A Spectroscopic Search for the non-nuclear Wolf-Rayet Population of the metal-rich spiral galaxy M83

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We present a catalogue of non-nuclear regions containing Wolf-Rayet stars in the metal-rich spiral galaxy M83 (NGC5236). From a total of 283 candidate regions identified using HeII 4686 imaging with VLT-FORS2, Multi Object Spectroscopy of 198 regions was carried out, confirming 132 WR sources. From this sub-sample, an exceptional content of 1035 +/- 300 WR stars is inferred, with N(WC)/N(WN) approx 1.2, continuing the trend to larger values at higher metallicity amongst Local Group galaxies, and greatly exceeding current evolutionary predictions at high metallicity. Late-type stars dominate the WC population of M83, with N(WC8-9)/N(WC4-7)=9 and WO subtypes absent, consistent with metallicity dependent WC winds. Equal numbers of late to early WN stars are observed, again in contrast to current evolutionary predictions. Several sources contain large numbers of WR stars. In particular, #74 (alias region 35 from De Vaucouleurs et al. contains 230 WR stars, and is identified as a Super Star Cluster from inspection of archival HST/ACS images. Omitting this starburst cluster would result in revised statistics of N(WC)/N(WN) approx 1 and N(WC8-9)/N(WC4-7) approx 6 for the `quiescent' disk population. Including recent results for the nucleus and accounting for incompleteness in our spectroscopic sample, we suspect the total WR population of M83 may exceed 3000 stars.

Reference: A&A in press
Status: Manuscript has been accepted

Weblink: http://arxiv.org/abs/astro-ph/0506343

Comments:

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