

The Luminosity Function of Blue Straggler Stars in the Globular Cluster M53 : Two Different Origins on the Blue Straggler Stars?

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From our recent observations covering the whole cluster of M53, we have discovered 117 blue straggler stars (BSSs) with a strong hint of a bimodal radial distribution. The bimodal BSS distribution in M53 is similar to that of M3, a globular cluster with a similar central density and concentration. We found that the innermost BSSs have a luminosity function (LF) significantly different from that of the outer BSSs. The shape of innermost BSSs LF resembles the prediction of the collisional formation model, whereas outer BSSs LF is consistent with the binary merger model. This situation is also similar to that of M3. This LF as well as bimodal distribution of M53 could be another suggestive, besides M3, of two different BSS creation mechanisms at work in regions of different stellar density within the same cluster. This is consistent with the hypothesis that the BSS formation mechanism might be affected by environmental conditions.