The spectroscopic Hertzsprung-Russell diagram of hot massive stars in the SMC

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We present a comprehensive stellar atmosphere analysis of 329 O- and B-type stars in the Small Magellanic Cloud (SMC) from the RIOTS4 survey. Using spectroscopically derived effective temperature (Teff) and surface gravities, we find that classical Be stars appear misplaced to low Teff and high luminosity in the spectroscopic Hertzsprung-Russell diagram (sHRD). Together with the most luminous stars in our sample, the stellar masses derived from the sHRD for these objects are systematically larger than those obtained from the conventional HRD. This suggests that the well-known, spectroscopic mass-discrepancy problem may be linked to the fact that both groups of stars have outer envelopes that are nearly gravitationally unbound. The non-emission-line stars in our sample mainly appear on the main-sequence, allowing a first estimate of the terminal-age main-sequence (TAMS) in the SMC, which matches the predicted TAMS between 12 and 40MâŠ™ at SMC metallicity. We further find a large underabundance of stars above â¼25MâŠ™ near the ZAMS, reminiscent of such ea findings in the Milky Way and LMC.

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