THE SUPER-METAL-RICH RR LYRAE STARS IN THE GALACTIC BULGE AND THE ORIGIN OF THE UV UPTURN PHENOMENON

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There are two scenarios for the UV upturn phenomenon (i.e., metal-poor vs. metal-rich horizontal-branch (HB) models). As already pointed out by Lee (1994), the metal-rich HB model predicts many super-metal-rich (SMR; [Fe/H] > 0) RR Lyrae stars in the Galactic bulge because SMR HB stars must cross the instability strip as they move from red to blue HB with increasing metallicity. Extensive observations by Walker & Terndrup (1991), however, found not a single SMR RR Lyrae. We have constructed here more detailed population models to test this possibility. Our models suggest that Galactic helium enrichment parameter is small ($\Delta Y/\Delta Z < 3$), and only metal-poor HB model is consistent with current observations.