MORPHOLOGY OF THE LOCAL SUPERCLUSTER*

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The intent of this brief note is to summarize some of the fundamental properties of the region, rich in galaxies, in which we live. A more complete account can be found in The Astrophysical Journal, 257, p. 389, 1982.

1. The Local Supercluster contains three components: the Virgo Cluster core (containing 20% of the luminous galaxies), a flat disk (containing 40% of the luminous galaxies), and a "halo" consisting of a small number of discrete clouds (containing 40% of the luminous galaxies).

2. The disk component is irregular in shape and can be separated into two principal clouds of galaxies. Overall, this component has the axial ratios 6:3:1. The global rms scale height along the short axis is $\pm 1.1\ h_{100}^{-1}$ Mpc.

3. The thinness of the disk suggests that either the supercluster is just collapsing today or random motions perpendicular to the disk are less than 100 km s^{-1}.

4. Line-of-sight random motions for galaxies within 4 h_{100}^{-1} Mpc of our position (all in the supercluster disk) are less than 100 km s^{-1}, and probably closer to 50 km s^{-1}.

5. Our Local Group is on the edge of a hole devoid of galaxies which has dimensions comparable with the dimensions of the Local Supercluster.

*This same paper was presented at the Patras General Assembly and appeared in the Highlights of Astronomy, Vol. 6, p. 747.

G. O. Abell and G. Chincarini (eds.), Early Evolution of the Universe and Its Present Structure, 239–240.

6. **Almost all galaxies in the halo component lie in a small number of clouds: 56% lie in 2 clouds, 86% lie in 5 clouds, 94% lie in 7 clouds. Triaxial spheroids with axes defined by the rms separations of galaxies in these clouds contain only 4% of the available volume off the plane of the supercluster.**

7. **The major halo clouds are prolate, elongated 2:1, and point toward the Virgo Cluster. These shapes must be attributed to tidal distention due to the mass of the central cluster. The existence of a bound group in one of these clouds is used to set an upper limit to the epoch of cloud formation at a redshift of z = 8.**

8. **There is a minor feature off the plane of the supercluster but parallel to it. The plane in our vicinity and this secondary feature appear to be streaming toward each other.**

Discussion

Huchra: A very quick point: I don't like differing from Sandage any more than I have to, so remember that:

$$\frac{\delta\rho}{\rho} = \frac{\rho_{\text{interior}}}{\rho_{\text{mean}}} - 1 \ .$$

For the value of $\delta\rho/\rho$, we find ~ 2 from the CfA survey, and Sandage, Tammann and Yahil find ~ 3, not 4.

On the Virgo cluster itself, most people analyze the dynamics assuming that all the galaxies in the 6° circle belong to a single, virialized unit. Dave Latham and I have been "drilling" this Virgo core region and now we have collected ~ 300 redshifts. When we plot the distribution of galaxies in three slices in "velocity space," we find a central core which persists from minus velocities to 2000+ km/s around M87, but there also are four additional, separated clumps, including a major condensation around N4472, with much lower internal velocity dispersions. The velocity histogram for the whole sample does not resemble a gaussian. The implication is that the "core" of Virgo is not virialized, and consists of a central, much smaller, core and separate groups. The M/L must be overestimated.

Abell: Stephen Eastmond found just this same result in his thesis three years ago. In the inner 6° are several concentrations of galaxies with different mean redshifts, ranging up to more than 2000 km/s. Moreover, when Eastmond estimated relative distances to the clumps, using their luminosity functions, he found the clumps to define a linear Hubble law.

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