

# OBSERVATIONS OF HII REGIONS IN Sc GALAXIES

LEONARD SEARLE

*Hale Observatories, Pasadena, Calif., U.S.A.*

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**Abstract.** A spectral survey of HII regions in the galaxies M33, M51, M101, NGC 2403 and NGC 1232 has been carried out. Absolute fluxes have been measured photo-electrically. The energy distribution of the embedded O-association and the intensities of the emission lines have been obtained. The emission spectra can be classified in a one-parameter sequence which is the same for all the galaxies studied. The spectral type is independent of size, shape, surface brightness and density of the HII region, but does depend on the location of the region in its galaxy.

In the galaxies surveyed there is a close correlation between the distance of an HII region from the center of the galaxy and the appearance of its spectrum. The line ratios  $[OIII]/H\beta$ ,  $H\alpha/[NII]$ , and  $[OII]/[NII]$  all increase by large factors as one passes from regions in the inner spiral arms to those in the outermost arms. The average value of these ratios in a galaxy increases on going from early Sc galaxies to late Sc galaxies. The results show that the N/O abundance ratio (and probably also the O/H abundance ratio) is lowest in irregular galaxies and in the outer parts of late Sc galaxies. It increases towards the center of the spirals and it is highest in the inner spiral arms of the early Sc galaxies. In contrast, the He/H abundance ratio is constant across galactic disks and along the morphological sequence.

## Discussion

*Terzian:* The electron densities of the HII regions which you mentioned are considerably smaller than those which we find in the HII regions of our own Galaxy. Do you have an explanation for this?

*Searle:* The HII regions which I have observed are less dense but much larger and more massive than the HII regions in the solar vicinity. They are more comparable with the Struve-Elvey emission regions than they are with Orion, for example.