

Abstract:

Precise studies on the Galactic bulge, thick disk, and multiple populations of globular cluster require stellar model with alpha enhancement and various helium contents. It is also important for extra- Galactic study to have alpha enhanced population synthesis. For this purpose we expand PARSEC model from solar-scaled composition to alpha enhanced mixtures. The new model is calibrated with globular cluster 47Tuc (NGC104). We then apply the calibration and alpha enhanced mixture based on the two 47Tuc populations ($[\alpha/\text{Fe}] \sim 0.4$ and 0.2) to other metallicities. The new model closes the gap between the observation and model prediction on the RGB bump. Besides the alpha enhanced metal mixture in 47Tuc, we also calculate evolutionary tracks based on metal mixtures from ATLAS9 APOGEE atmosphere model.