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Emission Line Galaxies in a Narrow Strip Toward Perseus.

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Many studies have suggested that emission line galaxies have different spatial distributions than non-emission line galaxies. ELGs tend to avoid rich clusters (Dressler, Thompson and Shectman 1985) and may sometimes reside within voids (Balzano and Weedman 1982). This paper describes work in progress on a redshift survey aimed both at determining the angular extent of the structures detected in deep pencil beam survey and at studying the characteristics of galaxies in and around those structures. The current focus is the distribution of emission line galaxies with respect to the rest of the sample.

The data consists of spectra for 190 galaxies in three 40' fields adjacent to the site of the deep pencil beam survey in Selected Area 68 (Koo, Kron, Szalay 1987). The spectra were obtained using the NESSIE Multifiber Feed and the RC Spectrograph at KPNO, have resolution of 8\AA FWHM, (twice that of the original deep survey) and have wavelength range of 4400\AA – 7230\AA . In addition to redshifts, equivalent widths were measured for [OIII], and $H\alpha + [NII]$.

Of the 190 galaxies, 29 exhibited strong [OIII] emission ($W_{5007} > 10\text{\AA}$). All of those galaxies with a low enough redshift for it to be detectable also showed $H\alpha$ emission. In addition, 17 galaxies with strong $H\alpha + [NII]$ ($W_{\lambda} > 25\text{\AA}$) showed only weak or no [OIII] emission. Hence, the emission in these galaxies would not have been detected if they resided at a redshift $z \geq 0.0950$ ($V_R \geq 27000$ km/s.)

Below are wedge plots in RA and Dec of the galaxies in these three fields. Notice the concentrations at $V_R \approx 19000$, 23000 and 33000 km/s, which extend across all 3 fields. From the Dec wedge plot it is apparent that groups or clusters make a significant contribution to the peaks in the velocity distribution, but do not account for all of the overdensity.

The emission line galaxies do not appear to avoid the galaxy concentrations. A KS test gives a probability of 30% that galaxies with strong $H\alpha$ or [OIII] are drawn from the same velocity distribution as those galaxies without strong emission but with a low enough velocity that $H\alpha$ could have been detected. A KS test of the galaxies with and without strong [OIII] over the entire sample gives a probability of only 2% that the galaxies have the same distribution. However, this result could be due to a failure to detect [OIII] galaxies, which may have lower luminosity, at greater distances.

At present we have only rough magnitudes for the galaxies. The survey reaches to $B_J \approx 20$ in two of the fields and to $B_J \approx 20.5$ in the third. The 24 galaxies fainter than $B_J = 20$ appear to lie in the same structures as the brighter galaxies, rather than in the voids.

Future work will include analysis of the distributions of galaxy luminosity, color and surface brightness.

References:

- Balzano, V. A., and Weedman D. W. (1982). *Ap. J. Lett.* **255**, L1.
Dressler, A., Thompson, I. A., and Shectman, S. A. (1985). *Ap. J.* **288**, 481.
Koo, D. C., Kron, R. G., and Szalay, A. S. (1987) in *13th Texas Symposium in Relativistic Astrophysics*, ed. M. P. Ulmer (World Scientific, Singapore p. 284)

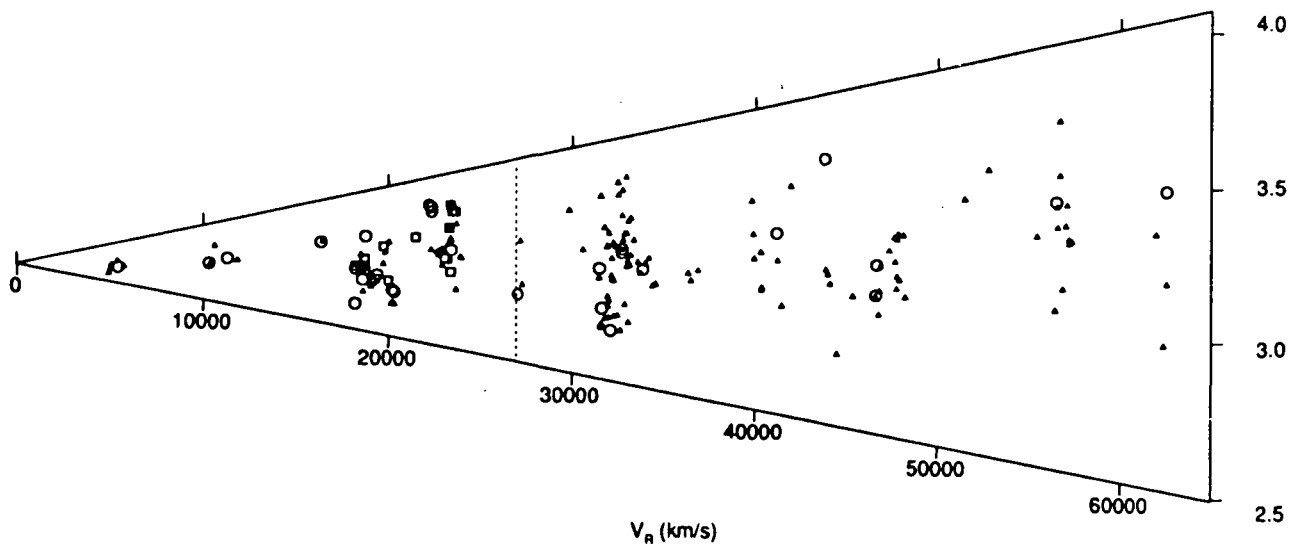


Figure 1: Wedge plot in RA. Circles indicate galaxies with strong [OIII], squares indicate galaxies with strong $H\alpha + [NII]$, but weak or no [OIII], and triangles indicate galaxies with no strong emission. The dotted line shows the velocity to which $H\alpha$ could be detected. The vertical scale has been stretched by a factor of 15 for clarity.

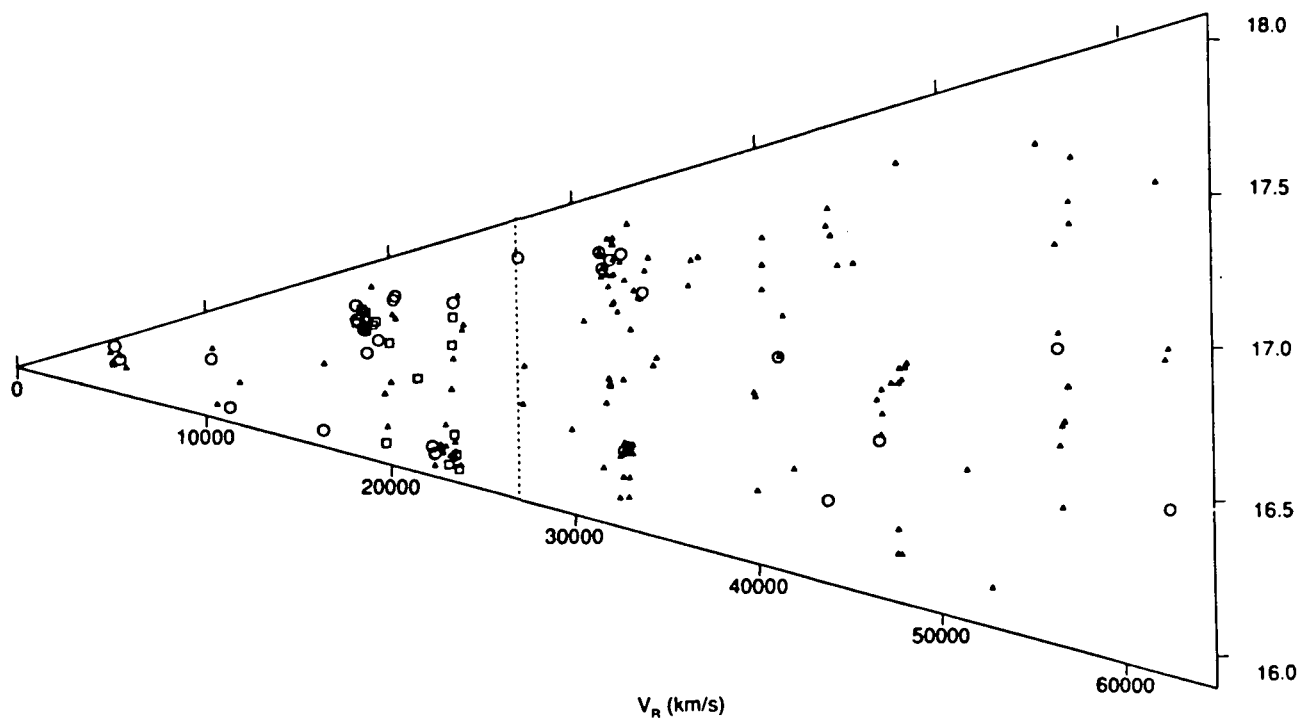


Figure 2: The same as Figure 1., but for a wedge plot in Dec.