Calibration of B,V,R,I Photometry for the Wide Field Channel of the HST Advanced Camera for Surveys

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Abstract.

We present new observations of two Galactic globular clusters, PAL4 and PAL14, using the Wide-Field Channel of the Advanced Camera for Surveys (ACS) on board the Hubble Space Telescope, and reanalyze archival data from a third, NGC2419. We matched our photometry of hundreds of stars in these fields from the ACS images to existing, ground-based photometry of faint sequences which were calibrated on the standard B,V,R,I system of Landolt. These stars are significantly fainter than those generally used for HST calibration purposes, and therefore are much better matched to supporting precision photometry of ACS science targets. We were able to derive substantially more accurate photometric transformation coefficients for several commonly used ACS filters compared to those published by Sirianni, et al. (2005), owing to the use of a factor of several more calibration stars which span a greater range of color. We find that the inferred transformations from each cluster individually do not vary significantly from the average, except for a small offset of the photometric zeropoint in the F850LP filter. Our results show that the published prescriptions for the time-dependent correction of CCD charge-transfer efficiency appear to work very well over the 3.5 yr interval that spans our observations of PAL4 and PAL14 and the archived images of NGC2419.