uvby Hβ - Strömgren and Crawford - 1956

Classification of F stars, later extended to other spectral types.

GENERAL INFORMATION

AUTHORS	B. Strömgren and D. L. Crawford
TELESCOPE	0.80m (reflector), Haute-Provence Obs.
DETECTOR	RCA 1P21 (refrigerated)
MAIN ARTICLE	Strömgren, B. 1956, Vistas in Astronomy 2, 1337

SYSTEM DESCRIPTION

BANDS DESCRIPTION [178] pg 58					FLUX CALIBRATION [178] pg 58
band	filter	λ_{peak} (Å)	half-width (Å)	λ_{eff} (Å)	(erg cm^{-2} sec^{-1} Å^{-1}) (#)
u	8mm SchottUG11 + 1mm SchottWG3	3500	300	3450	3.25 10^{-9}
v	interference	4110	190	4110	7.18 10^{-9}
b	interference	4670	180	4670	5.81 10^{-9}
y	interference	5470	230	5480	3.70 10^{-9}
[79] $H\beta_{narrow}$	KPNO 212	4859	30		
	KPNO 9	4858	29		
	KPNO 216	4868	26		
[79] $H\beta_{wide}$	KPNO 214	4890	145		
	KPNO 10	4850	136		
	KPNO 225	4870	210		

(#) Fluxes for an A0V star with $V_{Johnson} = 0.00$ and $E(B-V) = 0.00$.

For α Lyr: $(b-y) = 0.004$, $m_1 = 0.157$, c_1 =1.089, β = 2.903. [187]

SYSTEM ANALYSIS

COLOR INDICES AND PARAMETERS [117], pg 182-190

$(b-y)$: temperature indicator.

$c_1 = (u-v)-(v-b)$: measures the Balmer discontinuity; T_{eff} indicator in O-A stars, and luminosity indicator in A-F stars.

$m_1 = (v-b)-(b-y)$: measures the blocking by metallic lines.

$\beta = H\beta_{wide} - H\beta_{narrow}$: luminosity indicator in O-A stars and T_{eff} indicator in A-G stars.

REDDENING-FREE PARAMETERS [117], pg. 183

$$[c_1] = c_1 - \frac{E(c_1)}{E(b-y)}(b-y) = c_1 - 0.20\,(b-y)$$

$$[m_1] = m_1 - \frac{E(m_1)}{E(b-y)}(b-y) = m_1 + 0.18\,(b-y)$$

$$[u-b] \;=\; (u-b) \;-\; \tfrac{E(u-b)}{E(b-v)}(b-y) \;=\; (u-b) \;-\; 1.84\,(b-y)$$

$$[u-b] \;=\; [c_1] \;+\; 2[m_1]$$

REDDENING RATIOS [294]

$$E(b-y) \;=\; 0.7E(B-V)_{Johnson}$$

RELATIONS WITH OTHER SYSTEMS

UBV - Johnson and Morgan - 1953 [307]

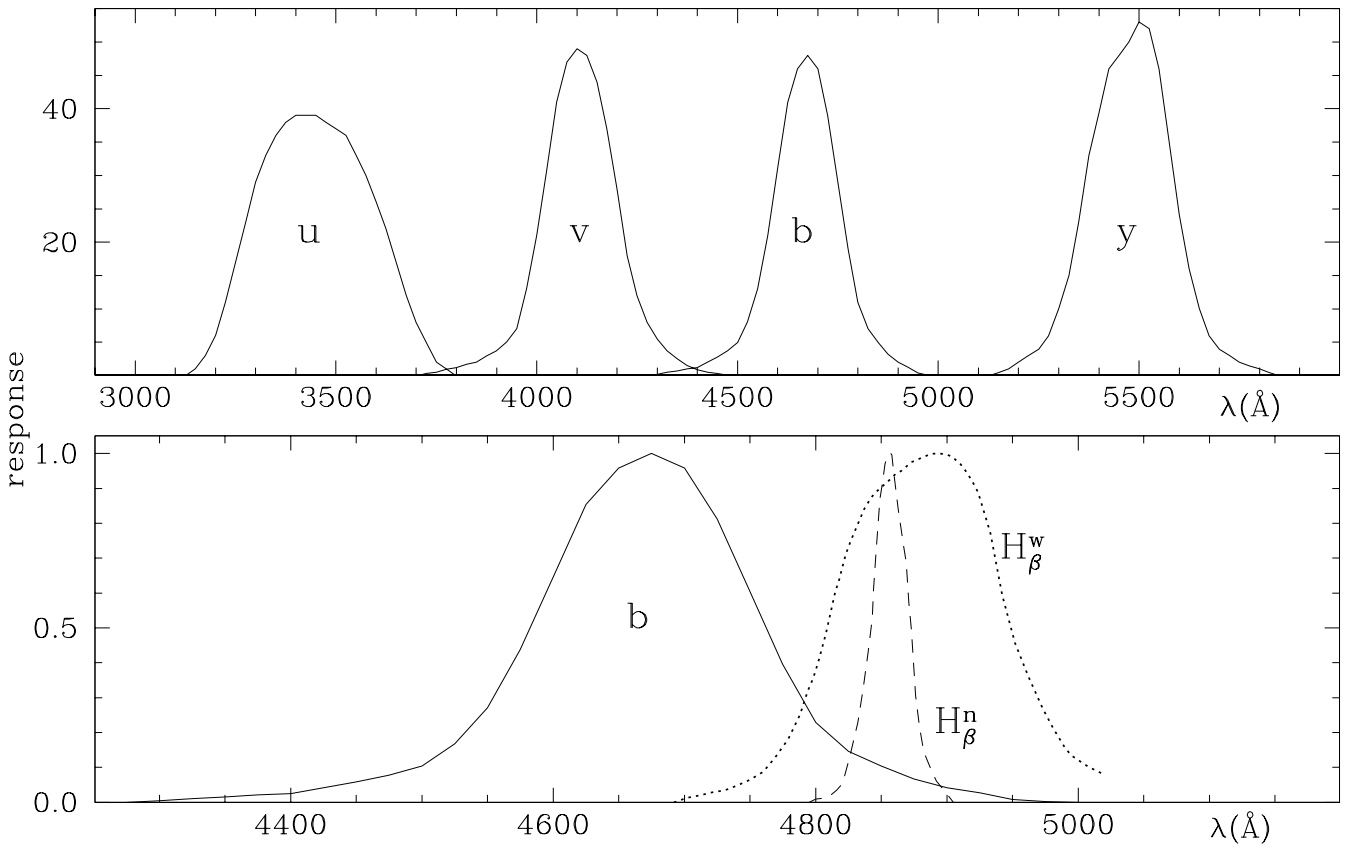
$(U-B)$	=	$0.675\ (\pm0.002)\ (u-b) \;-\; 0.938\ (\pm0.002)$	for stars O-B I-V, A-F III-V
$(B-V)$	=	$1.584\ (\pm0.007)\ (b-y) \;+\; 0.681\ (\pm0.014)\ m_1 \;-\; 0.116\ (\pm0.002)$	for stars O-B I-V, A III-V

U_CBV - Arp - 1958 [76]

$(B-V)$	=	$1.662\ (b-y) \;-\; 0.860\ m_1 \;-\; 0.134 \;-\; 0.027\ E(B-V)$	$(B-V) < 0.05$
$(B-V)$	=	$1.520\ (b-y) \;+\; 0.604\ m_1 \;-\; 0.092 \;-\; 0.015\ E(B-V)$	$0.05 < (B-V) < 0.70$

TRANSMISSION CURVES [211]

H^w_β and H^n_β are derived from Fig 1 of [79].



u		*v*		*b*		*y*		$H\beta_{wide}$		$H\beta_{narrow}$	
λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ (%)	λ (Å)	ϒ	λ (Å)	ϒ
3125	0.0	3700	0.0	4275	0.0	5125	0.0	4692	0.000	4795	0.000
3150	1.0	3725	0.3	4300	0.2	5150	0.5	4702	0.013	4800	0.009
3175	3.0	3750	0.5	4325	0.5	5175	1.0	4712	0.020	4806	0.012
3200	6.0	3775	1.0	4350	0.7	5200	2.0	4721	0.028	4812	0.023
3225	11.0	3800	1.2	4375	1.0	5225	3.0	4731	0.034	4816	0.034
3250	17.0	3825	1.7	4400	1.2	5250	4.0	4740	0.047	4820	0.053
3275	23.0	3850	2.0	4425	2.0	5275	6.0	4750	0.064	4822	0.076
3300	29.0	3875	3.0	4450	2.8	5300	10.0	4760	0.087	4826	0.130
3325	33.0	3900	3.7	4475	3.7	5325	15.0	4769	0.128	4832	0.229
3350	36.0	3925	5.0	4500	5.0	5350	23.0	4779	0.181	4836	0.321
3375	38.0	3950	7.0	4525	8.0	5375	33.0	4788	0.252	4840	0.428
3400	39.0	3975	13.0	4550	13.0	5400	41.0	4794	0.319	4843	0.527
3425	39.0	4000	21.0	4575	21.0	5425	46.0	4798	0.356	4844	0.611
3450	39.0	4025	31.0	4600	31.0	5450	48.0	4802	0.403	4846	0.719
3475	38.0	4050	41.0	4625	41.0	5475	50.0	4808	0.484	4849	0.870
3500	37.0	4075	47.0	4650	46.0	5500	53.0	4815	0.604	4851	0.916
3525	36.0	4100	49.0	4675	48.0	5525	52.0	4818	0.638	4853	0.970
3550	33.0	4125	48.0	4700	46.0	5550	46.0	4820	0.672	4855	0.996
3575	30.0	4150	44.0	4725	39.0	5575	35.0	4823	0.712	4857	1.000
3600	26.0	4175	37.0	4750	29.0	5600	24.0	4827	0.752	4858	0.996
3625	22.0	4200	28.0	4775	19.0	5625	16.0	4831	0.789	4859	0.962
3650	17.0	4225	18.0	4800	11.0	5650	10.0	4837	0.840	4861	0.901
3675	12.0	4250	12.0	4825	7.0	5675	6.0	4842	0.873	4863	0.840
3700	8.0	4275	8.0	4850	5.0	5700	4.0	4846	0.890	4867	0.733
3725	5.0	4300	5.5	4875	3.2	5725	3.0	4856	0.923	4869	0.687
3750	2.0	4325	3.7	4900	2.0	5750	2.0	4861	0.941	4871	0.573
3775	1.0	4350	2.5	4925	1.3	5775	1.5	4865	0.950	4873	0.496
3800	0.0	4375	1.5	4950	0.4	5800	1.0	4873	0.975	4875	0.382
		4400	0.9	4975	0.1	5825	0.5	4885	0.994	4876	0.305
		4425	0.5	5000	0.0	5850	0.0	4888	0.999	4879	0.218
		4450	0.3					4894	1.000	4882	0.153
		4475	0.1					4900	0.997	4884	0.130
		4500	0.1					4904	0.990	4888	0.092
		4525	0.0					4910	0.970	4892	0.061
								4913	0.957	4900	0.024
								4916	0.940	4905	0.000
								4919	0.923		
								4923	0.893		
								4925	0.873		
								4933	0.772		
								4942	0.594		
								4952	0.457		
								4962	0.362		
								4973	0.269		
								4981	0.212		
								4990	0.155		
								4995	0.134		
								5000	0.121		
								5008	0.101		
								5019	0.081		