DISCOVERY OF WOLF-RAYET STARS IN THE SBmIII GALAXY NGC 4214

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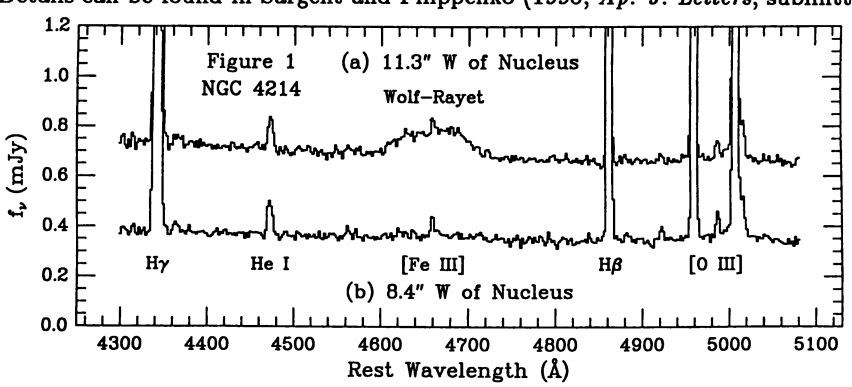
NGC 4214 is a nearby ($d \approx 5.4$ Mpc), gas rich, Magellanic irregular galaxy (SBmIII). Sandage and Bedke (1985, *Astron. J.*, **90**, 1992) show an excellent photograph of the galaxy in their Figure 1, Panel 21. As part of an extensive spectroscopic survey of nearby galaxies, we obtained long-slit (position angle 107°) spectra of NGC 4214 around the Hα and Hβ regions, with the Double Spectrograph on the 5-m Hale reflector at Palomar Observatory.

Prominent emission lines attributable to Wolf-Rayet stars are visible in the spectra. The Wolf-Rayet features exist in the nucleus, as well as in several off-nuclear H II regions. The shape and extent of the broad blend at 4660 Å indicates the presence of WC and WN stars. The detection of WC stars is very rare in galaxies outside the Local Group. Our discovery of WC stars is confirmed in spectra obtained with the 3-m Shane reflector at Lick Observatory; the C IV λ5808 line is clearly visible. This is consistent with the relatively high abundance of heavy elements in NGC 4214, compared with extragalactic H II regions. Broad Hα emission, due to Wolf-Rayet stars, is also visible in the nucleus of NGC 4214.

Very steep spatial gradients in the intensities of the Wolf-Rayet lines are observed in NGC 4214. Indeed, it appears that the lines are prominent in some regions, yet almost nonexistent in adjacent areas only 3″ away. Most surprising is the fact that, in general, the strongest Wolf-Rayet lines appear in H II regions having the brightest stellar continuum (e.g., Fig. 1). Weak, if any, Wolf-Rayet features are present in H II regions having strong, narrow emission lines but only a faint continuum. If the intensity of the broad features were entirely a function of the age of a starburst, with Wolf-Rayet stars beginning to appear after a few million years, we would not expect these results; the optical continuum of a starburst does not change appreciably over such short time scales. Similarly, metallicity gradients in NGC 4214 are too small to explain the observations. Instead, this correlation may be indicative of variations in the initial mass function at different locations of NGC 4214.

Details can be found in Sargent and Filippenko (1990, *Ap. J. Letters*, submitted).



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Wolf-Rayet Stars and Interrelations with Other Massive Stars in Galaxies, 655.