



PHOTOMETRY

Landolt





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Overview

In 1973, Landolt published a list of stars carefully transformed to the Johnson UBV system. He extended that list to include stars in the Cousins RC and IC bands in 1983. This was further refined in 1992.

This includes fields near the celestial equator as well as regions farther north and south of the equator.

The Landolt catalog has become the de facto standard for transforming to the $UBVR_C I_C$ system.



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Landolt Publications

In a series of papers, Landolt provided a process and measurements for standard photometric stars around the celestial equator, as well as more northern and southern stars.

In these papers, the results are outlined as seen below.

TABLE 2. UBVRi standard stars.

Star	$\alpha(2000)$	$\delta(2000)$	V	B-V	U-B	V-R	R-I	V-I	n	m	Mean Errors of the Mean					Notes	
											V	B-V	U-B	V-R	R-I		V-I
TPHE A	00:30:09	-46 31 22	14.651	0.793	0.380	0.435	0.405	0.841	29	12	0.0028	0.0046	0.0071	0.0019	0.0035	0.0032	
TPHE B	00:30:16	-46 27 55	12.334	0.405	0.156	0.262	0.271	0.535	29	17	0.0115	0.0026	0.0039	0.0020	0.0019	0.0035	1
TPHE C	00:30:17	-46 32 34	14.376	-0.298	-1.217	-0.148	-0.211	-0.360	39	23	0.0022	0.0024	0.0043	0.0038	0.0133	0.0149	
TPHE D	00:30:18	-46 31 11	13.118	1.551	1.871	0.849	0.810	1.663	37	23	0.0033	0.0030	0.0118	0.0015	0.0023	0.0030	
TPHE E	00:30:19	-46 24 36	11.630	0.443	-0.103	0.276	0.283	0.564	34	8	0.0017	0.0012	0.0024	0.0007	0.0015	0.0019	
TPHE F	00:30:50	-46 33 33	12.474	0.855	0.532	0.492	0.435	0.926	5	3	0.0004	0.0058	0.0161	0.0004	0.0040	0.0036	
TPHE G	00:31:05	-46 22 43	10.442	1.546	1.915	0.934	1.085	2.025	5	3	0.0004	0.0013	0.0036	0.0004	0.0009	0.0009	
PG0029+024	00:31:50	+02 38 26	15.268	0.362	-0.184	0.251	0.337	0.593	5	2	0.0094	0.0174	0.0112	0.0161	0.0125	0.0067	
PG0039+049	00:42:05	+05 09 44	12.877	-0.019	-0.871	0.067	0.097	0.164	4	3	0.0020	0.0030	0.0055	0.0035	0.0055	0.0045	
92 309	00:53:14	+00 46 02	13.842	0.513	-0.024	0.326	0.325	0.652	2	1	0.0035	0.0057	0.0028	0.0014	0.0035	0.0014	

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UBVRi PHOTOMETRIC STANDARD STARS IN THE MAGNITUDE RANGE $11.5 < V < 16.0$ AROUND THE CELESTIAL EQUATOR¹

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ABSTRACT

UBVRi photoelectric observations have been made on the Johnson-Kron-Cousins photometric system of 526 stars centered on the celestial equator. The program stars within a 298 number subset have sufficient measures so that they are capable of providing, for telescopes of intermediate and large size in both hemispheres, an internally consistent homogeneous broadband standard photometric system around the sky. The stars average 29 measures each on 19 nights. The majority of the stars in this paper fall in the magnitude range $11.5 < V < 16.0$, and in the color range $-0.3 < (B - V) < +2.3$.

1. INTRODUCTION

An internally consistent and homogeneous list of standard stars on the Johnson-Kron-Cousins broadband *UBVRi* photometric system was published several years ago (Landolt 1983). These stars easily enabled one to standardize broadband photometric data obtained at all but the largest telescopes. Their location in a narrow band centered on the celestial equator made them accessible to telescopes in both hemispheres. A bit of history regarding this photometric system has been recounted in Landolt (1983), and will not be repeated.

2. THE PROGRAM

The photometric results in this paper represent the second part of the three stage effort to provide *UBVRi* photoelectric photometric standard stars in the magnitude range $7 < V < 21$ over as broad a range in color as possible.

potential candidates. For one thing, there just are not many very red or blue stars in most of the Selected Areas that were studied, at least to the approximately 16-17th magnitude limit searched. Additional candidate stars, then, were selected from the literature; for example, several stars from the galactic anticenter study by Rubin *et al.* (1974) were considered, as were selected stars from the Giclas lists in various issues of the Lowell Observatory Bulletins. Several blue stars from the Palomar-Green survey (Green *et al.* 1986) were observed and eventually made into standard stars. All these observational data have been tied into the *UBVRi* standard stars published by Landolt (1983).

The third stage of this standard star project will provide *UBVRi* photometric standards roughly in the magnitude range $14.5 < V < 21.0$ (Landolt *et al.* 1993).

The data obtained for this stage of the standard star project came from the Cerro Tololo Inter-American Observatory (CTIO)'s 1.5 m telescope. Acceptable data were obtained on all or parts of 145 nights of the 211 nights

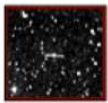


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Web Resources

Online websites, such as Mount Hamilton Observatory seen here, provides a means to search for standards within certain RAs.

UNIVERSITY OF CALIFORNIA OBSERVATORIES / LICK OBSERVATORY



STANDARD STARS

Photometric standards, smooth spectrum stars, and mean atmospheric extinction for Mt. Hamilton. Many stars here included are linked to finding charts.



[INTRODUCTION & REFERENCES](#)

OPTICAL FLUX STANDARDS:

[Hayes Bright Spectrophotometric Standards](#)

Landolt UBVR I Standards:

- [0 to 4 hrs](#)
- [4 to 8 hrs](#)
- [8 to 12 hrs](#)
- [12 to 16 hrs](#)
- [16 to 20 hrs](#)
- [20 to 0 hrs](#)

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Mount Hamilton Observing Information

← Four Hours
Landolt Standards
Next Four Hours →

0^h 3^h
 0^m to 59^m

Clicking on a star name produces a finder chart, but note that charts are only available from the mountain server, not from the UCSC mirror site.

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Star	RA (1950)	Dec(1950)	V	B-V	U-B	V-R	R-I	V-I	$\mu_{\alpha}(\text{sec/yr})$	$\mu_{\delta}(\text{arcsec/yr})$
HD 315	0 05 10.4	-02 49 37	6.440	-0.145	-0.497	-0.037	-0.064	-0.010	0.002	0.00
HD 2892	0 29 38.2	00 54 44	9.366	1.321	1.409	0.692	0.625	1.319	-0.001	0.00
BD -15 115	0 35 49.3	-15 16 23	10.881	-0.190	-0.860	-0.095	-0.103	-0.198		
BD -12 134	0 44 32.4	-12 08 40	11.775	-0.294	-1.329	-0.088	-0.078	-0.161		
BD -11 162	0 49 44.2	-10 56 02	11.190	-0.081	-1.138	0.050	0.095	0.144		
SA 92 336	0 52 27.5	00 31 10	8.046	0.985	0.815	0.518	0.465	0.984	-0.001	-0.05
SA 92 342	0 52 36.0	00 26 58	11.616	0.435	-0.040	0.264	0.272	0.536		



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Summary

Standard stars place photometric observations on a common platform.

Using these stars allows you to calibrate your photometric system against these well-defined systems and establish Transform Coefficients for each of your filters.

From these coefficients, you can make photometric measurements, apply the coefficient to achieve standardized measurements that are useful for others and other projects.



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Questions?