BSSs are more centrally concentrated than sub-giants of the same magnitude, reinforcing the interpretation that they are more massive than main sequence turn-off stars. Other interesting features of the CMD include the complete lack of blue subdwarfs below the blue end of the horizontal branch, which would certainly have been detected. This indicates that, unlike blue stragglers, blue subdwarfs are not ubiquitous features of globular cluster cores.

One of the BSSs is a likely variable star with an apparent period 75 minutes and amplitude 0.2 magnitude. This variable star candidate's light curve is consistent with the time variability displayed by SX Phoenicis type pulsators.

Several other blue stragglers and other stars show signs of variability. Further reductions of the complete data set are in progress.

75.03

NH, CH, and CN Band Strengths in M5 and M13 Bright Red Giants

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The Kast spectograph on the Lick 3m has been used to obtain moderate resolution spectra of eight M5 and four M13 bright red giants which cover the region from the UV NH band to the G-band (CH). Indices sensitive to absorption by these molecules and the blue CN band have been measured for the spectra and combined with the O and Na abundance results of Kraft et al. (1992, AJ, 104, 645) and Sneden et al. (1992, AJ, in press) to explore the relationships between C, N, O, and Na.

Among the four M13 stars, NH appears strongly anticorrelated with both [O/Fe] and CH, as well as correlated with [Na/Fe]. Similarly, CH band strengths are seen to correlate with [O/Fe] and anticorrelate with [Na/Fe]. Furthermore, the NH (CH) bands are strongest (weakest) in the two stars with the weakest (strongest) CN, implying that C is regulating the CN band strength and that N is therefore more abundant than C, in at least the CN-strong stars.

The situation is somewhat more complicated in M5, where, although CN and CH appear to be roughly anticorrelated, no compelling correlation exists between NH and [O/Fe] or [Na/Fe]. However, strong correlations do exist between CH band strengths and [O/Fe] and [Na/Fe] abundance ratios. It is found that while the two clusters may initially appear to have dissimilar abundance signatures on the basis of the NH band strengths, the NH bands in the cool, more metal rich ([Fe/H] = -1.5, Sneden et al. 1992) M5 red giants may have saturated. In order to test this, as well as to determine the absolute abundances of C and N, these spectra will be subjected to a model atmosphere/synthetic spectrum analysis similar to that described by Briley et al. (1992, ApJ, 387, 612).

75.04

HST Spectroscopic Observations of Two Red Giants in NGC 6752

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Ultraviolet observations of two red giants A31 and A59 in the globular cluster NGC 6752 were made with the GHRS on HST in April 1992. The medium resolution G270M grating was centered on the Mg II doublet (32795, 32802) with total integration times of ~4 hours for each star. The Mg II profiles show emission in both members of the multiplet with substantial absorption on the short-wavelength wings extending to ~100 km s^{-1}. These profiles indicate an expanding atmosphere and the presence of a stellar wind. Near simultaneous spectroscopy of the Hg and Ca II K-line were obtained at the 74-inch telescope and coude spectrograph at Mt. Stromlo. The Hg profiles in both stars indicate outward expansion as inferred from emission asymmetries and shifts of the absorption core. The Mg II observations are the first detection of winds from globular cluster giants. Theory demands mass loss from red giant stars in globular clusters, yet it has not been detected spectroscopically until now. Moreover, the fast outward velocity of this material exceeds the central escape velocity from NGC 6752, providing a natural explanation for the observed lack of interstellar material within globular clusters.

75.05

Photometric Analysis of NGC 1502, IC 1805, and IC 1848

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New uvby and H-beta photoelectric photometry have been obtained for B-type stars in these clusters. The data are combined with previously published photometry to analyze the color-magnitude diagrams, instellar reddening, and other characteristics of these three young open clusters. Systematic differences exist between some of the published photometry. The cluster photometry can be useful in helping to establish accurate calibrations of photometric indices and in comparisons with stellar evolution.

75.06

Blue Straggler Stars in the Core of M3 (NGC 5272)

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A complete inventory of stars brighter than the main-sequence turnoff inside of 6 core radii in M3 reveals a blue straggler star (BSS) population in the central regions of this intermediate-density cluster in whose outskirts BSS stars were first identified as a class by Sandage. The data are derived from V and R CCD frames with FWHM ~0.6 obtained with HRCam at the CFHT. In the 2' x 2' region surveyed, the BSS are marginally more concentrated than giants in the same V magnitude range. The BSS in the central 6 core radii appear to have a specific frequency much lower than that measured in the outskirts of M3 or in the low density cluster, NGC 5053.

75.07

A Far-Ultraviolet Color-Magnitude Diagram of ω Cen

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Far-ultraviolet exposures (centroid 1620 Å; bandwidth 225 Å; field of view 40 arcmin diameter) were obtained of the global cluster ω Cen with the Ultraviolet Imaging Telescope during the Astro-1 mission. These are combined with CCD observations in the Strömgren u band obtained at CTIO to construct an FUV, u color-magnitude diagram. In the FUV, photometry is complete to apparent FUV magnitude of 17.5, with over 1800 stars detected. This provides a complete sample of hot horizontal branch stars even in the dense core of the cluster. The CMD permits analysis of the HB structure, especially the extreme HB, with very low envelope mass and Teff > 20000 K. We also study the FUV and u luminosity functions of the cluster, with particular emphasis on hot stars above the HB.

75.08

Preliminary Calibration of the HB Absolute Magnitude-[Fe/H] Relation from Astrometric Distances to Globular Clusters

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By comparing proper motion and radial velocity dispersions in a globular cluster, one can derive an astrometric distance to the cluster that is independent of any standard candle assumptions. This technique is potentially very powerful for calibrating the absolute magnitude of the horizontal branch. A preliminary M_V([Fe/H]) relation is derived here using the currently available astrometric distances to several clusters. The derivation favors a large slope, but smaller slopes cannot be ruled out. Future work will use more accurate astrometric distances (via dynamical models) and additional clusters. This work has been partially supported by the NSF.