

A high spectral resolution study of abundances and isotopic composition of BHB stars in NGC 6397 and NGC 6752

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Observations and abundance analysis:

High-resolution spectra of three selected Blue Horizontal Branch B-type (BHB) stars in NGC 6397 (T183, T191, and T193) and three BHB stars in NGC 6752 (B665, B2151, and B2206) were obtained in August 2008 with UVES at VLT-UT2 with a resolution between 95,000 and 115,000. The selected BHB stars are post- u jump stars and thus display surface abundances that are significantly altered by diffusion effects in their atmospheres (Fig. 1). A detailed spectrum analysis was done relying on Kurucz ATLAS9 and ATLAS12 models, and the SYNTHE code was used to generate synthetic spectra. For the first time an analysis was performed for all elements for which spectral lines were detected in UVES spectra. In all stars we found an overabundance of P, Ti, Mn, Fe, and Y over the solar values and of Mg, Ca, and Cr over the cluster metallicity. He and Si appear always under

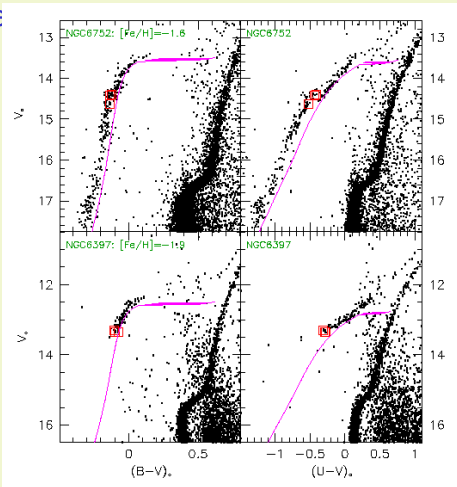
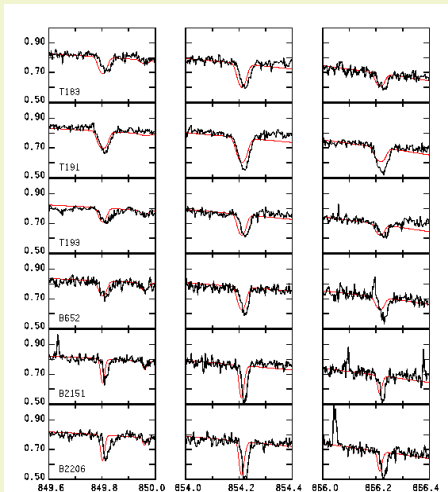
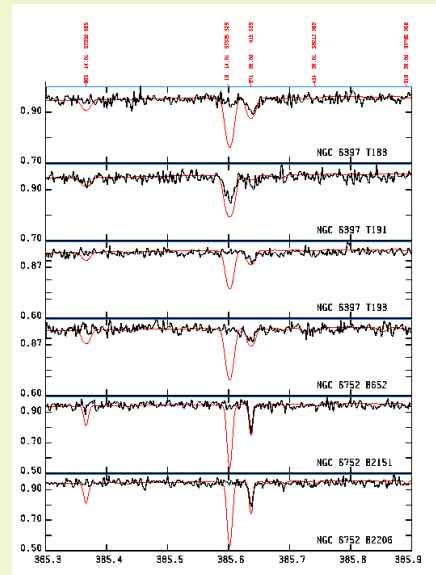


Fig. 1: The left panels display the classical V, (B-V) colour-magnitude diagrams of NGC 6397 (lower left) and NGC 6752 (upper left). For both clusters, the studied BHB samples are plotted as open squares. Appropriate metallicity ZAHB models from Pietrinferni et al. (2006, ApJ 642, 797) are also plotted. The right panels display the respective ultraviolet V, (U-V) diagrams. In the case of NGC 6752, the location of the Grundahl et al. (1999, ApJ 524, 242) u -jump is easily distinguished at $(U-V) \sim -0.4$.

Fig 2: Si was always found less abundant than the cluster metallicity. In this figure we show Si II 3856.18 Å computed with the abundance of the clusters (red line), i.e. -6.40 for NGC 6397 and -6.10 for NGC 6752.



Presence of isotopes and emission lines:

The isotopic anomaly of Ca is detected in all studied stars (Fig.3). Weak emission lines of Ti II, similar to those frequently observed in HgMn stars, have been discovered in the BHB star T191 (Fig.4)

Fig. 3: Ca II triplet shift. The computed profiles assuming the terrestrial isotopic mixture are presented by red lines.

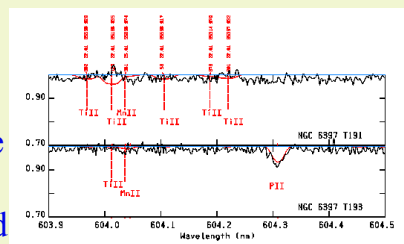


Fig. 4: Emission line of Ti II 6040.120 Å in T191.