# GROUND-BASED OBSERVATIONS OF NEAR ECLIPTIC ZODIACAL LIGHT BRIGHTNESS

Nebil Y. Misconi and J.L. Weinberg
Space Astronomy Laboratory, University of Florida
1810 NW 6th Street
Gainesville, Florida 32609
USA

ABSTRACT. Ground-based observations of the evening zodiacal light taken by Weinberg and Mann from Mt. Haleakala, Hawaii, during March 1966 are used to derive a table of zodiacal light brightnesses at high spatial resolution (as little as 0.5° in differential ecliptic longitude $\lambda-\lambda_\odot$ and 1.0° in ecliptic latitude $\beta$) over the region $29.5° < \lambda-\lambda_\odot < 56°$, $-30° < \beta < 30°$. Significant differences are found in the brightness distributions above and below the ecliptic plane.

Brightness, polarization, color and angular dependence of the light of the night sky were systematically observed by Weinberg and Mann from Mt. Haleakala, Hawaii between 1965 and 1969 (Weinberg and Mann, 1967). One of the several observing techniques that was used involved scanning the main cone of the zodiacal light over a range of 160° in azimuth centered on the ecliptic, beginning (evening) or ending (morning) with the onset of astronomical twilight. A multicolor photopolarimeter scanned back and forth in azimuth at 2.5 deg/sec, incrementing elevation in 1° steps between 5° and 24°. A sample of these data, taken in March 1966 at 5080Å, is reduced to isolate the zodiacal light. Additional data and full details of the observations, calibration, and data reduction will be presented elsewhere.

Data below elevation 10° are omitted here due to difficulties in the atmospheric corrections. The measured brightnesses were converted to absolute units ($S_{10}(V)_{G2V}$) by reference to a calibrated (by NBS Fritz Peak Observatory), 17.8-cm diameter $^{14}C$-activated phosphor source. The source was placed over the objective before and after each night's observations, filling both the aperture and the 3° diameter field of view (FOV). Bright stars were used to obtain an independent absolute calibration, the two methods agreeing to better than 5 percent.

Extinction corrections were made with coefficients derived from observations of bright stars using the same instrument. Atmospheric scattering corrections followed the method outlined by Weinberg (1964). The brightness contributed by "resolved" stars in each FOV were subtracted using a special merged star catalog developed for each color used with this instrument. Background starlight was subtracted using data obtained from Pioneer 10 observations beyond the asteroid belt, where the zodi-



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acal light was found to be vanishingly small compared to the background starlight (Hanner, et al., 1974). The airglow continuum contribution was obtained by using a typical zenith value of 43 $S_{10}(V)$ (Roach and Smith, 1964) multiplied by the van Rhijn function at each elevation for a plane parallel atmosphere (Weinberg, 1964). The band width and off-band rejection of the 5080Å filter were such that the airglow green line (5577Å) emission can be ignored. Tables 1 and 2 give the derived near-ecliptic zodiacal light brightnesses, at northern and southern ecliptic latitudes, respectively, for differential ecliptic longitudes from 29.5° to 56.0°. Missing data in the Tables correspond to regions in the Milky Way and/or with bright stars, where the separation of components is uncertain, or is a result of the timing and spatial coverage of the observing program. Other observations, not yet reduced in this manner, will be used to fill in most of the data gaps. The full body of data will be used to depict the topology of zodiacal light as seen from 1 AU and to model the large scale spatial distribution of the dust - in and out of the ecliptic.

Some of the Table 1 and 2 data are plotted in Figure 1 together with Dumont's ground observations (Levasseur-Regourd and Dumont, 1980) and with observations from the Helios 16° photometer (Leinert, et al., 1982). The Haleakala brightness data have higher spatial resolution than any other published data, they separately show data north and south of the ecliptic and thereby contain information on the positions of maximum brightness ("photometric axis") in March 1966, and, at Hong's suggestion, are not smoothed in order to avoid masking possible brightness structure. The Haleakala data increases more rapidly toward the sun and falls off more slowly away from the ecliptic than the Dumont data. Possible reasons for these differences are still being evaluated. Two other things are evident in the Haleakala data: (1) the zodiacal light is brighter above than below the ecliptic (i.e., the photometric axis or symmetry plane is displaced 1-2° north of the ecliptic), and (2) brightness structures first found by Hong at large elongations (this volume) were subsequently also found here. Similar structures are also seen in the zodiacal light data from Pioneer 10 (Toller and Weinberg, this volume).

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| λ-λ☉ \ β | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | λ-λ☉ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 56 | | | | | | | | | | | | | | | | | | 193 | 201 | | | | | | | | | | | | | 56 |
| 55.5 | | | | | | | | | | | | | | | 291 | 246 | 248 | | | | | | | | | | | | | | | 55.5 |
| 55 | | | | | | | | | | | | 316 | 289 | 278 | | | | | | 200 | | | | | | | | | | | | 55 |
| 54.5 | | | | | | | 393 | 371 | 344 | 336 | 326 | | | | | | | 209 | 208 | | | | | | | | | 123 | | | | 54.5 |
| 54 | 434 | 418 | 395 | 427 | 434 | 406 | | | | | | | | 292 | 278 | 263 | 243 | | | | | | | | | 125 | | | | | 54 |
| 53.5 | | | | | | | | | | 376 | | | 344 | | | | | | | | | | | | 154 | 152 | | | | | 53.5 |
| 53 | | | 456 | 414 | 413 | 406 | 378 | 372 | 379 | | | | | | | | | | | | | | 156 | 171 | | | | | | | 53 |
| 52.5 | 449 | 455 | | | | | | | | | | | | | | | | | | | 214 | 188 | | | | | | | | | 52.5 |
| 52 | | | | | | | | | | | | | | | | | | 249 | 250 | 223 | | | | 168 | 154 | | | | | | 52 |
| 51.5 | | | | | | | | | | | | | | | 289 | 269 | 248 | | | | | 197 | 197 | | | | | | | | | 51.5 |
| 51 | | | | | | | | | | | 350 | 367 | 340 | 307 | | | | | | 240 | 217 | | | | | | | | | | | 51 |
| 50.5 | | | | | 480 | 442 | 442 | 420 | 421 | 383 | | | | | | | 276 | 261 | 250 | | | | | 178 | 171 | | | | | | | 50.5 |
| 50 | 508 | 500 | 507 | 502 | | | | | | | | | 348 | 343 | 315 | 299 | | | | | | 203 | 194 | | | | 176 | | | | 50 |
| 49.5 | | | | | | | | | 443 | 425 | 386 | 351 | | | | | | | 341 | 332 | 240 | | | | 227 | 212 | | | | | 49.5 |
| 49 | | 539 | 522 | 532 | 541 | 506 | 472 | 446 | | | | | | | | 317 | 302 | 289 | | | | | 214 | 219 | | | | | | | 49 |
| 48.5 | 566 | | | | | | | | | | | | 386 | 364 | 328 | | | | | | | 268 | | | | | | | | | 48.5 |
| 48 | | | | | | | 506 | 481 | 473 | 446 | 424 | | | | | | 330 | 295 | 264 | 258 | | | | | 193 | 198 | | | | | | 48 |
| 47.5 | 598 | 609 | 607 | 567 | 543 | 536 | | | | | | | | 399 | 359 | 346 | | | | | | | | 187 | | | | | | | 47.5 |
| 47 | | | | | | | | | | | 448 | 441 | 412 | | | | | | | 210 | | | 260 | | 212 | 188 | | | | | 47 |
| 46.5 | | | 613 | 629 | 609 | 577 | 554 | 532 | 503 | 492 | | | | | | | 316 | | 275 | | 271 | 255 | | 211 | | | | | 168 | 156 | 46.5 |
| 46 | 632 | 640 | | | | | | | | | | | 422 | 385 | 359 | 330 | | | | | | | | | | | | 166 | 148 | | 46 |
| 45.5 | | | | | | | | 562 | 518 | 483 | 479 | 438 | | | | | | 288 | 286 | 290 | | | | | | 253 | 204 | | | 196 | 45.5 |
| 45 | 662 | 656 | 662 | 660 | 617 | 597 | 571 | | | | | | | | | 344 | 325 | | | | | | | 249 | 255 | | | | 262 | 219 | 45 |
| 44.5 | | | | | | | | | | | | 488 | 448 | 438 | 402 | | | | | | 268 | 262 | 253 | | | | | 231 | | | 44.5 |
| 44 | | | | 697 | 657 | 629 | 613 | 600 | 573 | 512 | | | | | | | | 344 | 333 | 299 | | | | | | 247 | 234 | | | | | 44 |
| 43.5 | 688 | 712 | 720 | | | | | | | | | | | 454 | 407 | 389 | 356 | | | | | | 300 | 272 | 262 | | | | | 156 | 160 | 43.5 |
| 43 | | | | | | | | | 629 | | 590 | | | | | | | | | 368 | 341 | 306 | | | | 218 | 198 | 188 | | | 43 |
| 42.5 | 763 | 783 | 773 | 730 | 714 | 679 | 685 | 643 | | | | | | | | | | | | | | | | | 244 | 228 | | | | | 42.5 |
| 42 | | | | | | | | | | | | | 555 | 504 | 474 | 423 | 391 | 384 | 344 | | | 316 | 275 | 249 | | | | | 213 | | 42 |
| 41.5 | | | | | | 789 | 759 | 703 | 676 | 613 | 572 | 526 | | | | | | | 353 | 328 | 333 | | | | | | 252 | 236 | | | | 41.5 |
| 41 | 888 | 863 | 841 | 857 | 824 | | | | | | | | | | 448 | 439 | 379 | 413 | | | | | | 296 | 285 | 269 | | | | 236 | 41 |
| 40.5 | | | | | | | | | | 654 | | 572 | 534 | 483 | | | | | | | 343 | 346 | 302 | | | | | | 252 | 246 | | 40.5 |
| 40 | 894 | 893 | 899 | 852 | 824 | 829 | 829 | 763 | 677 | | | | | | | | 464 | 390 | 391 | | | | | | | 306 | 305 | 305 | | | | 40 |
| 39.5 | | | | | | | | | | | | | 585 | 582 | | | | | | | | | | 342 | 320 | | | | | | 269 | 39.5 |
| 39 | | | | | | | 878 | 849 | 880 | 797 | 765 | 678 | 622 | | | | | | | | 417 | 368 | | | | | | 300 | 291 | 272 | | 39 |
| 38.5 | 996 | 1016 | 987 | 923 | 933 | | | | | | | | | | | 522 | 515 | 482 | 463 | 446 | | | | | 324 | | 318 | | | | | 38.5 |
| 38 | | | | | | | | | | | | 675 | 621 | 589 | 571 | | | | | | | 391 | 381 | 352 | | | | | | | 290 | 38 |
| 37.5 | | 1124 | 1090 | 1051 | 997 | | | 911 | 853 | | | | | | | | | | 478 | 468 | 450 | | | | | | | 304 | 303 | 308 | | 37.5 |
| 37 | 1111 | | | | | | | | | | | | | | 614 | 564 | 528 | 508 | | | | | | | 374 | 357 | 328 | | | | | 37 |
| 36.5 | | | | | | | | 885 | 855 | 812 | 798 | 756 | 693 | | | | | | | | | 479 | 440 | 384 | | 385 | | | | 340 | 336 | 36.5 |
| 36 | 1194 | 1180 | 1184 | 1132 | 1090 | 1053 | 1006 | | | | | | | | | | | 541 | 526 | 497 | 475 | | | | | | | | 362 | | | 36 |
| 35.5 | | | | | | | | | | | | 768 | 732 | 696 | 650 | 612 | 585 | | | | | | | 438 | | | | 386 | | | | 35.5 |
| 35 | | | 1294 | 1260 | 1187 | 1134 | 1109 | 1019 | 936 | 896 | 852 | | | | | | | | | 563 | 530 | 496 | 464 | | 405 | 402 | 420 | | | 390 | 401 | 35 |
| 34.5 | 1358 | 1369 | | | | | | | | | | | | | 726 | 709 | 687 | 679 | 604 | | | | | | | | | | 379 | | | 34.5 |
| 34 | | | | | | | | | 1065 | 1007 | 931 | 880 | 830 | 802 | | | | | | | | | 515 | 482 | | | 467 | 439 | | | | 34 |
| 33.5 | 1507 | 1491 | 1488 | 1418 | 1354 | 1285 | 1192 | 1127 | | | | | | | | | | | 639 | 605 | 546 | | | | | | | | 447 | 444 | 400 | 33.5 |
| 33 | | | | | | | | | | | | | | 816 | 779 | 728 | 712 | 656 | | | | | | | 534 | 499 | 476 | 474 | | | | 33 |
| 32.5 | | | | | | | 1347 | 1190 | 1179 | 1070 | 1028 | 960 | 894 | | | | | | | | 657 | 599 | 580 | 560 | | | | | | | | 32.5 |
| 32 | 1647 | 1648 | 1602 | 1560 | 1515 | 1383 | | | | | | | | | | | 777 | 726 | 664 | 664 | | | | | | | | 481 | 466 | 435 | | 32 |
| 31.5 | | | | | | | | | | | 1165 | 1106 | 1033 | 937 | 922 | | | | | | | | | | 567 | 547 | 530 | | | | | 31.5 |
| 31 | 1882 | 1874 | 1814 | 1712 | 1649 | 1601 | 1510 | 1421 | 1321 | 1210 | | | | | | | | | | | 709 | 689 | 632 | 593 | | | | | | | | 31 |
| 30.5 | | | | | | | | | | | | | | | 993 | 936 | 861 | 840 | 781 | 737 | | | | | | | | | | | | 30.5 |
| 30 | | | | | | | 1707 | 1608 | 1508 | 1349 | 1288 | 1229 | 1147 | 1097 | | | | | | | | | | | | | | | | | | | 30 |
| 29.5 | 2145 | 2135 | 2070 | 1977 | 1902 | 1794 | | | | | | | | | | | | | | | | | | | | | | | | | | 29.5 |

Table 1. Zodiacal light brightness at 5080Å in $S_{10}(V)_{G2V}$ units as a function of differential ecliptic longitude $\lambda-\lambda_{\odot}$, and at northern ecliptic latitudes, $\beta$.

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| λ-λ⊙ \ β° | 0 | -1 | -2 | -3 | -4 | -5 | -6 | -7 | -8 | -9 | -10 | -11 | -12 | -13 | -14 | -15 | -16 | -17 | -18 | -19 | -20 | -21 | -22 | -23 | -24 | -25 | -26 | -27 | -28 | -29 | -30 | λ-λ⊙ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 56 | | | | | | | | | | | | | | | | | | | | | | | 140 | 135 | 128 | | | | | | | 56 |
| 55.5 | | | | | | | | | | | | | | | | | | | | | 166 | 154 | | | | | 123 | | | | | 55.5 |
| 55 | | | | | | | | | | | | | | | | | 205 | 178 | | | | | | | | | | | | | | 55 |
| 54.5 | | | | | | | | | | | | 250 | 245 | 217 | 224 | 219 | | | | | | 153 | 158 | 161 | | | | | | | | 54.5 |
| 54 | 434 | 425 | 404 | 393 | 376 | 362 | 351 | 316 | 304 | 296 | 264 | | | | | | | | 176 | 170 | 165 | | | | | | 136 | | | | | 54 |
| 53.5 | | | | | | | | | | | | | | | 228 | 225 | 215 | 186 | | | | | | | | 141 | | | | | | 53.5 |
| 53 | | | | | | | | | 334 | 320 | 278 | 273 | 257 | 240 | | | | | | | | 161 | | | | | | | | | | 53 |
| 52.5 | 449 | 452 | 433 | 418 | 407 | 388 | 366 | 347 | | | | | | | | | | | 166 | 168 | 152 | | | | | 150 | | | | | | 52.5 |
| 52 | | | | | | | | | | | | | | | | | 216 | 200 | | | | | | | | | | | | | 124 | 52 |
| 51.5 | | | | | | | | | | | | | | | | | | | | | 174 | 171 | 175 | | | | | | | 96 | | 51.5 |
| 51 | | | | | | | | | | | | | | | | | 233 | 221 | 213 | 189 | | | | | | 135 | 110 | | | | | 51 |
| 50.5 | | | | | | | | | | | 341 | 324 | 314 | 308 | 264 | 262 | | | | | | | 180 | 147 | 148 | | | | | 134 | 125 | 50.5 |
| 50 | 508 | 495 | 495 | 483 | 458 | 420 | 426 | 401 | 384 | 372 | | | | | | | | | | 186 | 183 | 171 | | | | | | 142 | 129 | | | 50 |
| 49.5 | | | | | | | | | | | | | | | | 249 | 234 | 229 | 217 | | | | | | 150 | 174 | 157 | | | | | 49.5 |
| 49 | | | | | | | | 398 | 378 | 369 | 358 | | | | | | | | | | | 191 | 180 | 180 | | | | | | 134 | 133 | 49 |
| 48.5 | 566 | 544 | 530 | 494 | 467 | 466 | 437 | | | | | | | | | | | | 212 | 216 | 193 | | | | | | | 141 | 143 | | | 48.5 |
| 48 | | | | | | | | | | | | | | | 278 | 272 | 264 | 244 | | | | | | | 174 | 152 | 146 | | | | | 48 |
| 47.5 | 598 | 578 | 582 | 551 | 540 | 550 | 514 | 473 | 424 | 392 | 371 | 359 | | | | | | | | | | 213 | 208 | 197 | | | | | | 132 | 133 | 47.5 |
| 47 | | | | | | | | | | | | | | | | | | 284 | 259 | 237 | 218 | | | | | | 139 | 151 | 147 | | | 47 |
| 46.5 | | | | | | | | | | 408 | 393 | 388 | 366 | 347 | 293 | 293 | 281 | | | | | | 219 | 202 | 184 | | | | | | | 46.5 |
| 46 | 632 | 627 | 602 | 560 | 554 | 528 | | 452 | 439 | | | | | | | | | | | 228 | 213 | 216 | 211 | | | | | | | 148 | 139 | 46 |
| 45.5 | | | | | | | | | | | | | | 363 | 338 | 301 | 292 | 266 | 247 | | | | | | | | 166 | 144 | 133 | | | 45.5 |
| 45 | 622 | 643 | 623 | 610 | 573 | 560 | 506 | 502 | 484 | 440 | 410 | 441 | 426 | | | | | | | | | | 183 | 195 | 178 | | | | | | | 45 |
| 44.5 | | | | | | | | | | | | | | | | | | | | 241 | 221 | 219 | 200 | | | | | | | 161 | 150 | 149 | 44.5 |
| 44 | | | | | | | | | | | | | 391 | 309 | 341 | 322 | 302 | 269 | 256 | | | | | | | 210 | 197 | 179 | | | | | 44 |
| 43.5 | 688 | 683 | 653 | 627 | 621 | 587 | 537 | 522 | 501 | 456 | 429 | 368 | | | | | | | | | | | 227 | 225 | 212 | | | | | | | 43.5 |
| 43 | | | | | | | | | | | | | | | | | | 301 | 304 | 270 | 260 | 240 | | | | | | | | 201 | 193 | 182 | 43 |
| 42.5 | 765 | 769 | 740 | 740 | 712 | | 602 | 560 | 538 | 494 | 458 | 450 | | 421 | 420 | 390 | 363 | | | | | | | | | 188 | 221 | 221 | | | | | 42.5 |
| 42 | | | | | | | | | | | | | | | | | | | | | | 302 | 274 | 262 | 199 | | | | | | | | 42 |
| 41.5 | | | | | | | | | | | | | | | 436 | 404 | 386 | 372 | 338 | 298 | 293 | | | | | | | | | 182 | 173 | 173 | 41.5 |
| 41 | 888 | 859 | 847 | 787 | 741 | 675 | 666 | 640 | 619 | 576 | 544 | 497 | 472 | 440 | | | | | | | | | | | 233 | 209 | 201 | 187 | | | | | 41 |
| 40.5 | | | | | | | | | | | | | 474 | 447 | 434 | 417 | 379 | 337 | 308 | 292 | 282 | 267 | 255 | 237 | | | | | | | | | 40.5 |
| 40 | 894 | 890 | 884 | | | | | | | 568 | | | | | | | | | | | | | | | | | | | | 198 | 165 | 157 | 40 |
| 39.5 | | | | 847 | 833 | 739 | 705 | | 627 | | | | | | | | | | | | | | | | 228 | 220 | 201 | 185 | | | | | 39.5 |
| 39 | | | | | | | | | | | | | | | | | | | | 319 | 282 | 257 | | 248 | | | | | | | | | 39 |
| 38.5 | 996 | 978 | 905 | 871 | 831 | 796 | 741 | 731 | 651 | 614 | 580 | 530 | 523 | 480 | 437 | 410 | 379 | 368 | 338 | | | | | | | | | 220 | 215 | | | | 38.5 |
| 38 | | | | | | | | | | | | | | | | | | | | | | 302 | 267 | 272 | 262 | 257 | 227 | | | | | | 38 |
| 37.5 | | | | | | | | | | | | | | 522 | 508 | 460 | 438 | 397 | 382 | 369 | 336 | | | | | | | | | | | | 37.5 |
| 37 | 1111 | 1085 | 1041 | 1003 | 941 | 895 | 844 | 795 | 750 | 703 | 664 | 632 | 562 | | | | | | | | | | | | | | | | | | | | 37 |
| 36.5 | | | | | | | | | | | | | | | | | | | | | | 326 | 304 | 310 | 279 | | | | | | | | 36.5 |
| 36 | 1194 | 1167 | 1157 | 1104 | 1040 | 983 | 962 | 830 | 766 | 769 | 688 | 642 | 594 | 558 | 526 | 480 | 439 | 398 | | 408 | 348 | | | | | | | | | | | 243 | 36 |
| 35.5 | | | | | | | | | | | | | | | | | | | | | | | | | | 340 | 320 | 277 | 282 | 242 | | | 35.5 |
| 35 | | | | | | | | | | | | | | | | | | 490 | 453 | 431 | 415 | 394 | 378 | 347 | 356 | | | | | | | | 35 |
| 34.5 | 1338 | 1314 | 1280 | 1208 | 1195 | 1115 | 1035 | 938 | 876 | 849 | 780 | 751 | | 634 | 604 | 561 | 481 | | | | | | | | | | | | | | | | 34.5 |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 34 |
| 33.5 | 1507 | 1481 | 1454 | | | | | | | | | | | | | 629 | 616 | 546 | 507 | 503 | 449 | 427 | 391 | 396 | | | | | | | | | 33.5 |
| 33 | | | | 1407 | 1312 | 1222 | 1124 | 1067 | | | 876 | | 773 | | 696 | | | | | | | | | | | | | | | 291 | 277 | 33 |
| 32.5 | | | | | | | | | | | | | | | | | | | | | | 434 | 390 | 379 | 362 | 359 | 349 | 327 | 288 | | | 32.5 |
| 32 | 1647 | 1613 | 1514 | 1476 | 1375 | 1297 | 1246 | 1136 | 1065 | 977 | 902 | 861 | 798 | 747 | 694 | 625 | 584 | 562 | 512 | 511 | 469 | | | | | | | | | | | | 32 |
| 31.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 327 | 314 | 31.5 |
| 31 | 1882 | | | | | | | | | | | | | | | | | | | | 569 | 516 | | 457 | 435 | 416 | 395 | 390 | 352 | | | | 31 |
| 30.5 | | 1844 | 1776 | 1716 | 1626 | 1524 | 1426 | 1306 | 1187 | 1114 | 1055 | 967 | 917 | 879 | 829 | 732 | 699 | 669 | 625 | 604 | | | | | | | | | | | | | 30.5 |
| 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 449 | 413 | 373 | 380 | 30 |
| 29.5 | 2145 | 2090 | 2017 | 1900 | 1791 | 1669 | 1571 | 1458 | 1342 | 1270 | 1183 | 1080 | 995 | 967 | 912 | 835 | 789 | 740 | 725 | 685 | 646 | 589 | 567 | 535 | 496 | 491 | 471 | | | | | 29.5 |

Table 2. Zodiacal light brightness at 5080Å in $S_{10}(V)_{G2V}$ units as a function of differential ecliptic longitude, $\lambda-\lambda_{\odot}$, and at southern ecliptic latitudes, $\beta$.

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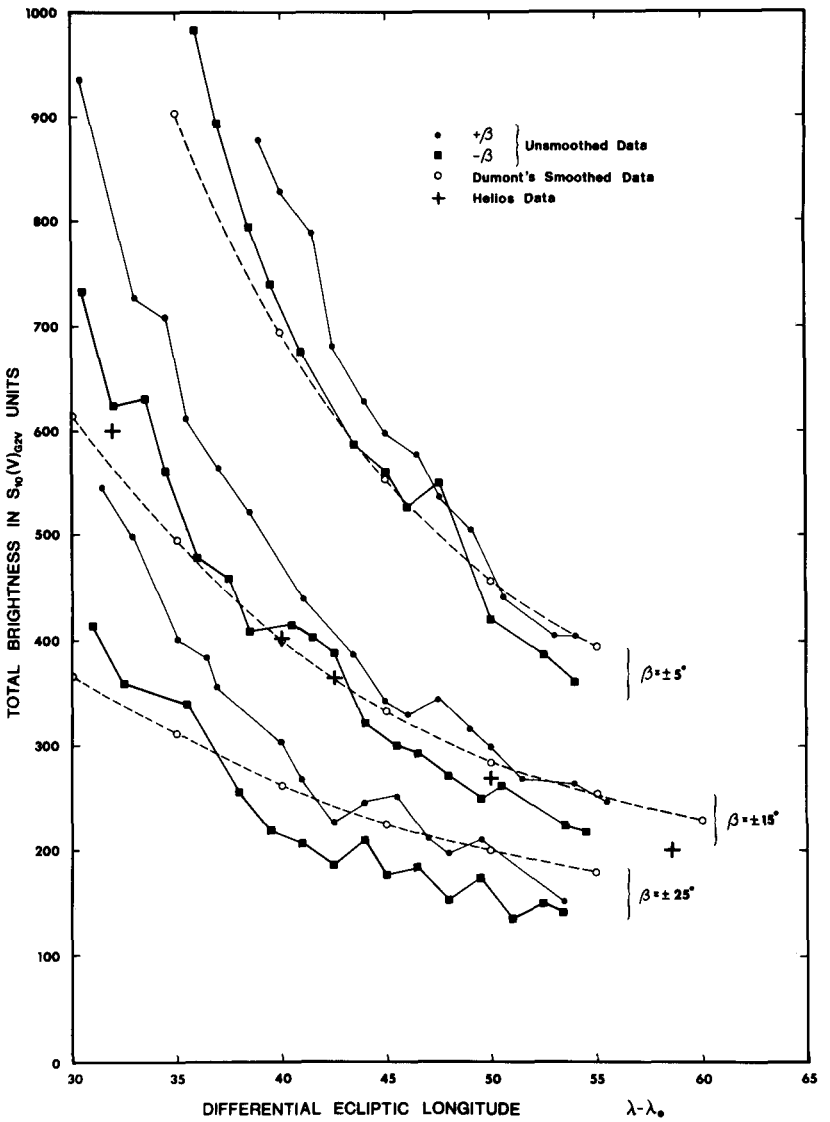


Figure 1. Zodiacal light brightness as a function of differential ecliptic longitude, $\lambda-\lambda_{\odot}$, for ecliptic latitudes, $\beta$, of $\pm 5°$, $\pm 15°$, and $\pm 25°$. Dumont (o) and Helios (+) data are shown for comparison.

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