	66607	6116	2984	29942	16250	7350	15997
6252	32166	2675	65165	17627	20533	11791	49326	3239	28064	10177	5899	11518	267	65710	6079	2957	29717	16275	7321	15813
6258	32347	2694	66332	17703	20738	11841	49626	3238	29064	10177	6294	11524	277	66829	6103	3039	30001	16495	7492	16046
6264	32946	2704	66948	17301	20541	11921	49198	3314	29146	10026	6523	11736	298	67171	6428	3119	30393	16653	7726	16183
6270	32840	2745	66948	17301	20541	11921	49198	3314	29146	10026	6523	11736	298	67171	6428	3119	30393	16653	7726	16183
6276	32191	2812	65768	17399	20859	11896	49189	3328	28720	9857	6590	11611	289	66262	6453	3147	29854	16504	7813	15881
6282	31876	2884	66297	17399	21038	11896	49189	3328	28720	9857	6590	11611	289	66262	6453	3147	29854	16504	7813	15881
6288	31684	2856	66981	17548	20868	11780	49893	3721	29457	9992	7297	11527	347	63862	6910	3278	30158	16480	7916	16208
6294	31979	2865	66584	17380	20531	11583	49017	3739	29617	10002	7545	11507	401	65409	6855	3280	29966	16017	7946	16029
6300	32082	2823	65526	17247	20660	11584	48424	3924	28995	9920	8088	11431	417	65460	6972	3327	30098	16061	8185	16288
6306	31798	2882	65116	16888	20992	11646	48018	4076	28449	9868	8540	11462	419	65080	7319	3446	30286	16011	8288	16220
6312	31332	2884	64138	16824	20845	11573	47197	4178	28195	9846	9009	11387	485	64596	7438	3447	29793	15915	8345	15997
6318	31188	2917	65444	17104	20403	11484	47367	4286	28099	10002	8971	11628	500	64759	7562	3500	30430	16190	8448	16607
6324	31525	2959	66576	17424	20694	11638	48657	4403	28759	10098	9113	11584	526	64238	7630	3500	30430	16190	8448	16607
6330	31593	2943	66297	17392	20629	11757	49235	4551	29259	10024	9663	11567	567	65080	7771	3539	30437	15960	8705	16634
6336	31914	2946	65536	17366	20427	11581	48963	4633	29015	9968	9967	11564	617	64079	7982	3660	29806	15960	8705	16634
6342	31985	2991	65596	17221	20752	11580	49174	4669	29001	9940	10297	11607	638	62383	8141	3668	28612	16451	8789	16510
6348	31950	3013	66648	17312	20752	11580	49174	4669	29001	9940	10297	11607	638	62383	8141	3668	28612	16451	8789	16510
6354	31970	3039	66697	17433	20906	11346	48685	4468	28724	10016	9491	11628	593	63820	7671	3567	29727	16223	8449	16162
6360	31557	3024	66765	17321	21120	11668	49612	4610	29338	9932	10160	11791	613	64420	7882	3584	30017	16320	8449	16162
6366	31557	3024	66765	17321	21120	11668	49612	4610	29338	9932	10160	11791	613	64420	7882	3584	30017	16320	8449	16162
6372	31921	2961	67052	17892	21218	11772	49381	4524	29350	10086	9374	11728	606	63860	7705	3509	30160	16448	8309	16397
6378	32668	2968	67409	18024	21465	11851	49998	4462	29052	9883	8933	11590	579	64199	7098	3336	30473	16764	8528	16445
6384	32455	2904	68187	18023	21364	11752	50178	4396	28959	9966	9070	11532	600	62835	7236	3366	30513	16621	8250	16372
6390	31907	2906	67708	17788	21175	11660	49034	4416	28840	9923	9671	11304	610	62886	7646	3562	30037	16150	8862	16393
6396	31366	2976	66668	17642	20597	11574	48925	4665	28264	9908	10182	11361	716	62886	7646	3562	30037	16150	8862	16393
6402	30586	3059	65798	17562	20495	11467	49177	4913	28682	9901	10718	11263	719	63258	8090	3705	29720	16053	8903	16426
6408	30332	3059	65852	17331	20758	11370	48564	4994	28623	9859	11154	11263	719	63258	8090	3705	29720	16053	8903	16426
6414	30739	3067	65748	17369	21233	11428	48303	5086	28511	9774	11091	11259	719	62414	8234	3740	29764	16300	9137	16334
6420	30782	3120	66223	17856	21624	11436	48854	5176	28824	9943	11151	11488	687	63322	8178	3743	30001	16157	9138	16334
6426	31466	3126	66985	17622	21517	11421	49311	5215	29397	9643	11455	11488	703	62647	8195	3752	29982	16206	9137	16334
6432	31422	3081	66310	17531	21157	11329	48926	5186	29050	9747	11474	11467	735	60956	8128	3663	29966	16388	9037	16341

Table 2: Flux (E-16 erg/cm<sup>2</sup>.s.Å) (continued)

λ	Hip 689	Hip 1055	Hip 4809	Hip 11233	Hip 11352	Hip 12552	Hip 14230	Hip 14569	Hip 17491	HD 25811	AD Leo	Hip 51945	Wolf 424	Hip 64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77725	Hip 78564
6498	29918	3079	64410	16567	20244	10936	47280	5473	27735	9345	12582	10972	931	59164	8309	3791	25156	15392	9470	16279
6504	29692	3193	65489	17252	20705	10961	48429	5626	28279	9486	13252	11182	876	60161	8680	3879	29921	15926	9901	16593
6510	29443	3221	65472	17005	20293	11114	48092	5684	28500	9270	13765	11268	1011	59931	8928	3959	29828	15961	9945	16743
6516	29443	3239	65825	16765	20529	11246	48925	5839	28403	9033	13951	11268	1058	59283	9143	3992	29364	15879	9945	16753
6522	29772	3288	65582	17235	20879	11044	47739	5980	28786	9101	14241	11080	1105	58640	9145	4049	29214	16100	10069	16764
6528	30324	3348	65660	17391	21011	11043	47973	6065	29136	9204	14241	11080	1188	57125	9308	4089	29352	16184	10068	16678
6534	30614	3270	66948	16967	20957	11063	48693	6173	28979	9125	15163	11047	1233	56996	9317	4140	29467	16186	10061	16703
6540	29980	3215	65948	16875	20695	10946	48522	6168	28930	8878	14804	11140	1230	56773	9228	4076	29127	16092	9967	16755
6546	29363	3264	66088	17000	20394	10628	46487	5953	28625	8540	14436	10895	1132	56603	9041	3992	28556	15704	9796	16831
6552	28084	3210	63366	16165	19482	10311	43914	5781	27638	7545	15292	10296	1177	54663	8810	3935	27382	15090	9423	15893
6558	25296	3111	57419	14717	18059	9578	41041	5714	26637	6571	17037	9614	1370	40196	8676	3890	25473	14400	9508	15319
6564	24494	3148	59471	14809	18016	8950	40122	5714	25432	6492	15565	10074	1188	42201	8656	3897	26173	14843	9606	15598
6570	26657	3204	63260	16439	19453	9680	43335	5685	26569	7405	13751	10601	974	49309	8636	3869	28058	15529	9697	15925
6576	28253	3222	64343	17106	20289	10405	46263	5734	28429	8182	13315	10974	918	53513	8810	3977	28053	15838	9885	16117
6582	28858	3238	65196	17024	20567	10735	47833	5808	29035	8655	13564	11159	918	54614	8947	4035	29060	15858	9948	16415
6588	29058	3248	65446	16849	20665	10708	47475	5770	28680	8873	13511	10966	912	55491	8813	3950	28752	15848	9884	16592
6594	29083	3276	65953	16938	20931	10651	47492	5680	28343	8935	13121	11218	906	57192	8843	4022	29007	16031	10069	16584
6600	29353	3309	66620	17220	20896	10698	47883	6090	28465	9004	13134	11244	886	57048	8847	4049	29537	16112	10093	16554
6606	29599	3272	67404	16959	20511	10790	47934	5761	28526	9062	13195	11088	864	57356	8841	4010	29378	16026	9959	16665
6612	30183	3261	66933	16927	20733	10798	47934	5761	28357	9072	12731	11304	865	57840	8841	4010	29378	16026	9959	16665
6618	30083	3271	66144	17270	21086	10967	48816	5713	28692	9201	12552	11071	797	56529	8791	3990	28996	16180	9905	16803
6624	29732	3261	65906	17392	21492	11067	48813	5622	29132	9401	12028	11036	773	57956	8654	4004	29114	16233	9913	16860
6630	29170	3259	65948	17214	21323	10905	48266	5490	28900	9370	11778	11052	735	58348	8595	3984	29660	16140	10085	16695
6636	28846	3296	66039	17017	21029	10832	48052	5475	28347	9323	12074	11229	769	57774	8643	4010	28766	16140	10085	16695
6642	29319	3303	66363	17145	20859	10838	47834	5345	28174	9278	11767	11327	709	57728	8599	4032	29789	16237	9951	16544
6648	29785	3228	66101	16934	20820	10920	48278	5143	28440	9158	10922	11495	613	57573	8390	3978	29399	16183	9969	16485
6654	30078	3237	66034	16811	21003	10919	48677	4922	28327	9159	10676	11087	651	58131	8245	3921	29304	15904	9866	16579
6660	28717	3294	67032	17512	21250	10828	48439	5094	28354	9313	10951	11094	674	57665	8225	3897	29207	16180	9792	16634
6666	28659	3259	66537	17282	21111	10624	48779	5055	28647	9360	10761	11439	672	58174	8204	3867	29207	16180	9792	16634
6672	28659	3259	66537	17282	21111	10624	48779	5055	28647	9360	10761	11439	672	58174	8204	3867	29207	16180	9792	16634
6678	29140	3185	65668	16652	20668	10679	48616	4826	28577	9104	10059	11405	569	57564	7725	3773	28670	16035	9697	16416
6684	28788	3185	65668	17177	21100	10716	48664	4648	28654	9001	9607	11405	569	57564	7725	3773	28670	16035	9697	16416
6690	28747	3144	67898	17347	20597	10632	48064	4584	28438	9192	9603	11185	561	57559	7621	3726	28579	15879	9614	16424
6696	28793	3152	66615	16896	20443	10667	47955	4724	27792	9196	9961	11057	604	57979	7750	3737	29112	15501	9710	16424
6702	28668	3177	65398	16785	20624	10808	47907	4835	27803	9106	10223	11124	629	56913	7924	3759	29292	15832	9358	16383
6708	28543	3088	65678	16859	20637	10800	47154	4614	28028	9094	10846	10700	622	57222	7821	3648	29230	15791	9318	16311
6714	27118	3115	52585	16976	21102	10578	47084	4614	27826	9031	8861	11036	532	57485	7360	3482	28457	15418	9034	16297
6720	27924	3148	56985	17116	20996	10711	46863	4327	27826	9031	8861	11036	532	57485	7360	3482	28457	15418	9034	16297
6726	28615	3161	67813	16826	20412	10654	46981	4349	28147	9057	9194	11060	507	57000	7168	3522	29497	15865	9368	16464
6732	29188	3196	67792	16991	20881	10666	48009	4463	27610	9201	9283	11225	551	56920	7291	3581	28997	15987	9372	16274
6738	29116	3140	67726	17753	21353	10552	48111	4533	27791	9221	9283	11263	551	56920	7428	3581	28664	15814	9313	16144
6744	28646	3054	67704	17784	21284	10678	48336	4398	27733	9044	9053	11173	534	57347	7462	3551	28253	16224	9222	16381
6750	28530	3104	67312	17849	21029	10621	47137	4420	27726	9074	9184	11164	567	58202	7253	3552	29446	15896	9148	16328
6756	28924	3181	67397	17600	20739	10631	47632	4420	28018	9084	9281	11273	567	57497	7260	3554	29214	15905	9212	16359
6762	29163	3174	68589	17003	20992	10625	48213	4405	28525	9137	9656	11355	641	58988	7514	3602	28519	15985	9352	16566
6768	28960	3229	68408	17226	21176	10506	46328	4470	28523	9185	9746	11185	670	57659	7903	3593	28946	15832	9352	16566
6774	28122	3218	68097	17124	21150	10531	49424	4536	28422	9081	9411	11980	675	58520	7468	3569	28946	15832	9352	16566
6780	28179	3187	68694	17174	21058	10745	48284	4496	28394	9115	9411	11422	605	57406	7197	3462	29199	15832	9352	16566
6786	27756	3196	67045	17174	21188	10732	47440	4303	27853	9083	9261	11186	563	57431	6999	3462	29199	15832	9352	16566
6792	28615	3118	67861	16929	21013	10599	47678	4272	27904	9034	9135	11411	626	58273	7010	3435	28221	16208	9070	16386
6798	29009	3150	67822	16865	20932	10603	47504	4283	27916	9087	9317	11236	640	58903	7010	3435	28221	16208	9070	16386
6804	29118	3115	67711	17114	20890	10540	48111	4408	28312	9132	9555	11080	637	57474	7034	3492	28343	16203	9013	16484
6810	28963	3112	68911	17126	21039	10697	48911	4366	28168	9213	9407	11019	653	58050	7012	3482	29389	16313	9068	16384
6816	28879	3105	68534	17370	20682	10541	47195	4306	27704	8897	9631	11358	641	58008	7021	3472	28964	16205	8981	16384
6822	28789	3135	68694	17697	20581	10426	47084	4500	28203	8962	9592	11358	688	58008	7142	3450	28930	16097	8737	16234
6828	28789	3135	68694	17697	20581	10426	47084	4500	28203	8962	9592	11358	688	58008	7142	3450	28930	16097	8737	16234
6834	28789	3135	68694	17697	20581	10426	47084	4500	28203	8962	9592	11358	688	58008	7142	3450	28930	16097	8737	16234
6840	27439	3099	67201	16753	20512	10547	46930	4509	28253	8705	9667	11016	669	58263	7086	3419	28930	15552	8638	1





Table 2: Flux ( $E-16 \text{ erg/cm}^2 \cdot \text{s} \cdot \text{\AA}$ ) (continued)

$\lambda$	Hip 689	Hip 1055	Hip 4809	Hip 11253	Hip 11352	Hip 12552	Hip 14230	Hip 14669	Hip 17491	HD 26811	AD Leo	Hip 51945	Wolf 424	Hip 64838	Hip 65011	Hip 66008	Hip 70973	Hip 72479	Hip 77225	Hip 78864
7314	22674	3417	59163	13698	17395	8270	39182	7052	23549	6971	19878	9416	2045	45239	9495	4205	23932	13072	11058	14370
7320	22684	3395	59669	14167	17444	8250	39787	6903	23186	7008	19817	9631	2152	45602	9583	4196	23865	12767	10864	14419
7326	22730	3428	59499	14592	16969	8141	39590	6925	23306	7048	20293	9874	2214	46059	9589	4281	23981	13352	11195	14704
7332	22457	3514	60958	14592	17470	8464	39834	7242	24171	7054	20993	9846	2303	46082	9730	4344	24765	13693	11241	14739
7338	22654	3509	62120	14652	17814	8640	39854	7515	24513	7223	20990	9832	2335	46586	9900	4412	24754	13636	11051	14662
7344	22879	3433	62974	14572	17693	8649	39766	7347	24414	7204	21178	9839	2348	46182	9886	4412	24589	13480	11233	14664
7350	22850	3403	59847	14073	17285	8551	39135	7255	23902	7254	21209	9485	2410	45165	9942	4310	23893	13313	11076	14043
7356	22740	3445	58648	13847	17252	8343	39135	7255	23902	7162	21466	9504	2481	45291	9815	4265	24031	13466	11184	14155
7362	22695	3460	58542	14141	17211	8221	39466	7431	23977	6889	21856	9551	2559	45291	9815	4265	24031	13466	11184	14155
7368	22804	3527	58076	14250	17213	8251	39466	7431	23977	6889	21856	9551	2559	45291	9815	4265	24031	13466	11184	14155
7374	22510	3551	59315	13802	17213	8251	39466	7431	23977	6889	21856	9551	2559	45291	9815	4265	24031	13466	11184	14155
7380	22044	3514	59074	13804	17263	8307	39181	7859	24409	6913	22531	9456	2676	46166	10000	4424	24529	13660	11554	14970
7386	21796	3559	58281	13802	17947	8198	39680	7797	23976	7054	22819	9298	2752	45445	10101	4352	23731	13106	11697	14195
7392	21796	3559	58281	13802	17947	8198	39680	7797	23976	7054	22819	9298	2752	45445	10101	4352	23731	13106	11697	14195
7398	21796	3559	58281	13802	17947	8198	39680	7797	23976	7054	22819	9298	2752	45445	10101	4352	23731	13106	11697	14195
7404	21924	3548	58339	13404	18082	8466	41030	7927	23287	7139	22938	9224	2710	44838	9902	4392	23995	13203	11316	14183
7410	21918	3576	57774	13717	17301	8217	39299	7879	23287	7157	23119	9224	2710	44780	9931	4392	23995	13203	11316	14183
7416	21308	3540	58158	14081	17388	8132	39491	8053	23420	6846	23365	9408	2715	44764	9930	4394	23971	12905	11426	14256
7422	21052	3531	59472	14165	17638	8523	40050	8065	23561	6852	23705	9272	2855	42950	10123	4388	24063	13471	11741	14735
7428	21340	3566	59674	14234	17802	8118	39712	8143	23109	7179	23743	9410	2765	42950	10123	4388	24063	13471	11741	14735
7434	21656	3579	59463	14081	17908	8331	39641	8121	23486	6990	23468	9488	2858	43463	10235	4401	23965	13324	11483	14511
7440	21637	3617	60071	14141	17908	8331	39641	8121	23486	6990	23468	9488	2858	43463	10235	4401	23965	13324	11483	14511
7446	21580	3660	59580	14213	17040	8093	38266	8064	23136	6684	23765	9256	2810	42943	10087	4380	23509	13029	11574	14979
7452	21708	3654	58732	14580	16988	8299	38636	8046	23703	7052	23757	9256	2810	42943	10087	4380	23509	13029	11574	14979
7458	21981	3631	58710	13685	16691	8232	39693	8081	23172	7095	23705	9222	2855	42950	10123	4388	24063	13471	11741	14735
7464	21981	3631	58710	13685	16691	8232	39693	8081	23172	7095	23705	9222	2855	42950	10123	4388	24063	13471	11741	14735
7470	21532	3612	58572	14110	17801	8191	39493	8298	23156	6801	23928	9392	2869	43833	10242	4458	24016	12861	11807	14363
7476	21317	3660	57073	14110	17801	8191	39493	8298	23156	6801	23928	9392	2869	43833	10242	4458	24016	12861	11807	14363
7482	21478	3489	57560	14185	17672	8200	39662	8112	23718	6593	23966	9277	2878	43267	10242	4458	24016	12861	11807	14363
7488	21140	3537	59592	14446	17611	8140	39047	8144	23280	6815	24107	9326	2925	42266	10180	4398	23554	12858	11714	14226
7494	20919	3609	60109	14194	17989	8058	38842	8216	23257	6731	24904	9339	3028	43277	10337	4412	23102	13079	11806	14237
7500	21691	3537	59926	13868	17510	8197	39400	8298	23192	6782	24904	9339	3028	43277	10337	4412	23102	13079	11806	14237
7506	22109	3494	58061	13682	16697	8154	37892	8155	22883	6541	24341	9227	3034	43460	10346	4364	23036	12704	11659	14373
7512	21148	3573	57309	13335	16952	7681	37981	8299	23442	6541	24341	9227	3034	43460	10346	4364	23036	12704	11659	14373
7518	20973	3566	58969	13337	17063	7971	37992	8353	23081	6673	25082	9293	3039	43271	10427	4485	22814	12526	11745	14292
7524	20740	3665	58015	13784	17205	8037	38142	8362	22553	6562	25874	9260	3173	41819	10293	4485	22814	12526	11745	14292
7530	20740	3665	58015	13784	17205	8037	38142	8362	22553	6562	25874	9260	3173	41819	10293	4485	22814	12526	11745	14292
7536	21245	3700	58461	13997	17098	7900	38220	8362	22553	6562	25874	9260	3173	41819	10293	4485	22814	12526	11745	14292
7542	21373	3648	59086	14213	16899	7821	37558	8552	22698	6673	25315	9163	3282	41966	10344	4503	23178	12856	11841	14401
7548	21659	3638	57941	14483	16724	7824	37358	8552	22698	6673	25315	9163	3282	41966	10344	4503	23178	12856	11841	14401
7554	21169	3579	57195	14213	16773	7952	37477	8510	22669	6740	25222	9196	3264	40708	10502	4539	22766	12778	11843	13866
7560	20299	3534	57721	13660	16537	7813	36924	8448	22902	6682	25122	9421	3254	41966	10548	4514	23053	12544	11893	14063
7566	20685	3610	58492	13540	16439	7869	36847	8408	23606	6768	25711	9197	3244	42395	10537	4487	22677	12640	11891	14292
7572	20779	3608	58598	13803	16484	7865	37277	8512	23398	6545	25896	8956	3277	41826	10537	4487	22677	12640	11891	14292
7578	20448	3462	58007	13420	16866	7791	37417	8273	22699	6505	25034	8848	3255	40836	10428	4509	23276	13045	11647	14072
7584	19701	2961	52758	11539	15989	7012	35129	7743	22114	6234	21195	8027	2857	39060	10011	4211	21774	12843	11043	13266
7590	15944	1980	38786	8559	12906	7012	19140	19140	5720	14950	14950	6023	2075	33218	8869	3408	17485	11219	6794	11080
7596	9937	1172	32854	5591	8424	5152	17321	6410	4338	3359	8709	4086	1285	23022	6627	2342	10406	7987	4930	7132
7602	6721	1052	18010	4150	5628	3224	10963	4338	2885	2449	8725	3408	874	15754	4300	1694	6666	4995	4113	4660
7608	7615	1408	22460	4820	5473	2634	12528	2808	1830	2101	11762	4101	1015	15234	3844	1842	7312	4676	5704	4918
7614	9822	1702	28903	6097	7775	3258	18216	3816	10606	2740	14213	4993	1437	19215	4990	2406	10842	5928	6992	7187
7620	10316	1663	30343	6420	8561	4002	18278	3836	12836	3343	13121	5023	1549	22445	6016	2627	12288	7167	6476	8048
7626	10004	1666	20460	6237	8158	3987	16876	4052	12574	3347	12139	4936	1308	21694	5976	2484	10946	6951	6741	7371
7632	10325	1665	30750	6465	8123	3798	17650	3933	12279	3335	12906	5095	1170	20691	5709	2465	10896	6952	6747	7178
7638	11672	1859	33521	7392	9042	3963	20184	4159	12877	3511	14165	5638	1259	21954	5847	2691	12415	7783	7916	8928
7644	12976	2086	37001	8466	10106	4409	23895	4702	14295	3739	15481	6356	1365	21516	6416	3018	14136	7965	8106	9328
7650	14250	2478	41543	9317	11174	5080	25916	5441	15865	4086	16488	6868	1426	29437	7245	3264	15345	8437	8836	9734
7656	14878	2777	45737	10657	12397	5546	28302	6273	17641	4947	16037	7535	1324	32444	7713	3387	17033	9520	9177	10146

Table 2: Flux ( E-16 erg/cm<sup>2</sup>.s.Å ) (continued)

$\lambda$	Hip	Hip	Hip	Hip	Hip	Hip	AD	Hip	Wolf	Hip	Hip	Hip	Hip	Hip	Hip	Hip	Hip	Hip				
722	20452	689	1055	4809	38843	13451	11252	12552	14230	14669	17481	25811	51945	424	64838	65011	60008	70973	12714	77275	78564	
728	19679	3839	59454	19679	38393	7375	23140	9368	1986	1886	42017	9917	4422	22192	422	422	422	422	422	422	13833	
734	19771	3720	59454	19679	38393	7375	23140	9368	1986	1886	42017	9917	4422	22192	422	422	422	422	422	422	14127	
738	19679	3839	59454	19679	38393	7375	23140	9368	1986	1886	42017	9917	4422	22192	422	422	422	422	422	422	14127	
740	19991	3600	58365	13451	11252	12552	14230	14669	17481	25811	51945	424	64838	65011	60008	70973	12714	77275	78564	14127	14127	
746	19991	3600	58365	13451	11252	12552	14230	14669	17481	25811	51945	424	64838	65011	60008	70973	12714	77275	78564	14127	14127	
752	19246	3675	58361	13451	11252	12552	14230	14669	17481	25811	51945	424	64838	65011	60008	70973	12714	77275	78564	14127	14127	
758	19246	3675	58361	13451	11252	12552	14230	14669	17481	25811	51945	424	64838	65011	60008	70973	12714	77275	78564	14127	14127	
764	20229	3654	60333	13571	16597	7842	37110	7096	9335	1908	39886	9826	4373	22995	3067	11867	14096	14096	14096	14096	14096	14096
770	20141	3664	59753	13592	16481	7702	37484	7261	37484	7261	22372	6140	20648	9350	1985	39599	9826	4373	22995	3067	11867	
776	20217	3647	58202	14002	16481	7702	37484	7261	37484	7261	22372	6140	20648	9350	1985	39599	9826	4373	22995	3067	11867	
782	19354	3626	57661	13638	16147	7688	37662	7149	21295	9335	1908	39886	9826	4373	22995	3067	11867	14096	14096	14096	14096	
788	19375	3644	57294	13740	16203	7674	36637	7287	22468	6583	20854	6414	20630	9423	2034	38998	9761	4404	23463	12798	13764	
794	19375	3644	57294	13740	16203	7674	36637	7287	22468	6583	20854	6414	20630	9423	2034	38998	9761	4404	23463	12798	13764	
798	19375	3644	57294	13740	16203	7674	36637	7287	22468	6583	20854	6414	20630	9423	2034	38998	9761	4404	23463	12798	13764	
804	19375	3644	57294	13740	16203	7674	36637	7287	22468	6583	20854	6414	20630	9423	2034	38998	9761	4404	23463	12798	13764	
808	19375	3644	57294	13740	16203	7674	36637	7287	22468	6583	20854	6414	20630	9423	2034	38998	9761	4404	23463	12798	13764	
812	19350	3605	58485	13646	16896	7794	37620	7888	22074	6479	21594	8829	2276	39802	10053	4434	22969	12441	11509	12687	13999	
818	19350	3605	58485	13646	16896	7794	37620	7888	22074	6479	21594	8829	2276	39802	10053	4434	22969	12441	11509	12687	13999	
824	19243	3538	58800	12760	16384	7498	37083	7498	22623	6293	20927	9159	2146	40708	10113	4382	22784	12860	11835	14748	14748	
830	18688	3617	59080	12760	16384	7498	37083	7498	22623	6293	20927	9159	2146	40708	10113	4382	22784	12860	11835	14748	14748	
836	18688	3617	59080	12760	16384	7498	37083	7498	22623	6293	20927	9159	2146	40708	10113	4382	22784	12860	11835	14748	14748	
842	19149	3653	58200	12878	16559	7383	37584	7297	22654	6369	21591	8570	2162	39850	9739	4254	22644	12377	11920	14146	14146	
848	19149	3653	58200	12878	16559	7383	37584	7297	22654	6369	21591	8570	2162	39850	9739	4254	22644	12377	11920	14146	14146	
854	19106	3674	55973	13159	16852	7326	36486	7562	22437	6037	21671	8746	22960	40220	9479	4394	22306	12696	11938	13879	13879	
860	19472	3623	55747	13444	16242	7374	36988	7069	22437	6037	21671	8746	22960	40220	9479	4394	22306	12696	11938	13879	13879	
866	18687	3620	56401	13262	16204	7289	37010	7610	22797	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
872	18992	3620	56401	13262	16204	7289	37010	7610	22797	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
878	18992	3620	56401	13262	16204	7289	37010	7610	22797	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
884	18956	3586	55975	12851	15779	7396	36280	7652	22176	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
890	18956	3586	55975	12851	15779	7396	36280	7652	22176	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
896	18956	3586	55975	12851	15779	7396	36280	7652	22176	6124	22206	8662	2348	38681	9864	4403	22406	12887	11798	13897	13897	
902	18556	3633	60676	12741	15939	7454	36334	7875	21708	6048	22510	8660	2475	38702	10028	4418	21858	12492	11813	13709	13709	
908	18556	3633	60676	12741	15939	7454	36334	7875	21708	6048	22510	8660	2475	38702	10028	4418	21858	12492	11813	13709	13709	
914	18273	3529	54426	12806	16012	7556	36260	7728	21124	6054	22382	8468	2436	37619	9817	4394	21536	12230	11941	14043	14043	
920	18488	3518	53595	12944	16075	7390	36589	7710	21824	6022	22674	8605	2406	37582	9968	4374	21474	12130	11843	13535	13535	
926	17192	3495	53327	12580	15704	7175	36069	7772	21427	6042	23063	8279	2490	36224	10013	4382	21067	11599	11654	12975	12975	
932	16443	3460	53789	12238	15366	7088	36059	7787	19954	5968	23063	8279	2490	36224	10013	4382	21067	11599	11654	12975	12975	
938	17831	3415	54485	12414	15477	7078	34579	7666	20551	5953	22762	8251	2569	36314	9822	4238	20617	11516	11455	13003	13003	
944	17831	3415	54485	12414	15477	7078	34579	7666	20551	5953	22762	8251	2569	36314	9822	4238	20617	11516	11455	13003	13003	
950	17134	3414	54182	11872	15096	7125	34108	7644	21245	6018	23733	8038	2632	37333	9867	4310	21629	11840	11553	13273	13273	
956	17682	3393	54902	12621	15028	7278	35383	7931	21269	5835	23810	8169	2632	37486	10020	4392	20486	12001	11514	13110	13110	
962	17832	3392	54902	12621	15028	7278	35383	7931	21269	5835	23810	8169	2632	37486	10020	4392	20486	12001	11514	13110	13110	
968	18283	3556	55259	12657	14603	7063	33553	7959	20954	5641	23733	8038	2632	37486	10020	4392	20486	12001	11514	13110	13110	
974	18034	3609	55940	13045	14818	6914	34201	8002	21123	5711	23944	8135	2804	36672	10152	4380	20813	12010	11603	13356	13356	
980	18076	3501	55144	12888	14918	6886	34948	8002	21123	5711	23944	8135	2804	36672	10152	4380	20813	12010	11603	13356	13356	
986	17824	3479	53614	12203	14915	7075	34597	7978	21585	5687	24622	8412	2869	37245	9896	4317	21097	11757	11598	13303	13303	
992	17248	3479	53614	12203	14915	7075	34597	7978	21585	5687	24622	8412	2869	37245	9896	4317	21097	11757	11598	13303	13303	
998	17248	3479	53614	12203	14915	7075	34597	7978	21585	5687	24622	8412	2869	37245	9896	4317	21097	11757	11598	13303	13303	
1004	16743	3503	53301	11900	14488	6944	33806	7902	20551	5953	22762	8251	2569	36314	9822	4238	20617	11516	11455	13003	13003	
1010	16008	3610	53407	11528	14488	6944	33806	7902	20551	5953	22762	8251	2569	36314	9822	4238	20617	11516	11455	13003	13003	
1016	16008	3610	53407	11528	14488	6944	33806	7902	20551	5953	22762	8251	2569	36314	9822	4238	20617	11516	11455	13003	13003	
1022	16903	3450	52209	12002	14621	6806	33294	8126	20721	5675	24726	8320	3134	36142	10176	4251	20408	11544	11453	13179	13179	
1028	16903	3450	52209	12002	14621	6806	33294	8126	20721	5675	24726	8320	3134	36142	10176	4251	20408	11544	11453	13179	13179	
1034	16903	3450	52209	12002	14621	6806	33294	8126	20721	5675	24726	8320	3134	36142	10176	4251	20408	11544	11453	13179	13179	
1040	16132	3406	51025	12341	15243	6816	33510	7992	20576	5684	25043	8135	3165	35830	10274	4254	20513	11422	11592	13219	13219	
1046	16132</																					

