

Star Formation History of ω Centauri from Wide-field CCD Photometry

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We present wide-field and high-precision BV and Ca & Stromgren by photometry of ω Centauri, which represents one of the most extensive photometric surveys to date for this cluster. The member stars of ω Cen are well discriminated from foreground Galactic field stars from the different distributions in the hk $[(Ca-b)-(b-y)]$ vs. $b-y$ diagram. The color-magnitude diagrams show the presence of several distinct red-giant branches (RGBs) with a red, metal-rich, sequence clearly separated from other bluer metal-poor ones. Comparison with our population models suggests the most metal-rich population is few billion years (~ 4 Gyr) younger than the most metal-poor population. From the comparison of the luminosity functions between metal-poor and metal-rich RGBs, we confirm this age - metallicity relation predicted from our synthetic horizontal-branch models. From the presence of several distinct populations and the internal age-metallicity relation, we suggest ω Centauri has enriched itself over several billion years and was once part of a more massive system that merged with the Milky Way, as the Sagittarius dwarf galaxy is in the process of doing now.