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Globular clusters offer ideal laboratories to test the predictions of stellar evolution. When doing so with spectroscopic analyses during the 1990s, however, the parameters we derived for hot horizontal branch stars deviated systematically from theoretical predictions. The parameters of cooler, A-type horizontal branch stars, on the other hand, were consistent with evolutionary theories. In 1999, two groups independently suggested that diffusion effects might cause these deviations, which we verified subsequently. I will discuss these observations and analyses and their consequences for interpreting observations of old stellar populations.
