FORCAST Color Corrections: Observing Cycle 1

An observer often wishes to determine the true flux of an object at the reference wavelength, $Fvobj(\lambda ref)$, rather than the flux of an equivalent nominal, "flat spectrum" source. To do this, we define a color correction K such that

$$K= Fvnom,obj(\lambda ref)Fvobj(\lambda ref),$$

where $Fvnom,obj(\lambda ref)$ is the flux density one obtained by measurement on a data product. Divide the measured values by K to obtain the "true" flux density. In terms of the wavelengths defined above,

$$K= \lambda\lambda ref\ \lambda piv2FvobjFvobj(\lambda ref).$$

We give values for K for power-law and blackbody spectral shapes in the Tables below. For most filters and spectral shapes, the color corrections are small (<10%).

Note that mid-way through Cycle 1 the use of the Barr3 dichroic was discontinued and the Barr2 dichroic was adopted for all dual mode observations. Therefore, we provide separate Tales of wavelengths and color corrections in Tables 1-6.

Table 1. Filter Wavelengths for non-dichroic mode, Cycle 1

$\langle\lambda\rangle$	5.356	5.610	6.348	6.614	7.702	8.609	10.650	11.089	11.344	11.784	11.721	19.670	24.262
$\lambda(piv)$	5.355	5.610	6.348	6.614	7.700	8.608	10.650	11.085	11.344	11.781	11.718	19.590	24.226

$\langle\lambda\rangle$	31.383	33.431	34.678	37.112
$\lambda(piv)$	31.309	33.381	34.620	37.056

Table 2. Color Corrections for non-dichroic mode, Cycle 1

Filter	α							T_{BB}(K)						
$\langle\lambda\rangle$	-3	-2	-1	0	1	2	3	10000	5000	1000	500	300	100	50
5.356	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001	1.001	1.000	1.000	1.001	1.024	1.122
5.610	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.014	1.076
6.348	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.040
6.614	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.015	1.083
7.702	1.000	1.000	1.000	1.000	1.001	1.002	1.004	1.002	1.002	1.001	0.999	0.999	1.037	1.218
8.609	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.005	1.030
10.650	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.002	1.012
11.089	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.002	1.000	0.999	1.019	1.144
11.344	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1,999	1.001	1.009
11.784	1.000	1.000	1.000	1.000	1.001	1.003	1.005	1.003	1.003	1.002	1.000	0.999	1.011	1.093
11.721	1.000	1.000	1.000	1.000	1.001	1.003	1.005	1.003	1.003	1.002	1.000	0.999	1.011	1.094
19.670	1.007	1.000	1.000	1.008	1.028	1.071	1.166	1.067	1.064	1.040	1.019	1.001	1.004	1.277
24.264	1.003	1.000	1.000	1.003	1.010	1.022	1.050	1.021	1.020	1.015	1.010	1.004	0.995	1.059
25.242	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
25.248	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
31.383	1.004	1.000	1.000	1.005	1.016	1.044	1.134	1.042	1.040	1.028	1.018	1.010	0.991	1.025
33.431	1.002	1.000	1.000	1.003	1.010	1.023	1.048	1.023	1.022	1.018	1.013	1.008	0.994	1.011
34.678	1.003	1.000	1.000	1.004	1.011	1.025	1.051	1.024	1.023	1.019	1.015	1.009	0.994	1.010
37.112	1.002	1.000	1.000	1.003	1.010	1.025	1.057	1.024	1.024	1.019	1.014	1.009	0.995	1.005

Note: For power law spectral shapes, $F_\nu \sim \nu^\alpha$

Table 3. Filter wavelengths for dichroic mode, Cycle 1, Barr 2 dichroic

$\langle\lambda\rangle$	5.363	5.614	6.351	6.621	7.723	8.604	10.650	11.010	11.316	11.806	11.755	19.670	24.262
$\lambda(piv)$	5.363	5.614	6.351	6.620	7.721	8.604	10.650	11.007	11.316	11.803	11.752	19.590	24.226

$\langle\lambda\rangle$	31.360	33.568	34.642	36.981
$\lambda(piv)$	31.303	33.553	34.603	36.947

Table 4. Color corrections for dichroic mode, Cycle 1, Barr 2 dichroic

Filter	α							T_{BB}(K)						
$\langle\lambda\rangle$	-3	-2	-1	0	1	2	3	10000	5000	1000	500	300	100	50
5.363	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001	1.001	1.000	1.000	1.001	1.024	1.126
5.614	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.019	1.108
6.351	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.040
6.621	1.000	1.000	1.000	1.000	1.001	1.001	1.002	1.001	1.001	1.000	1.000	1.000	1.026	1.142
7.723	1.000	1.000	1.000	1.000	1.001	1.002	1.004	1.002	1.002	1.001	0.999	0.999	1.036	1.207
8.604	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.005	1.029
10.650	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.002	1.012
11.010	1.001	1.000	1.000	1.001	1.002	1.003	1.005	1.003	1.003	1.002	1.000	0.999	1.017	1.129
11.316	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.007
11.806	1.000	1.000	1.000	1.000	1.001	1.002	1.004	1.002	1.002	1.001	1.000	0.999	1.009	1.070
11.755	1.000	1.000	1.000	1.000	1.001	1.002	1.004	1.002	1.002	1.001	1.000	0.999	1.010	1.075
19.670	1.007	1.000	1.000	1.008	1.028	1.071	1.166	1.067	1.064	1.040	1.019	1.001	1.004	1.277
24.262	1.003	1.000	1.000	1.003	1.010	1.022	1.050	1.021	1.020	1.015	1.010	1.004	0.995	1.059
25.242	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
25.248	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
31.360	1.004	1.000	1.000	1.004	1.011	1.023	1.044	1.023	1.022	1.018	1.014	1.009	0.992	1.022
33.568	1.001	1.000	1.000	1.001	1.003	1.006	1.010	1.006	1.006	1.005	1.004	1.003	0.998	1.004
34.642	1.002	1.000	1.000	1.002	1.007	1.014	1.024	1.014	1.013	1.012	1.010	1.007	0.995	1.007
36.981	1.002	1.000	1.000	1.002	1.006	1.012	1.021	1.012	1.011	1.010	1.008	1.006	0.997	1.003

Note: For power law spectral shapes, $F_\nu \sim \nu^\alpha$

Table 5. Filter wavelengths for dichroic mode, Cycle 1, Barr 3 dichroic

$\langle\lambda\rangle$	5.354	5.603	6.352	6.594	7.704	8.609	10.651	11.054	11.339	11.813	11.738	19.670	24.262
$\lambda(piv)$	5.354	5.602	6.352	6.594	7.703	8.608	10.651	11.050	11.339	11.810	11.735	19.590	24.226

$\langle\lambda\rangle$	31.360	33.568	34.642	36.981
$\lambda(piv)$	31.303	33.553	34.603	36.947

Table 6. Color corrections for dichroic mode, Cycle 1, Barr 3 dichroic

Filter	α							T_{BB}(K)						
$\langle\lambda\rangle$	-3	-2	-1	0	1	2	3	10000	5000	1000	500	300	100	50
5.354	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001	1.000	1.000	1.000	1.001	1.024	1.124
5.603	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.013	1.071
6.352	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.038
6.594	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.014	1.076
7.704	1.000	1.000	1.000	1.000	1.001	1.002	1.004	1.002	1.002	1.001	0.999	0.999	1.036	1.215
8.609	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.005	1.030
10.651	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.002	1.012
11.054	1.001	1.000	1.000	1.001	1.002	1.004	1.006	1.004	1.003	1.002	1.000	0.999	1.018	1.141
11.339	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.009
11.813	1.001	1.000	1.000	1.001	1.002	1.003	1.005	1.003	1.003	1.002	1.000	0.999	1.012	1.103
11.738	1.001	1.000	1.000	1.001	1.002	1.003	1.005	1.003	1.003	1.002	1.000	0.999	1.013	1.106
19.670	1.007	1.000	1.000	1.008	1.028	1.071	1.166	1.067	1.064	1.040	1.019	1.001	1.004	1.277
24.262	1.003	1.000	1.000	1.003	1.010	1.022	1.050	1.021	1.020	1.015	1.010	1.004	0.995	1.059
25.242	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
25.248	1.001	1.000	1.000	1.001	1.002	1.004	1.007	1.004	1.004	1.003	1.002	1.001	0.999	1.012
31.360	1.004	1.000	1.000	1.004	1.011	1.023	1.044	1.023	1.022	1.018	1.014	1.009	0.992	1.022
33.568	1.001	1.000	1.000	1.001	1.003	1.006	1.010	1.006	1.006	1.005	1.004	1.003	0.998	1.004
34.642	1.002	1.000	1.000	1.002	1.007	1.014	1.024	1.014	1.013	1.012	1.010	1.007	0.995	1.007
36.981	1.002	1.000	1.000	1.002	1.006	1.012	1.021	1.012	1.011	1.010	1.008	1.006	0.997	1.003

Note: For power law spectral shapes, $F_\nu \sim \nu^\alpha$